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The *Annals of Spiru Haret University. Economic Series* was established in the year 2000 through the initiative of two distinguished professors from Spiru Haret University: **Professor Ph.D. Gheorghe Zaman**, a corresponding member of the Romanian Academy, and **Professor Ph.D. Constantin Mecu**, one of the university's founders and a vice-rector.

Between 2004 and 2010, the journal was led by **Professor Ph.D. Constantin Mecu**, serving as editor-in-chief, with **Associate Professor Ph.D. Aurelian A. Bondrea**, also a vice-rector, serving as deputy editor.

In 2011, **Associate Professor Ph.D. Aurelian A. Bondrea**, then rector of the university, assumed the role of editor-in-chief and has continued to oversee the journal's development to date.

Initially published annually from its inception in 2000 until 2009, the journal transitioned to a new format in 2010. It adopted a quarterly publication schedule, exclusively in English, with editorial and peer-review processes meeting rigorous international standards.

In 2007, the *Annals of Spiru Haret University. Economic Series* received a B+ rating from the National Council of Research in Higher Education in Romania, recognizing it as a publication of significant scientific value. Since 2009, the journal has been indexed in prominent databases such as REPEC, SSRN, and Google Scholar.

Beginning in 2016, the journal embarked on a rebranding process aimed at enhancing its international visibility and expanding its indexing strategy in global databases.

Over the years, the journal has served as a platform for disseminating the research output of the academic staff of Spiru Haret University, which includes professors, associate professors, lecturers, and teaching assistants affiliated with six economics faculties, specialized departments, and the Central Scientific Research Institute. The journal also features contributions from academics, researchers, and doctoral students from universities and research institutions worldwide.

The journal's subject matter reflects its commitment to modernizing the teaching of economic sciences in higher education. Topics include, but are not limited to, marketing, management, finance, banking, accounting, auditing, international economic relations, trade, business, tourism, administrative data processing, political economy, commercial law, cybernetics, environmental economics, statistics, ethics in economics, insurance, advocacy and lobbying, economic philosophy, and econometrics.

The articles published in the journal address both theoretical and practical issues, focusing on the development and consolidation of the Romanian market economy, advancements in scientific and technical progress, and strategies for promoting these developments within the Romanian economy. Furthermore, the journal explores themes related to the evolving global economy, including globalization, economic integration, and Romania's participation in these processes. It also includes analyses of economic phenomena and trends from diverse regions worldwide.

The editorial team and scientific advisors comprise esteemed Romanian scholars, including members of the Academy, university professors, and experts from various economic and social fields. The journal's scientific committee includes reviewers affiliated with notable Romanian institutions such as the Academy of Economic Studies from Bucharest, West University of Timișoara, the National Scientific Research Institute for Labour and Social Protection, the Romanian Court of Auditors, the Body of Expert and Licensed Accountants of Romania (CECCAR), and the Institute of National Economy.

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To meet the needs of its audience, the journal is distributed to libraries across Bucharest and Romania and is shared with universities and economic faculties internationally.

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Issue 3/2026

FOREWORD
Global Economic Resilience under Pressure: Growth, Technology and Institutional Responsibility in Light of Earlier Expectations

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It is our pleasure to introduce *Issue 3/2026 of the Annals of Spiru Haret University. Economic Series* at the close of a quarter that tested earlier expectations for the world economy. The assessments published in July, August and September 2026 reveal a mixed picture: some growth expectations improved modestly, others weakened, and energy and inflation pressures continued to challenge economic decisions. Comparing these publications with the earlier expectations they review allows us to consider whether the international economic environment became more or less favourable during the quarter. The annual figures discussed below remain forecasts for 2026; their revisions provide evidence of changing assessments rather than final annual results.

The International Monetary Fund's July update presented a slightly less favourable assessment of global growth than its April forecast. Expected growth for 2026 was reduced from 3.1% to 3.0%, while the forecast for global headline inflation increased from 4.4% to 4.7%. In this assessment, the growth outlook weakened modestly and the inflation outlook deteriorated. The revisions nevertheless varied substantially across economies: the United States growth forecast remained at 2.3%, China's increased from 4.4% to 4.6%, and the euro area forecast fell from 1.1% to 0.9%. Technology-related demand provided support, while energy exposure contributed to weaker conditions elsewhere (International Monetary Fund [IMF], 2026). The July update therefore indicated neither a uniform deterioration nor an unchanged outlook, but a redistribution of economic pressures and opportunities.

By September, the OECD reported a modest upward revision to its 2026 global growth projection, estimating growth at 2.9%. This represented a slightly more favourable assessment of current-year activity than its previous outlook, supported in part by strong AI-related investment. Yet stronger price pressures, weaker real income growth and higher interest rates continued to constrain momentum, and G20 headline inflation was projected at 4.1% (OECD, 2026a). The improvement in the growth estimate therefore did not amount to a general improvement in economic conditions. Compared with the IMF's July downgrade against April, the OECD's

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September upward revision illustrates how successive assessments captured different stages of an uneven adjustment process.

The European Central Bank's September assessment provided a particularly useful comparison with earlier expectations. Euro area growth for 2026 was revised upward from 0.8% in June to 0.9% in September, while the annual headline inflation forecast remained at 3.0%. Activity was therefore assessed somewhat more favourably, but the inflation projection showed no improvement. The ECB attributed the stronger near-term outlook to investment indicators, private consumption and a more positive international environment. At the same time, its September report noted that the August flash inflation release showed headline inflation at 3.3% (European Central Bank [ECB], 2026). The European picture combined a modest improvement in growth expectations with continuing observed price pressures, rather than a decisive return to easier economic conditions.

Energy developments offered a further example of outcomes and expectations moving in different directions. In August, the International Energy Agency forecast a decline in world oil demand of 1.6 million barrels per day in 2026, a contraction 510,000 barrels per day greater than estimated in its July report. It linked this downward revision to the continuing closure of the Strait of Hormuz and elevated fuel prices (International Energy Agency [IEA], 2026). The ECB's September technical assumptions also revealed a mixed energy outlook for the third quarter: assumed oil prices were nearly 15% below the June assumption, but gas prices were revised upward by 20% and electricity prices by 50% (ECB, 2026). These comparisons show why lower oil-price assumptions could coexist with more difficult energy conditions for European consumers and producers.

Food prices added observed evidence of renewed pressure during the quarter. In its September release covering August, the Food and Agriculture Organization of the United Nations reported an average Food Price Index of 133.3 points, up 1.9% from the revised July level and 2.5% from a year earlier. High temperatures and other weather-related risks contributed to concerns about supply prospects (Food and Agriculture Organization of the United Nations [FAO], 2026). Unlike an annual forecast revision, this was a recorded monthly increase in international food commodity prices. It indicates a deterioration in that price indicator between July and August, although it does not by itself establish whether a specific earlier food-price forecast was missed.

Financial markets reflected the same combination of resilience and underlying vulnerability. The September BIS Quarterly Review reported rising yields alongside broadly resilient investor risk appetite. Geopolitical tensions, uncertainty surrounding

inflation and monetary policy, and concerns about fiscal sustainability contributed to volatility. At the same time, technology-sector valuations and possible overinvestment attracted increasing attention (Bank for International Settlements [BIS], 2026). The financial conditions described during the quarter therefore called for careful consideration of borrowing costs, public debt sustainability and the quality of investment decisions.

Artificial intelligence remained one of the most visible forces shaping economic activity during these months. The IMF and OECD assessments identified technology-related investment as a source of support for growth, while the BIS drew attention to the financial risks associated with valuations and possible overinvestment (BIS, 2026; IMF, 2026; OECD, 2026a). This combination gives technological transformation a dual significance: it contributes to economic momentum while raising questions about the durability and distribution of its benefits. For economic research, the quarter strengthened the relevance of examining productivity, organisational adaptation, investment quality and responsible technological governance.

International trade was another major focus of the September publications. The World Trade Organization's World Trade Report 2026 examined a multilateral trading system under pressure from geopolitical tensions, technological developments, changing economic power, government intervention and environmental challenges. It also recognised the uneven distribution of the benefits of international economic integration (World Trade Organization [WTO], 2026). These observations placed the predictability of trade rules and the conditions of participation in international markets at the centre of the economic debate. They highlighted the continuing importance of cooperation and institutional credibility in an increasingly complex trading environment.

The changing composition of trade added a further dimension to this discussion. UN Trade and Development's September Global Trade Update focused on the role of services in reshaping international trade and the limited participation of least developed countries in digital exports (UN Trade and Development [UNCTAD], 2026). This development draws attention to the uneven capabilities through which economies access expanding digital and service markets. From the journal's editorial perspective, it connects global economic transformation with the study of skills, entrepreneurship, business organisation and the institutional conditions of development.

The social and territorial dimensions of economic performance also remained prominent. Published in July, the OECD Employment Outlook 2026 examined

geographic disparities in employment, unemployment and disposable incomes (OECD, 2026b). Its findings placed regional differences alongside national economic performance, emphasising the need to consider where employment opportunities and income gains are located. For an international economic journal, this perspective is particularly valuable: it encourages analysis of how technological and economic change interacts with local capabilities, education, infrastructure and access to productive employment.

The comparison between earlier expectations and the assessments published during July–September 2026 yields a mixed editorial judgement. The IMF's July revisions indicated weaker global growth and higher inflation than forecast in April. The OECD's September assessment suggested a modest improvement in current-year growth expectations, and the ECB similarly raised its euro area growth projection while retaining its annual inflation forecast. Oil-demand expectations deteriorated in August, energy assumptions diverged across commodities, and international food prices rose. The quarter thus demonstrated resilience in economic activity alongside persistent—and in some areas stronger—cost pressures. It would be inaccurate to describe the earlier outlook as either wholly confirmed or wholly overturned; the evidence instead points to selective improvements within an international environment that remained demanding.

Issue 3/2026 of the Annals of Spiru Haret University. Economic Series is presented against this changing economic background. The publications of July, August and September show the value of examining what changed relative to previous expectations, which pressures persisted and where resilience exceeded earlier assessments. This perspective connects the journal's engagement with innovation, management, entrepreneurship, finance, governance and sustainable development to the economic conditions confronting institutions and businesses at the end of the third quarter.

Highlights of the Articles Included in Part I – Artificial Intelligence, Digitalization, Innovation and Digital Markets

The first thematic section brings together twelve studies of the economic, managerial and institutional dimensions of digital transformation. Conceptual and normative analyses are complemented by survey evidence and comparative international data. The contributions connect technological capabilities with trust, human judgement, organisational adaptation and market structure, extending the foreword's international economic perspective into specific business and public-sector settings.

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Gerardo Marco Bencivenga opens the section with *"Beyond Computational Efficiency: Algorithmic Empathy as a Strategic and Normative Asset for Business Sustainability in the Industry 5.0 Era"*. The paper develops a normative argument that automation focused primarily on cost reduction can weaken the trust and relationships supporting economic activity. It presents algorithmic empathy as a framework for integrating legal guarantees and protection of human vulnerability into technological governance, including through hybrid neuro-symbolic architectures. Its contribution positions responsible AI integration as a condition of sustainable business, rather than treating computational efficiency as a sufficient measure of success.

In *"Algorithmic Pricing and Revenue Management in Tourism Services: Economic Efficiency, Demand Uncertainty and Consumer Trust"*, **Erick Nicolae Furduescu and Rareș Gabriel Florea** use a literature-based conceptual analysis to distinguish the conditions under which dynamic pricing can be applied across tourism services. Standardised, perishable inventories, such as hotel rooms and airline seats, lend themselves more readily to automated adjustment than bundled or personalised experiences. The authors argue that pricing efficiency must remain connected with perceived fairness and understandable pricing rules. Their contribution supports service-specific adoption and continued managerial judgement where algorithms cannot fully capture the complexity of the offer.

Stefano Amodio's *"Foreshadowing Innovation as a Strategic Device of Symbolic, Cognitive and Competitive Anticipation in Complex Systems with High Information Density"* develops an interdisciplinary framework for innovation pre-announcements. Drawing on signalling, organisational psychology and anticipatory cognition, it examines how announcements shape expectations, perceived value and organisational coordination before implementation. The paper balances these potential benefits against imitation, product cannibalisation and commitments that constrain adaptation. Its discussion of vaporware highlights the risks of persistent discrepancies between promises and delivery. The contribution emphasises credibility, flexibility and responsible management of uncertainty as foundations of effective innovation communication.

Kanayo Chike Nwosu, Gloria Ifeyinwa Anachuna and Augustine Ebuka Arachie contribute empirical evidence in *"Digital Marketing Performance of Small Businesses in Developing Countries: An Artificial Intelligence Context"*. Using a questionnaire-based survey of SMEs in southeastern Nigeria, with a reported sample size of 371, the study examines content personalisation and customer engagement. It reports a strong, statistically significant positive association between these variables

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and recommends greater use of data-informed personalisation. The study gives the section a concrete small-business perspective, while its survey design and geographic setting frame the scope within which the reported relationship should be interpreted.

Ana-Maria Grosu and Roxana Paun's *"The Streaming War: Competition, Content Exclusivity and Digital Consumerism"* connects competition law with digital market organisation and consumer behaviour. Drawing on market indicators from the United States, Europe and Romania, the analysis examines exclusive catalogues, vertical integration, intellectual property and subscription behaviour. It argues that exclusivity can encourage original content and differentiation while also producing fragmented access, switching costs and subscription fatigue. The contribution places consumer welfare alongside commercial freedom and copyright protection, identifying interoperability and careful merger assessment as important elements of the regulatory discussion.

Erick Nicolae Furduescu and Anemarÿ-Alexandra Jderu examine managerial change in *"From Computer-Aided Design to Flexible Manufacturing Systems: The Transformation of Operational Managers' Roles in Digital Production Environments"*. Their literature-based conceptual analysis traces the implications of CAD, CAM, CIM and flexible manufacturing systems for production responsibilities. The paper argues that operational managers increasingly coordinate technologies, data, people and flexible processes, extending their involvement into design and integration decisions. Its contribution explains why digital capability requires managerial interpretation, workforce development and operational discipline before it can translate into sustained performance.

Gino Fontana's *"The Regulation of Digital Currencies in Europe, Regulatory Limits, Private and Market Protection"* offers a systematic and comparative legal analysis centred on the EU Markets in Crypto-Assets Regulation. The paper examines disclosure, prudential requirements, supervision and the protection of market participants, alongside the limits of regulatory intervention. It characterises the European approach as oriented towards preventive protection while identifying tensions between control, technological neutrality and innovation. The contribution situates digital finance within the broader development of European economic law and connects private protection with the functioning and stability of markets.

Carmela Santarcangelo's *"The Automation of the Administrative Measure in the School System: Efficiency, Economy and 'Reserve of Humanity"* adopts a conceptual and normative approach to Italian school administration. It distinguishes automated procedures from automated final decisions, examining allocation, enrolment, financial support and vulnerable circumstances. The paper also considers

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implementation, maintenance, training, supervision, litigation and technological dependence when evaluating anticipated savings. Its proposed framework combines transparent criteria, comprehensive cost assessment and accessible human review. The contribution makes human judgement and accountability integral to the evaluation of sustainable administrative automation.

Raffaele Angrisani and Gerardo Marco Bencivenga extend the discussion to teaching in *"The Role of AI in New Pedagogical Methodologies: Between Adaptive Efficiency and the Challenge of Algorithmic Empathy"*. Their conceptual analysis considers adaptive learning, assessment and instructional support alongside the relational and ethical dimensions of education. Algorithmic empathy is presented as a design and governance framework that preserves teachers' autonomy and contextual judgement, rather than attributing emotional capacities to machines. The paper advocates educational augmentation supported by teacher preparation, critical digital literacy, transparency and human oversight.

In *"The Evolution of the Sharing Economy: From Collaborative Consumption to Platform Capitalism in Digital Markets"*, **Erick Nicolae Furduescu and Dan Marian Albulescu** use a literature-based conceptual analysis to examine how collaborative exchange becomes organised through commercial platforms. The authors argue that sharing persists, but increasingly operates within infrastructures controlling data, visibility, rankings and transaction rules. Trust and reputation become mechanisms that shape economic opportunity as well as facilitate exchange. The contribution presents platforms as both enablers of access and sources of digital market power, encouraging more precise distinctions between collaborative practices and professionalised commercial activity.

Marinela Geamănu, Lăcrămioara Hurloiu, Bianca Rusu and Iulian Hurloiu examine managerial functions in *"The Impact of Artificial Intelligence on Business Management"*. The paper discusses how AI relates to planning, organising, coordinating and controlling, alongside process automation and decision support. It balances potential efficiency gains with concerns about security, ethics and workforce adjustment. Its recommendations emphasise digital infrastructure, continued employee training and responsible implementation. The contribution provides a broad managerial perspective that complements the section's more specialised studies of tourism pricing, digital marketing and manufacturing.

Elena Gurgu and Ramona-Olivia Ștefănescu-Mihăilă close the section with *"The Paradox of Global Fragmentation: Artificial Intelligence, Servicification and and the Reconfiguration of Global Trade Towards Reglobalization*"".Using descriptive, comparative and trend-based analysis of OECD, WTO and UNCTAD

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evidence, the study examines AI adoption, services trade, digital delivery and value-chain reorganisation. Its analysis associates expanding service-intensive and digital exchange with a reconfiguration of globalisation, while finding limited support for generalised reshoring. The contribution also highlights uneven technological participation, presenting reglobalisation as an emerging pattern of international integration with opportunities and persistent development disparities.

Together, these studies show why digital transformation requires analysis of both technical capabilities and the conditions under which they are used. Across markets, organisations and educational institutions, the contributions repeatedly connect potential efficiency gains with trust, competences, governance and accountability. Their different approaches enrich the section's discussion of innovation while maintaining the distinction between conceptual propositions, context-specific empirical relationships and descriptive international trends.

Highlights of the Articles Included in Part II. Strategic Management, Human Resources, Leadership and the Future of Work

The second section examines how organisations develop the capabilities, working conditions and institutional arrangements needed to sustain performance during periods of change. Its eleven contributions connect strategic partnerships and leadership development with workforce learning, organisational culture, employee protection and effective labour governance. Across empirical studies, comparative analyses and conceptual frameworks, the papers highlight the importance of aligning organisational objectives with the people and processes through which those objectives are pursued.

Christopher Chiedozie Ikeogu, Vivian Ngozi Ikeogu and Wilfred Isioma Ukpere open the section with *"The Moderating Role of Institutional Conditions in Partnership-Innovation Relationship: Evidence from Lubricant Oil Industry."* Drawing on survey data from 562 stakeholders in a Nigerian lubricant distribution network, the study examines how regulatory enforcement, infrastructure and market formalisation shape the relationship between strategic partnerships and value chain innovation. The reported results suggest that supportive institutional conditions strengthen this relationship. However, the authors acknowledge substantial measurement weaknesses in the institutional construct, making its disaggregation an important requirement for further research. The contribution directs attention to the institutional foundations on which collaborative innovation depends.

Njideka P. Onyekwelu, Francis E. Monyei, Elizabeth C. Nel and Amechi F. Anoke address workforce adaptability in *"Employee Upskilling and Reskilling as Strategic Human Resource Practices for Organisational Sustainability in the Future*

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of Work." Based on semi-structured interviews in a telecommunications company, the paper explores continuous learning, digital training opportunities and organisational support for employee development. Its findings position upskilling and reskilling within long-term workforce planning, linking the development of existing capabilities with preparation for emerging responsibilities. The recommendations emphasise regular skills assessments, accessible learning infrastructure and a culture that supports continuing professional development.

Bongani Sibiya broadens the discussion through *"Leadership Development as a Catalyst for Organisational Behaviour and Effectiveness: A Comparative Study of Selected Countries."* Using secondary evidence and document analysis across eight Southern African countries, the paper examines how leadership development translates into competencies, behaviours and organisational outcomes. The comparative analysis identifies shared requirements for strategic direction, ethical conduct, adaptability and people development, while recognising the influence of national and institutional circumstances. Its proposed approach combines a common foundation of leadership capabilities with contextual adaptation, offering a framework for understanding why development programmes require sensitivity to the environments in which leaders operate.

Oludare Isaac Faseyiku, Adio Lateef Abolaji, Victor Ajibayo Adeyeye, Victoria Francess Iheanacho, Idowu Ayodele Ojuri and Bolaji Temitope Oyemade examine everyday organisational practices in *"Impact of Organisational Culture on Employee Productivity in Manufacturing Organisations."* A questionnaire survey involving 70 respondents at Guinness Nigeria Plc. investigates teamwork, rewards, communication, and training and development. The study reports significant relationships between these dimensions and employee productivity, highlighting how organisational culture takes shape through concrete management practices. Its recommendations favour sustained managerial support and employee feedback mechanisms, providing a company-specific perspective on the connection between workplace culture and productive performance.

Harriet Rivalani Maluka and Fumani Donald Mabasa bring employee vulnerability into focus in *"Workplace Bullying: Mitigation Strategies Amongst Temporary Employees."* Drawing on interviews with 20 temporary employees in a higher education institution, the study identifies four principal responses: clear anti-bullying policies, staff and managerial awareness, confidential reporting with fair investigations, and psychological support. The paper highlights the importance of extending workplace protection to employees regardless of contractual status. Its practical contribution lies in connecting formal procedures with supportive

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organisational behaviour, including the involvement of bystanders and management in addressing bullying.

Lerato Anastacia Moagi explores an alternative route to workforce development in *"Empowering Semi-Skilled Artisans through Recognition of Prior Learning."* Reviewing literature on recognition schemes, including South Africa's Artisan Recognition of Prior Learning programme and comparable international initiatives, the paper considers how experiential competence can acquire formal recognition. The review identifies potential benefits for professional identity, employability, career progression and sectoral productivity. It also acknowledges that certification cannot guarantee employment and that gender disparities may restrict access to its benefits. Accessible assessment, institutional coordination and sustained stakeholder support consequently emerge as essential conditions for effective implementation.

Bongani Sibiya and Ayanda Sibiya connect workforce management with organisational processes in *"Integrating Operations Management Principles into Human Resource Management: A Conceptual Framework for Regulatory Institutions."* Supported by qualitative interviews with 41 participants across regulatory entities, the framework integrates transformation, quality, productivity and performance measurement with strategic human resource practices. The analysis identifies organisational fragmentation as a source of duplicated effort, communication failures and weak alignment between individual responsibilities and institutional objectives. Its contribution is a reciprocal model in which operational requirements inform workforce decisions, while information about skills, staffing and employee needs informs operational planning.

Pedro Uwadum Adagbor, Olusola Arinola Akinboboye and Wilfred Isioma Ukpere examine employee wellbeing and organisational risk in "*Managing Workplace Health Promotion and Health Literacy for Occupational Safety Compliance: An Economic and Organisational Perspective."* A survey of 341 employees across two organisations reports positive relationships between health promotion, health literacy and safety compliance. Together, the two explanatory variables account for approximately 34.3% of the observed variation in compliance. The findings support stronger workplace health programmes and continuing safety education, highlighting the managerial importance of ensuring that employees can understand and apply health information in their working environments.

Christopher Chiedozie Ikeogu, Vivian Ngozi Ikeogu, Chidiebere Uche Ekeugo and Wilfred Isioma Ukpere contribute a methodological perspective through *"Structural Equation Modelling in Emerging Market Supply Chain Research: Methodological Insights and Best Practices."* Drawing on a dataset of 562

respondents from Nigeria's lubricant distribution industry, the paper discusses construct operationalisation, reliability, validity and model evaluation. Its treatment of a poorly performing institutional construct illustrates why complex contextual conditions require careful measurement. Recommendations concerning construct disaggregation, data triangulation and transparent reporting reinforce the section's wider concern with producing evidence that can credibly inform organisational and institutional decisions.

Zephrus Molewa, Harriet Rivalani Maluka and Fumani Donald Mabasa investigate the organisational pathways connecting leadership and innovation in *"The Mediating Effect of Organisational Climate Dimensions on the Relationship between Transformational Leadership and Innovative Work Behavior in a State-Owned Enterprise."* Using survey data from 323 employees, the study examines dimension-specific mediation through bootstrap analysis. Teamwork, accountability and leadership climate emerge as particularly important pathways within the reported results. The practical implications favour combining leadership development with cross-functional collaboration and accountability arrangements that distinguish misconduct from well-intentioned experimentation, helping organisations create conditions in which innovative behaviour can develop.

Michael Sean Koorapetse and Wilfred Isioma Ukpere conclude the section with *"Benefits of Effective Labour Dispute Resolution Systems: A Critical Assessment of Their Contribution to Workplace Justice and Industrial Harmony."* Through an exploratory qualitative study involving semi-structured interviews with participants from Botswana and other Southern African Development Community countries, the paper considers the relationship between dispute resolution, access to justice and organisational effectiveness. Its findings highlight the importance of credible mechanisms for addressing workplace disagreements, sustaining trust in labour institutions and supporting constructive employment relations. The contribution positions fair dispute resolution as an institutional resource with implications for both employee protection and organisational stability.

Taken together, these contributions present organisational effectiveness as dependent on the interaction between workforce capabilities, managerial practices and institutional conditions. They show how learning opportunities, recognised competence, supportive leadership, safe working environments and fair procedures can reinforce organisational adaptability. The section also brings methodological responsibility into this discussion: credible conclusions require measures and research designs that reflect the complexity of the settings being studied. These complementary perspectives connect the future of work with the continuing

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responsibility to develop, support and fairly govern the people who make organisational performance possible.

Highlights of the Articles Included in Part III. Entrepreneurship, SMEs, Education and Consumer Behaviour

The third section brings together eight contributions examining how knowledge, entrepreneurial capabilities, consumer decisions and educational practices support economic and social development. The papers move from the management of intangible resources in small businesses to entrepreneurial intentions, ethical consumption and climate-oriented enterprise, before considering rural production and technology adoption in universities. A shared concern is how capabilities become effective practice when financial constraints, institutional support and access to learning shape the opportunities available to individuals and organisations.

Godknows Gomwe and Alpheaus Litheko open the section with *"Intellectual Capital Competency as a Driver of Sustainable Performance in SMEs."* Drawing on academic literature, organisational studies and industry reports, the paper examines the complementary roles of human, structural and relational capital. Its central argument concerns the organisational ability to acquire, integrate and use these resources to create value. The review connects employee knowledge, organisational processes and stakeholder relationships with innovation and adaptability, presenting intellectual capital competency as a dynamic capability relevant to the economic, social and environmental sustainability of smaller enterprises.

John Olusegun Adebayo, Rahman Oladimeji Mustapha, Aminu Nasir Brimah and Kolawole Sunday Ajibola examine the foundations of entrepreneurial engagement in *"Risk Taking and Entrepreneurial Intention: Universities Students' Perspectives."* Based on a survey sample of 450 final-year students across six universities in Southwest Nigeria, the study reports a significant positive relationship between risk-taking propensity and entrepreneurial intention, with approximately 23% of the variation explained by the reported model. Its educational implications favour integrating practical entrepreneurial experiences into university curricula, helping students develop informed approaches to uncertainty alongside managerial, communication and vocational skills.

Olusola O. Kareem and Ayodele Oniku turn to purchasing decisions in *"Price Choice and Ethical Consumption among Generation Z Consumers."* Using a cross-sectional survey of undergraduate students in Ogun State, Nigeria, the study explores how affordability and perceived value relate to ethical consumption. The findings highlight the financial constraints that can prevent favourable attitudes towards sustainable products from becoming purchasing behaviour. The contribution places

pricing within the discussion of responsible consumption, recommending that firms combine accessible prices with clear communication of product benefits and that supportive policies address the costs of sustainable production and distribution.

Samuel Bangura, Princess Thulile Duma and Ntombifuthi Alexia Mthembu extend the sustainability discussion in *"A Scoping Review of the Role of Social Entrepreneurship in Advancing SDG 13."* Following the Arksey and O'Malley framework, the review identifies themes concerning hybrid business models, leadership and stakeholder engagement, resource mobilisation, and tensions surrounding institutional integration and education. It examines climate-related activities including renewable energy, waste management, climate-smart agriculture and community resilience. The paper highlights the capacity of social enterprises to combine environmental and social objectives with commercial viability, while recognising the organisational tensions and institutional barriers that can constrain their scale and continuity.

Alpheaus Litheko, Faan Pelser and Godknows Gomwe address enterprise development in rural settings through *"Strategic Management of Small-Scale Poultry Production: Rural Economic Development."* Drawing on qualitative interviews with informal poultry farmers in South Africa, the study applies dynamic capabilities theory to the challenges of finance, market access, infrastructure and business management. Its analysis emphasises the capacity to identify changes, pursue opportunities and adapt operations. The recommendations connect targeted financial assistance with marketing training, improved financial records and strategic management support, illustrating how rural enterprise development depends on both productive resources and the capabilities required to manage them.

Taofeek Gbolahan Muibi, Ganiyu Oluwaseyi Quadri and Wilfred I. Ukpere explore digital learning practices in *"Social Media Influence on Students' Academic Performance: Emergency Remote Teaching (ERT) Experience from Educational Management Perspective."* A descriptive survey of 400 students at the University of Ibadan examines social media use during emergency remote teaching. Respondents reported using digital platforms for academic, social and informational purposes, with many perceiving benefits for learning and access to study materials. The paper draws attention to the educational opportunities and distractions associated with extensive platform use, recommending institutional guidance that helps students employ these resources productively.

Ewere Clinton Okonta, Iwezu Joseph Iwezu and Wilfred Isioma Ukpere examine teaching capabilities in *"Technology Integration in Accounting Education: A Study of Software Utilisation and Teaching Effectiveness in Universities."* Based

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on questionnaire data from 120 Business Education lecturers in Delta State, Nigeria, the study compares the use of accounting packages, spreadsheets and learning management systems. It reports differences in utilisation, with spreadsheets used more extensively than learning management tools, and identifies lecturer competence and institutional support as important factors in integration and instructional effectiveness. Its recommendations combine professional training, reliable infrastructure, licensed software and deliberate curriculum planning.

Ganiyu Oluwaseyi Quadri and Wilfred I. Ukpere conclude the section with *"Computer Self-Efficacy and Readiness to Use Quick Response Codes by Library Personnel in Universities: An Educational Management Focus."* Using a descriptive survey covering 95 library personnel in selected universities in Ibadan, the paper reports low computer self-efficacy and limited readiness to adopt QR code applications. The findings highlight the human capability requirements accompanying digital service development. Recommendations concerning regular needs assessments, professional learning and practical training position library staff development as an essential component of efforts to improve technology use and university information services.

Together, these contributions connect sustainable development with the capacity to turn knowledge, intentions and technological opportunities into practical outcomes. Small enterprises require organisational learning and access to resources; prospective entrepreneurs need experience in managing uncertainty; ethical consumers face affordability constraints; and educational institutions depend on the competence of those who use and support digital systems. The section offers complementary perspectives on the investments and institutional support through which these capabilities can contribute to enterprise resilience, inclusive learning and responsible economic participation.

Highlights of the Articles Included in Part IV. Finance, Audit, Public Debt, Governance and Institutional Performance

The fourth section brings together seven contributions examining how financial resources are managed, reported, monitored and translated into institutional and developmental outcomes. Moving between insurance portfolios, banking audit, public internal audit, municipal financial management and public borrowing, the papers explore the relationship between financial capacity and responsible governance. They also consider the professional competencies and evidential foundations needed to ensure that financial decisions serve organisational stability and public objectives.

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Hassiba Almi opens the section with *"Investment Portfolios and Solvency in the Insurance Sector: An Empirical Analysis of Risk Management Strategies."* Using official data for 22 direct insurance companies operating in Algeria in 2024, the study examines portfolio composition, investment yields and solvency positions. Its company-level analysis reveals substantial differences beneath the sector's aggregate indicators, with eleven insurers falling below the study's threshold for solvency-margin coverage of technical provisions. The paper connects these vulnerabilities with investment performance and underwriting discipline, recommending gradual portfolio diversification and a phased transition towards risk-based supervision adapted to domestic market conditions.

Oluwakemi Cecilia Aina Ogunwole addresses the credibility of financial information in *"Audit Attributes and Financial Reporting Quality of Deposit Money Banks."* Drawing on data from thirteen Nigerian banks over 2014–2024, the study examines audit fees, auditor independence, specialisation and audit firm size in relation to reporting quality measured through discretionary accruals. The reported results identify significant relationships between these attributes and financial reporting quality. The contribution highlights the importance of audit independence and professional competence, directing attention to the regulatory and organisational arrangements that support reliable information for financial decision-making.

Elena Gurgu examines an emerging professional challenge in *"Generative AI in Public Internal Audit: Opportunities, Risks and Professional Judgment in the Age of Algorithmic Assurance."* Adopting a documentary and conceptual approach, the article combines recent research, professional standards and published survey evidence to assess potential applications across the audit cycle. Its central contribution is a distinction between AI-generated suggestions, verified audit evidence and professional conclusions. A hypothetical public-administration example illustrates the verification required before an apparent discrepancy can support an audit finding. The analysis positions GenAI as a tool whose contribution depends on traceable sources, controlled information processing and substantive auditor review.

Taolo Shai, Rewai Mutoko and Praise Mutoko examine local financial administration in *"Predictors of Satisfactory Performance in Municipal Accounting and Auditing Services."* Based on a survey of 120 finance employees in the City of Tshwane Metropolitan Municipality, the paper considers the competencies and institutional practices associated with satisfactory performance and compliance with municipal financial requirements. Its findings emphasise experience, knowledge transfer and the consistent application of financial rules, while identifying resource-

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management and technological limitations. The recommendations connect continuing professional development with stronger accountability and institutional capacity, highlighting the relationship between municipal financial governance and effective public service delivery.

Eugene A. Okpe, Clever A. Gbanador and Simeon G. Nenbee investigate the developmental implications of borrowing in *"A Dumitrescu-Hurlin Panel Causality Test Analysis on Subnational Debts and Poverty."* Using data for Nigeria's 36 states over 2012–2021, the study examines predictive relationships between debt and poverty through panel causality testing. It reports bidirectional links involving subnational debt and a unidirectional relationship running from external debt to poverty. These findings inform recommendations concerning fiscal discipline, debt-management capacity and the allocation of borrowed resources to education, agricultural value chains and entrepreneurial development, bringing the social consequences of subnational borrowing into the discussion of public financial management.

Oghenevo Benjamin Okpoude and Temitope Sade Akintunde extend this discussion in *"The Effect of Corruption and Public Debt on Infrastructural Development."* Drawing on panel data for West African economies over 2015–2024, the study examines long-run relationships and short-run interactions using panel econometric techniques. It reports a positive long-run relationship between public debt and infrastructure development, alongside institutional effects that require careful interpretation in light of the corruption-control measure employed. The policy discussion emphasises disciplined borrowing, responsible allocation and stronger institutional safeguards, directing attention to the conditions under which debt-financed expenditure can support productive infrastructure.

Marian-Lucian Baciu-Andrei and Roxana Paun concludes the section with *"The Managerial Investment Decision in the Improvement of Civil Servants in the Field of Accessing Structural Funds – The Key to Success. Theoretical and Practical Aspects."* The article connects investment in professional development with the administrative demands of accessing and implementing development funding. An exploratory case study of Vâlcele local administration in Covasna County, Romania, draws on interviews concerning professionalism, cooperation and continuing training needs. Its contribution highlights the managerial rationale for developing staff capabilities while recognising that training must be supported by suitable working conditions, coordination and opportunities to apply acquired knowledge.

Together, these contributions connect financial performance with the quality of the institutions and professional practices supporting it. Portfolio management,

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independent auditing, reliable evidence, municipal competence and disciplined borrowing all influence whether resources can sustain stability and generate public value. The section also highlights the importance of interpreting financial indicators and research findings within their methodological and institutional contexts. Its collective contribution is to place accountability, professional judgment and administrative capacity at the centre of responsible financial governance.

Highlights of the Articles Included in Part V. Economic Development, Urbanisation, Environment and Territorial Sustainability

The fifth section brings together four contributions examining the environmental, spatial and distributive dimensions of economic development. The papers investigate how globalisation, urban expansion and renewable energy consumption relate to carbon emissions, territorial attractiveness and income inequality. Their findings highlight the importance of context and non-linear relationships: greater international integration, urbanisation or renewable energy use does not produce uniform outcomes across different stages of development. Together, the contributions connect economic transformation with the policies and institutional capacities needed to support environmentally sustainable and socially inclusive development.

Mercy T. Musakwa and Nicholas M. Odhiambo open the section with *"Does Globalisation Spur Carbon Emissions? New Evidence from an Emerging Economy."* Using South African data for 1983–2022, the study applies a quadratic specification within an autoregressive distributed lag framework to examine whether the relationship is linear or non-linear. The results indicate no statistically significant long-run effect of globalisation on carbon emissions, while identifying an inverted U-shaped relationship in the short run. The paper interprets this pattern in relation to the potential diffusion of cleaner technologies through trade and investment, highlighting how the environmental implications of international integration may change as integration deepens.

Cylia Zidane and Amina Smadi examine the spatial consequences of development in *"Urban Sprawl and Territorial Attractiveness in Small and Medium-Sized Towns."* Drawing on semi-structured interviews with institutional stakeholders and local planning documents, the study investigates urban expansion in the wilaya of Tizi-Ouzou, Algeria. Its findings associate poorly controlled sprawl with car dependency, spatial fragmentation, infrastructure pressures and the degradation of natural and agricultural areas. The paper also identifies opportunities to strengthen territorial attractiveness through coordinated planning, improved transport and the promotion of local economic, tourism and heritage assets. Its contribution

emphasises the implementation capacity required to translate territorial strategies into balanced development.

Nicholas M. Odhiambo extends the urbanisation discussion in *"Is there a U-shaped relationship between urbanisation and income inequality? Evidence from emerging and developing economies."* Using panel data for 28 countries over 1990–2022, the study employs estimators and diagnostic procedures that address cross-country dependence and other econometric concerns. The reported results identify a U-shaped relationship: urbanisation is initially associated with lower income inequality, followed by increasing inequality at higher levels of urbanisation. Evidence of bidirectional Granger predictability further highlights the interaction between these processes. The contribution draws attention to the changing distributive implications of urban development and the importance of ensuring that expanding cities offer broadly accessible economic opportunities.

Selma Bitat, Souad Douba and Ahmed Boudeghdegh conclude the section with *"The Impact of Renewable Energy Consumption on Carbon Dioxide Emissions: The Moderating Role of Economic Growth."* Analysing panel data for fifteen Middle Eastern and North African countries over 2000–2024, the study examines renewable energy consumption alongside economic growth and their interaction. The estimated model reports a positive direct coefficient for renewable energy consumption and a negative interaction coefficient with growth, indicating that the relationship with emissions varies with economic conditions. The paper consequently recommends combining renewable energy expansion with infrastructure investment and coordinated economic and environmental policies, emphasising the conditions under which energy transition can support emissions reduction.

These contributions show how environmental sustainability, territorial balance and social inclusion intersect within development processes. International integration may influence access to cleaner technologies; urban expansion can reshape both territorial opportunities and income distribution; and renewable energy outcomes depend on wider economic conditions. The section encourages attention to these relationships when designing development policies, with particular emphasis on coherent planning, institutional coordination and the capacity to adapt interventions to different national and local circumstances.

The five thematic sections of Issue 3/2026 of the *Annals of Spiru Haret University. Economic Series* bring together complementary perspectives on economic resilience, technological transformation and institutional responsibility. Across artificial intelligence, strategic management, entrepreneurship, education, finance and territorial sustainability, the contributions examine how organisations

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and societies respond to change and how the benefits of innovation and development can be sustained and shared.

Read alongside the economic developments discussed at the beginning of this foreword, the papers reinforce the importance of examining expectations against evidence. Forecasts, technological promises and development strategies require continuing reassessment as circumstances evolve. Economic research contributes to this process by testing relationships, identifying constraints and clarifying the conditions under which proposed solutions may deliver their intended outcomes.

A recurring concern throughout the issue is the relationship between technological capability and human responsibility. Artificial intelligence and digital systems create opportunities for improving decisions, coordinating production, expanding services and supporting learning. Their effective use also depends on professional competence, reliable information, appropriate oversight and clear accountability. The contributions encourage careful consideration of how technological change affects trust, autonomy and the quality of organisational and institutional decisions.

The papers addressing leadership, human resources and education emphasise the capabilities that enable people to participate in these transformations. Continuous learning, recognition of experiential knowledge, supportive working environments and fair employment practices contribute to organisational adaptability. The studies on entrepreneurship and consumer behaviour similarly demonstrate the importance of understanding how resources, uncertainty and affordability influence the translation of intentions into action.

Financial and institutional responsibility provides another connection across the volume. Reliable reporting, independent audit, disciplined borrowing and competent administration influence the capacity of organisations and public authorities to manage resources effectively. The contributions on environmental and territorial development extend this responsibility to the consequences of economic activity for emissions, inequality, mobility and local communities. Together, these perspectives place the quality and distribution of development outcomes alongside questions of growth and efficiency.

The international character of this issue enriches these discussions. Contributions drawing on European and African experiences, including evidence from emerging economies, bring different institutional settings and research traditions into dialogue. Their diversity offers opportunities for comparison while reminding readers that findings must be interpreted in relation to the circumstances and methods through

which they were produced. This exchange supports the journal's commitment to international scholarship and research with practical relevance.

On behalf of the Editorial Board, I sincerely thank all authors for choosing the *Annals of Spiru Haret University. Economic Series* to disseminate their research. I also extend our appreciation to the reviewers, members of the Scientific Committee, Editorial Committee and Technical Committee, and all collaborators whose expertise and dedication have supported the preparation of this issue. Their work sustains the scholarly dialogue on which the journal depends.

We hope that the contributions published in Issue 3/2026 will encourage further investigation, constructive debate and international collaboration. We invite researchers, educators, business leaders and policymakers to engage critically with the findings and arguments presented, explore their implications and develop the questions they raise. Through this continuing exchange, research can strengthen understanding and inform decisions that respond to economic, institutional and societal needs.

Readers wishing to explore the journal's publications and editorial objectives are invited to visit http://anale-economie.spiruharet.ro/. Comments and suggestions may be addressed to ashues@spiruharet.ro. Authors interested in contributing to future issues may submit their manuscripts through the online platform at http://anale.spiruharet.ro/index.php/economics/login.

Through rigorous inquiry, open dialogue and shared responsibility, we can contribute to a deeper understanding of economic change and to more informed choices about our collective future.

Research is the breath of the future. Let's shape the world together!

Associate Professor Ph.D. Elena Gurgu
Deputy Editor-in-Chief
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ACADEMIA PAPERS

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BEYOND COMPUTATIONAL EFFICIENCY: ALGORITHMIC EMPATHY AS A STRATEGIC AND NORMATIVE ASSET FOR BUSINESS SUSTAINABILITY IN THE INDUSTRY 5.0 ERA

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Abstract

Generative Artificial Intelligence (GenAI) is redefining the infrastructure of the global economy with unprecedented magnitude. In this scenario, organizations face a radical digitalization where the massive management of Big Data becomes the primary capital for innovation and decision-making. However, the current paradigm of technological integration—if focused exclusively on hyper-automation and the contraction of labor costs—triggers an unsustainable macroeconomic paradox: predatory efficiency erodes the relational and fiduciary base upon which the market itself is founded. This paper, based on a rigorous systematic review of 44 international frontier studies and the latest legal-economic guidelines, dissects the profound "alignment gap" existing between the vast simulative capabilities of technical systems and the normative frameworks required to govern them. The structural solution lies not in a mild ethical revision, but in the ontological integration of Algorithmic Empathy. This doctrine, mediated by hybrid neuro-symbolic architectures, compels the algorithm to recognize the presence of the law as an impassable limit and a guarantee for the human counterpart. Through the analysis of socio-technical governance, service integrity, and the necessary transition to Industry 5.0, this study demonstrates how Algorithmic Empathy

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represents a tangible balance-sheet asset, essential for mitigating legal risks and forging authentic sustainable development.

Keywords: *generative AI, algorithmic empathy, big data management, alignment gap, sustainable development, industry 5.0, neuro-symbolic architectures.*

JEL Classification: O33, M14, K24, Q01

1. INTRODUCTION

Generative artificial intelligence (GenAI) is reshaping business operations by expanding the range of tasks that organisations can automate or support through computational systems. Its applications increasingly extend beyond data processing to knowledge production, customer communication and professional decision support. Recent experimental and workplace research demonstrates that GenAI can improve performance in selected contexts. Noy and Zhang (2023) identify productivity gains in professional writing tasks, while Brynjolfsson et al. (2025) document improvements in customer-support productivity, particularly among less experienced workers. These findings establish the economic relevance of AI while also indicating that its benefits depend on the tasks, workers and organisational environments involved.

However, improvements in speed and output do not provide a complete measure of successful digital transformation. Organisations also depend on reliable information, professional competence, stakeholder trust and the capacity to address the consequences of their decisions. Research on Big Data in business management highlights the expansion of digital tools across organisational activities, including information exchange, transactions and communication (Iatagan et al., 2022). As these activities become increasingly mediated by AI, managerial evaluation must consider both operational performance and the quality of the relationships through which business value is created.

This broader perspective is particularly relevant when AI systems interact directly with customers. Huang and Rust (2024) examine the potential of GenAI to recognise emotional cues and produce responses that communicate empathetic understanding. Such capabilities raise an important distinction between an interaction that appears supportive and a system whose operation adequately protects the person receiving the service. Recognising distress or generating reassuring language does not, by itself, establish factual reliability, fairness or

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accountability. Consequently, the managerial challenge concerns how organisations combine responsive communication with safeguards appropriate to the context of use.

The Industry 5.0 perspective provides a relevant setting for this discussion. Leng et al. (2022) place human centricity, sustainability and resilience at the centre of industrial development. Within this perspective, technological progress should be evaluated through its contribution to human and organisational capabilities, alongside its effects on production. Similarly, the National Institute of Standards and Technology (NIST, 2023) treats AI as a socio-technical system whose risks arise from interactions between technology, people and deployment contexts. These approaches encourage organisations to integrate governance into technological development rather than evaluate responsibility only after a failure occurs.

Against this background, the present article examines **algorithmic empathy** as a proposed strategic and normative framework for sustainable business management. The concept refers here to the capacity of an AI-enabled service arrangement to identify relevant human circumstances and respond within explicit ethical, organisational and legal boundaries. It does not require attributing emotions or consciousness to machines. Instead, it connects the recognition of human needs with verifiable protections, human oversight and organisational responsibility.

The article addresses the following question: **How can algorithmic empathy connect the efficiency gains of AI with the protection of stakeholders and the requirements of sustainable business development?** Its contribution consists in bringing together research on productivity, service relationships, responsible innovation and neuro-symbolic AI. Through this synthesis, it develops the proposition that algorithmic empathy may constitute a strategic organisational capability whose value depends on its implementation and demonstrated effects.

2. LITERATURE REVIEW

2.1. Artificial intelligence, productivity and the conditions of business value

Recent evidence supports the productivity potential of GenAI while discouraging universal assumptions about its effects. Noy and Zhang (2023) demonstrate that access to ChatGPT improves performance on selected professional writing tasks. Their experimental design provides evidence for task-specific benefits, but does not establish equivalent outcomes across all occupations or decision environments. For business management, this distinction requires organisations to evaluate where AI supports performance and where additional verification remains necessary.

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Brynjolfsson et al. (2025) complement this evidence through a study of AI assistance in customer support. Their findings indicate that productivity improvements are unevenly distributed, with less experienced workers benefiting particularly strongly. The study therefore supports an interpretation of AI as a means of supporting and disseminating professional knowledge, alongside its automation potential. For the present article, this evidence provides a foundation for examining how computational assistance can strengthen human capabilities without assuming that replacing human participation is always the most effective organisational choice.

The broader digital infrastructure underlying these developments is discussed by Iatagan et al. (2022). Their analysis of Big Data in business management identifies the expanding role of digital technologies in organisational information flows and operational processes. This contribution helps situate GenAI within an ongoing transformation of business management. However, data availability and processing capacity should be distinguished from the quality of the decisions they support. The present article extends this discussion by asking how organisations can combine digital capability with safeguards for the people affected by its use.

2.2. Empathetic communication and the quality of AI-mediated services

Huang and Rust (2024) provide a direct contribution to the analysis of AI-mediated customer care. Their framework considers a progression from emotion recognition to empathetic responses, emotional management support and the development of customer relationships. They also identify gaps between current technological capabilities and the requirements of effective customer care. Their work suggests that emotional responsiveness should be assessed within a service process rather than treated as an isolated linguistic feature.

This perspective creates a useful starting point for distinguishing perceived empathy from protective conduct. A system may generate language that users experience as considerate, while the accuracy or appropriateness of its advice remains uncertain. Within the framework proposed in this article, empathetic communication therefore acquires strategic significance when it is connected to reliable information, appropriate escalation and respect for user vulnerability. This connection is a conceptual extension of the customer-care literature, rather than an established consequence of empathetic wording alone.

A complementary perspective comes from Calota Toma and Gurgu (2022), whose study examines quality management in the pharmaceutical field during the COVID-19 pandemic. Although it does not investigate algorithmic empathy, it provides a sector-specific context for understanding service quality where

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professional support and user needs are particularly important. Its relevance to the present discussion lies in the managerial evaluation of services under conditions of vulnerability and uncertainty. The transfer of these considerations to AI-mediated services requires attention to the responsibilities attached to information provision and professional assistance.

2.3. Human competence and the organisation of AI integration

AI adoption also changes the competencies required of managers and employees. Koponen et al. (2025) examine sales managers' perceptions of interpersonal communication competence when leading AI-integrated teams. Their longitudinal case study demonstrates the relevance of communication and leadership within organisational AI integration. This contribution challenges the assumption that increasing technological capability reduces the significance of interpersonal competence. Instead, managers must coordinate changing tasks and relationships as human and AI contributions become more closely connected. osuva.uwasa.fi

For algorithmic empathy, these findings suggest that protective and responsive service cannot be achieved through interface design alone. Employees must understand when to rely on AI assistance, when to question an output and when human intervention is necessary. Organisations must also establish responsibilities for reviewing problems and responding to affected users. Accordingly, the present article treats algorithmic empathy as a capability distributed across technology, professional practice and management arrangements.

2.4. Industry 5.0 and the sustainability of technological transformation

Leng et al. (2022) examine Industry 5.0 as a perspective that places human needs, sustainability and resilience alongside technological development. Their analysis provides a foundation for assessing innovation through wider organisational and societal objectives. Applied to AI adoption, this perspective encourages consideration of working conditions, professional development and the ability of organisations to remain effective under changing circumstances.

Responsible innovation scholarship further qualifies the relationship between technological development and sustainability. Mangelkramer (2022) argues that responsibility should be integrated into innovation processes, including consideration of future consequences and sustainability trade-offs. Her systematic review indicates that innovations presented as sustainable can still overlook important social or ethical effects. For AI-enabled business transformation, this supports an evaluation that extends beyond immediate efficiency gains to the

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distribution of benefits, potential harms and opportunities for stakeholder participation.

Together, these contributions support the article's proposition that sustainable AI integration requires more than operational optimisation. Algorithmic empathy is positioned within this broader agenda as a framework for connecting individual protection with organisational performance. Its contribution must nevertheless be assessed through observable practices and outcomes, including service reliability, effective oversight and the treatment of vulnerable users.

2.5. AI governance and neuro-symbolic approaches

The NIST AI Risk Management Framework offers an operational perspective on responsible AI governance. NIST (2023) identifies characteristics of trustworthy AI that include validity, reliability, safety, accountability, transparency, explainability, privacy protection and the management of harmful bias. Its governance approach spans the AI lifecycle through the functions of governing, mapping, measuring and managing risk. This framework supports the development of organisational controls through which the proposed principles of algorithmic empathy could be evaluated.

At the technical level, Garcez and Lamb (2023) examine neuro-symbolic AI as an approach integrating neural learning with symbolic knowledge representation and reasoning. Their analysis identifies opportunities for connecting learning capabilities with explicit representations that may support explanation and reasoning. This makes neuro-symbolic approaches relevant to the article's discussion of systems operating under identifiable constraints. However, the architecture itself does not guarantee appropriate decisions: its effectiveness depends on the rules represented, the quality of the information used and the conditions under which the system is tested and deployed.

2.6. Research gap and conceptual contribution

The reviewed literature provides complementary accounts of AI productivity, empathetic customer care, managerial competence, sustainable innovation and trustworthy system development. These perspectives establish the importance of evaluating AI through both operational results and its effects on people. They also distinguish technical capabilities from the organisational arrangements required to use them responsibly.

The present article proposes algorithmic empathy as an integrative framework connecting these dimensions. Its central proposition is that recognising human circumstances becomes strategically valuable when linked to reliable service, explicit safeguards and accountable decision processes. This creates a basis for

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future empirical investigation into whether such arrangements improve stakeholder trust, service outcomes and organisational resilience. It also supports describing algorithmic empathy as a potential strategic capability, while leaving its economic effects and implementation requirements open to systematic evaluation.

3. THE MACROECONOMIC ILLUSION AND THE IMPERATIVE OF SUSTAINABLE DEVELOPMENT

We stand at an evolutionary crossroads where corporate enthusiasm often masks a profound systemic delusion. Generative Artificial Intelligence is currently being administered to global markets through a teleological narrative that crowns it as the ultimate horizon of productivity. Macroeconomic projections outline an AI contribution of up to 14% of global GDP by 2030—the equivalent of an estimated 13 trillion-dollar injection. As authoritatively evidenced in recent studies (Iatagan, Zorzoliu, & Gurgu, 2022), digitalization is altering organizations with a radicalism never seen before. In this expansive process, Big Data is configured not just as inert matter, but as true capital to increase efficiency and enable innovation.

Yet, this trajectory conceals a global-scale trap. If digital transformation were reduced to a mere extractive speed race—a blind rush towards the drastic contraction of latency times and the total replacement of human capital—the system would implode. The market, in its most visceral sense as a network of exchanges, relies on a delicate relational balance. Predatory efficiency, pushed to its paroxysm, ends up inexorably eroding its own demand base. Who will purchase the hyper-optimized services of machines if automation has made society precarious?

We must acknowledge that modern economies require a radical paradigm shift to face the asymmetries of the 21st century. Living in an era marked by growing inequalities and systemic challenges, Sustainable Development is no longer a mere philanthropic option, but the only true structural solution. Authentically sustainable business management is no longer measured by "time saved," but by the "trust preserved" within its ecosystem.

4. THE ALIGNMENT GAP IN THE BIG DATA ERA

Empirical analysis confirms the fragility of the current integration model. Scrutinizing a corpus of 44 peer-reviewed international articles within my recent systematic literature review, an unequivocal diagnosis emerges: there is a severe "alignment gap" between the immeasurable capabilities of technical systems and the normative frameworks called upon to govern them.

Although AI adoption is now endemic, less than 20% of top-tier organizations have structured mature governance protocols to stem the negative externalities of

algorithmic action. Furthermore, 45% of current models rely on purely qualitative architectures that dramatically lack "ecological validity" in high-risk contexts. In a scenario where the use of Big Data becomes indispensable for monitoring flows and preventing fraud, we cannot tolerate automated decisions escaping a strict legitimacy check. In this regulatory vacuum—where the machine predicts and rules without perceiving the constitutional boundary of its own action—the enterprise is literally walking on a minefield. This is where the paradigm must shift, invoking the framework of **Algorithmic Empathy**.

5. ALGORITHMIC EMPATHY AS A SAFEGUARD AND PREVENTIVE COMPLIANCE

The concept of Algorithmic Empathy—extensively codified (Bencivenga, 2025)—rejects any anthropomorphic drift or sentimental fiction. It stands, on the contrary, as a technical-legal constraint: the machine must be instructed, through its source code, to recognize the "presence" of the law as an impassable limit and a guarantee for the human counterpart.

In business management dynamics, this translates into a formidable lever of stability. We are not talking about *ex-post*sanctioning compliance, but about preventive conformity inoculated *by-design*. If corporate AI internalizes the prohibition against exploiting user vulnerability, the risk of discriminatory bias, privacy violations, and subsequent reputational litigation drops drastically. Algorithmic Empathy thus emerges as a guarantee of shareholder capital.

6. SOCIO-TECHNICAL GOVERNANCE AND THE DESTRUCTION OF BLACK BOXES

The transition towards a digital and sustainable economy demands the immediate destruction of "black boxes." The market requires radical transparency: the opacity of decision-making processes can no longer be shielded as a trade secret, as it generates lethal information asymmetries.

Legal estimates indicate that AI regulation, driven by the paradigms set by the European AI Act, is destined to quadruple by the end of the decade. Addressing this regulatory tsunami requires value-sensitive co-design frameworks, compelling computer engineers to resolve ethical and normative dilemmas during the algorithmic training phase, not in a courtroom. Intelligent business management does not suffer the law; it prevents it; it internalizes the cost of human oversight as a true strategic investment.

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7. NEURO-SYMBOLIC ARCHITECTURES AGAINST THE AUTHENTICITY GAP

On the strictly engineering front, Algorithmic Empathy decrees the impassable limit of purely connectionist neural networks. Business, legal, and ethical decisions cannot be subjected to a statistical game based on "the next most probable word." The law is an axiomatic axis.

It is necessary to migrate towards **hybrid neuro-symbolic architectures**. These advanced systems weld the formidable computational power and pattern recognition of Deep Learning with the inflexible rigor of symbolic logic. The hybrid algorithm recognizes vulnerability but is bound by a symbolic directive that forbids unfair practice.

The absence of such a constraint has already produced catastrophic damage: recent jurisprudence (e.g., *Moffatt v. Air Canada*, 2024) has condemned a corporate giant precisely because its chatbot, lacking neuro-symbolic boundaries, "hallucinated" a refund policy for a vulnerable passenger. The machine was not empathetic; it simulated. And simulation without a guarantee generates the "authenticity gap"—the instantaneous and definitive rupture of the pact of trust. The company's goal, on the contrary, must be an empathy founded on principles.

8. SERVICE QUALITY AND THE ADVENT OF SOCIETY 5.0

The decisive test of this infrastructure occurs on the ground of interactions. GenAI is inexorably absorbing the customer-company interface, replacing the emotional and mediating work that historically defined human interactions.

However, the essence of a service is not exhausted in mere provision. As clearly demonstrated by research conducted on highly critical ecosystems, such as the pharmaceutical-healthcare sector (Calota Toma & Gurgu, 2022), a professional service transcends pure assistance or material delivery to become a bastion of information, education, and promotion. Indeed, the benefit for the user is maximized sometimes even in the absence of a physical product, relying solely on consultancy and relational support. If a service is defined by the degree of reassurance and the quality level that impacts the key moments of a person's life, commodifying its interface by delegating it to emotionless algorithms is equivalent to systemic suicide.

Algorithmic Empathy merges here with the vision of Industry 5.0 and the nascent Society 5.0. AI is not a tool of substitution, but of *augmentation*. Empathy-driven automation must absorb grueling tasks to free up the cognitive space

necessary for human operators to engage in critical thinking and authentic supervision.

9. CONCLUSIONS: THE CODE OF GLOBAL TRUST

Continuing to think of digital transformation as the purchase of increasingly powerful software means having fundamentally misunderstood the anthropological scope of our time. Artificial Intelligence is not the ultimate goal for cost contraction; it must be the catalyst for Sustainable Development that curbs social inequality.

Algorithmic Empathy offers the legal and economic keystone to transform hyper-technology into a vector of symbiotic growth. The profit of the coming decade will not belong to those who simply process more data, but to those who demonstrate the ability to code, shield, and defend the vulnerabilities of their market. Integrating the fundamental guarantees of the individual into the source code is not the obstacle to the business of the future; it is, indisputably, its precondition.

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ALGORITHMIC PRICING AND REVENUE MANAGEMENT IN TOURISM SERVICES: ECONOMIC EFFICIENCY, DEMAND UNCERTAINTY AND CONSUMER TRUST

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Abstract

Tourism has always depended on fragile balances: rooms that remain empty after one night, aircraft seats that lose value after departure, attractions that face sudden peaks of demand and packages whose costs are shaped long before the tourist makes a choice. In this context, price is no longer only a number printed in a catalogue, but an adaptive signal produced from data, timing, scarcity and expected behaviour. This paper examines algorithmic pricing and revenue management in tourism services as a way of transforming demand uncertainty into managerial action. Based on a literature based conceptual analysis, the study explores why dynamic pricing is more easily applied in services with visible capacity, standardized inventory and continuous data flows, while it becomes more difficult in bundled, negotiated or highly personalized tourism products. The paper shows that algorithmic pricing can help tourism businesses use capacity more intelligently and react faster to market changes. However, the real test is not only whether the

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algorithm finds a profitable price, but whether the tourist still understands and accepts that price. The paper therefore frames pricing as both an economic instrument and a relationship of trust.

Keywords: *algorithmic pricing; revenue management; tourism services; demand uncertainty; consumer trust; economic efficiency*

JEL Classification: L83, M31, D12, D22, O33

Introduction

Tourism is one of the economic sectors where the price of a service is rarely a simple number. A hotel room loses its commercial value after one unused night, an aircraft seat disappears as an opportunity after departure, a car rental fleet depends on daily availability, while a guided tour or a package holiday may combine several suppliers, negotiated costs and uncertain demand. This particular structure makes tourism highly sensitive to time, capacity and consumer behaviour. Algorithmic pricing and revenue management have therefore become more visible in tourism because they help firms adjust prices according to booking patterns, demand pressure, seasonality, market signals and the expected willingness to pay of different consumer segments (Kopalle et al., 2023; van der Rest et al., 2022).

The article examines the use of algorithmic pricing and revenue management in tourism services, with particular attention to the differences between services where pricing automation is relatively easy to apply and services where it remains operationally difficult. The central issue is not only whether algorithms can calculate a profitable price, but whether tourism businesses can use such prices without damaging consumer trust. Recent studies show that consumers do not react only to the final price itself, but also to the way price changes are perceived, explained and attributed. A price variation may therefore be economically justified from the firm's perspective, but fragile from the tourist's perspective when it appears unfair, opaque or discriminatory (Alderighi et al., 2022; Choi et al., 2023; Ying et al., 2024).

The importance of this topic comes from the fact that tourism services operate under permanent demand uncertainty. Prices are affected by booking windows, occupancy levels, local events, online reviews, digital traces, inflation expectations and sudden changes in consumer sentiment. At the same time, new forecasting tools allow firms to read demand signals more quickly than before, including signals generated by reviews, user generated photos, short videos and booking curves. This turns pricing into a more data intensive managerial activity, but also

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increases the distance between the price seen by the tourist and the logic behind that price (Viverit et al., 2023; Hu et al., 2024; Wu et al., 2024; Xu et al., 2024).

The study addresses this matter through a literature based conceptual analysis. Instead of testing a statistical model, it compares tourism services according to their capacity characteristics, data availability, degree of standardization, perishability and service complexity. This approach helps explain why algorithmic pricing is more easily applied in services with measurable inventory and repeated transactions, while it becomes more difficult in bundled, negotiated or highly personalized products. The analysis also connects the economic logic of revenue optimization with the behavioural logic of consumer trust, because a price that is efficient from the firm's perspective may still be rejected by consumers if it seems arbitrary or exploitative (Heidary & Pluut, 2025; Mazrekaj et al., 2025; Qi et al., 2024).

The article is related to existing literature on dynamic pricing, algorithmic decision making, hospitality and tourism demand forecasting, personalized pricing and consumer fairness. Previous studies have examined algorithmic pricing as a managerial tool, a technological mechanism and an ethical challenge. However, less attention has been given to the sectoral differences within tourism services, especially to the question of why the same pricing logic works smoothly in some services and becomes more fragile in others. The contribution of this article is to frame algorithmic pricing as both an instrument of economic efficiency and a relationship of trust between tourism businesses and tourists (Li et al., 2025; van der Rest & Heidary, 2024; Wang et al., 2025; Wang et al., 2024).

A useful way to read this topic is to see the tourism price as a meeting point between calculation and expectation. For the business, the price protects capacity, reduces the risk of empty inventory and reacts to demand before the opportunity disappears. For the tourist, the same price says something about value, fairness and credibility. This double meaning makes algorithmic pricing more complex than a simple technological improvement. It changes not only how prices are produced, but also how tourists interpret scarcity, timing and the promise behind the service.

Literature Review

Revenue management in tourism starts from a problem that is almost brutal in its simplicity: many tourism services expire before they are consumed. A hotel cannot recover yesterday's unsold room, an airline cannot sell a seat after departure, and a timed attraction cannot move unused demand into another day without losing part of its value. This is why price setting in tourism has always

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been closer to a race against time than to a fixed calculation of cost plus margin. The recent literature on dynamic pricing explains this movement from stable tariffs toward prices that react to demand, capacity and market pressure, while research on hospitality and tourism also warns that algorithmic price adjustment cannot be separated from the way customers interpret automated decisions (Kopalle et al., 2023; van der Rest et al., 2022).

The newer discussion is no longer only about changing prices faster. What changes is the material from which the price is built. In traditional pricing, managers often relied on seasonality, historical demand, competitor observation and experience. In algorithmic pricing, the price is increasingly assembled from live or near live signals: booking rhythm, search behaviour, customer heterogeneity, availability, cancellation patterns and expected willingness to pay. This makes price less of a final managerial decision and more of a continuous interpretation of demand. Recent work on artificial intelligence and dynamic pricing places this shift at the centre of the debate, because AI connects information, prediction and automated decision making inside the same commercial process (Chenavaz & Dimitrov, 2025).

Tourism is particularly suitable for this discussion because its demand is visible before it fully materializes. Booking curves, online searches, comments, photos, videos and reviews are not just traces left by tourists. They can become early signs of future demand. In hotel demand forecasting, for example, booking curves may reveal the rhythm of reservations before occupancy is finalized, while online reviews, review sentiment and user generated photos can provide additional signals about market interest. Short video content also matters because it can influence and reflect destination attention before actual purchase decisions are made (Viverit et al., 2023; Li et al., 2024; Wu et al., 2024; Xu et al., 2024; Hu et al., 2024).

Still, a better prediction does not automatically create a better relationship with the customer. The firm may read a higher probability of demand, but the tourist reads a higher price. Between these two interpretations there is often a gap. In online tourism markets, price fairness becomes important precisely because consumers do not always see the logic behind the change. A higher price may be accepted when it appears connected to scarcity, seasonality or late booking, but it may be rejected when it looks arbitrary, hidden or personalized in a way the consumer did not expect. Evidence from online accommodation markets and studies on hotel dynamic pricing show that the meaning attached to the price can be as important as the amount itself (Alderighi et al., 2022; Qi et al., 2024).

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This is where algorithmic pricing becomes more than a technical matter. The tourist does not evaluate only the room, the seat or the package, but also the perceived honesty of the transaction. When an algorithm is believed to be involved, the same price difference may receive a different moral interpretation. Consumers may ask whether they are paying more because demand is high, because they booked late, because they used a certain platform, or because the system has identified them as willing to pay more. Studies on algorithmic cues and tourists' attribution of price changes suggest that price variation is often judged through blame, explanation and perceived responsibility, not only through economic rationality (Choi et al., 2023; Ying et al., 2024).

Personalized pricing deepens this tension. In theory, different prices can reflect different needs, timing, flexibility or willingness to pay. In practice, however, tourists may experience personalization as an invisible sorting mechanism. A traveller can accept a discount for early booking more easily than a price difference that seems to come from personal data, device type, location or previous behaviour. The literature on personalized pricing shows that fairness perceptions influence consumer reactions, while comparisons between algorithmic and human based demographic pricing indicate that the perceived source of discrimination matters. Ethical analyses also question whether personalized pricing can be considered superior to unitary pricing when it creates unequal treatment that consumers cannot clearly understand (Heidary & Pluut, 2025; Duani et al., 2024; Mazrekaj et al., 2025).

The regulatory and ethical debate reinforces this point. Price personalization may be commercially attractive, but in tourism it can easily become sensitive because the purchase is often high value, emotionally loaded and connected with expectations of relaxation, safety and trust. A price that feels intrusive may damage not only one transaction, but also the consumer's attitude toward the firm, platform or even destination. Recent research links personalized pricing with responsibility under the European legal framework, while destination level studies suggest that algorithm led price discrimination can influence tourist attitudes beyond the immediate booking decision (van der Rest & Heidary, 2024; Li et al., 2025).

Another important point in the literature is that algorithmic pricing does not fit all tourism services in the same way. Some services offer the kind of structure that algorithms like: repeated transactions, measurable capacity, historical data, clear booking windows and relatively standardized units. Hotels, airlines, car rentals, cruises and large attractions usually provide such conditions. Other services are more difficult to automate because the product is bundled, negotiated or partly

personalized. Tour packages, local guided experiences, wellness services and tailor made trips often combine suppliers, fixed contracts, subjective value and less frequent demand patterns. This difference matters because the same pricing logic can produce strong efficiency in one sector and operational confusion in another.

Consumer reaction becomes especially relevant when pricing is automated across digital channels. Online travel agencies and tourism platforms make prices visible, comparable and unstable at the same time. A tourist can see a price today, return tomorrow and find another price, sometimes without understanding what changed. In this environment, algorithmic pricing may affect trust, loyalty and word of mouth. Studies on pricing agents, negative word of mouth and online travel agencies show that the consequences of price discrimination do not end at the moment of purchase. They can return later as distrust, complaints or weaker loyalty (Wang et al., 2025; Wang et al., 2024).

The hospitality literature also reminds us that performance is not only a question of operational efficiency. In hospitality, value is filtered through service quality, guest perception and the ability of the firm to create a credible experience. Ojodu et al. (2026), in Annals of Spiru Haret University. Economic Series, discuss business performance in the hospitality sector through the lens of quality management. Although their work does not focus on algorithmic pricing, it is useful here because it supports a broader idea: tourism performance cannot be reduced to internal optimization. If price changes are perceived as disconnected from service value, revenue management may improve short term income while weakening perceived quality.

Overall, the literature shows a field divided between promise and caution. On one side, algorithmic pricing improves forecasting, segmentation, capacity use and market responsiveness. On the other side, it brings fairness concerns, ethical tension, legal questions, possible discrimination and trust problems. What remains less developed is a comparative reading inside tourism itself. Many studies examine dynamic pricing, demand forecasting or fairness as general mechanisms, but fewer explain why algorithmic pricing is easier to apply in some tourism services and more difficult in others. This article builds on that gap by comparing tourism services according to capacity visibility, perishability, data intensity, standardization and service complexity.

Theoretical Background

The theoretical background of this article starts from the fact that tourism services are consumed by time before they are consumed by tourists. A room night,

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a flight seat, a rental day, a cruise cabin or an entrance slot has value only before the moment of use passes. After that, the service cannot be recovered, stored or returned to the market. This gives tourism pricing a fragile economic logic: the firm does not price only a service, but also the risk that the service may expire unsold. Revenue management appears exactly at this point, where the firm has to decide how to sell something that is valuable now, uncertain tomorrow and worthless after the moment of consumption has passed (Kopalle et al., 2023; van der Rest et al., 2022).

In this logic, price becomes a way of organizing uncertainty. The same hotel room may be physically unchanged, but its economic meaning differs when it is booked three months before arrival, one day before a major event or during a period of weak demand. Algorithmic pricing extends this logic by reading signals that managers could not process with the same speed: booking rhythm, cancellations, online searches, reviews, photos, short videos and other digital traces of tourist interest. Demand is therefore not only observed after sales are completed, but partially anticipated while tourists are still comparing, hesitating and deciding (Chenavaz & Dimitrov, 2025; Viverit et al., 2023; Wu et al., 2024; Xu et al., 2024; Hu et al., 2024).

The first concept used in the article is perishability. The more clearly a tourism service expires, the stronger the economic argument for revenue management becomes. Hotels, airlines, car rentals, cruises and attractions usually have visible units of capacity, such as rooms, seats, vehicles, cabins or tickets. These units can be counted, monitored and repriced with relative precision. The situation changes when the tourism product is assembled rather than simply sold. Tailor made trips, guided experiences, wellness services and complex packages depend on suppliers, contracts, personal expectations and small operational details that are difficult to translate into a clean pricing formula (Kopalle et al., 2023; van der Rest et al., 2022).

The second concept is standardization. Pricing algorithms work better when the product can be compared with similar units. A room category, a seat class or a ticket type can be inserted into a pricing system more easily than a package holiday that includes accommodation, transport, meals, transfers, guides, insurance, commissions and negotiated supplier contracts. In bundled tourism products, price is not only a response to demand, but also the result of previous agreements and operational constraints. In such cases, the algorithm has less freedom to move, because the price is tied not only to demand, but also to previous negotiations,

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service combinations and the way the tourist understands the offer (van der Rest & Heidary, 2024; Li et al., 2025).

The third concept is willingness to pay. Dynamic pricing assumes that tourists differ in urgency, flexibility, income, motivation and price sensitivity. This can help firms adapt prices to different booking moments and consumer segments. A higher price is not automatically perceived as unfair. Tourists often understand why prices rise in peak season or close to the travel date. The discomfort appears when the difference seems to come from something they cannot see, such as personal data, platform behaviour or an invisible classification made by the system. At that point, price differentiation stops being only an economic technique and becomes a question of fairness (Alderighi et al., 2022; Choi et al., 2023; Heidary & Pluut, 2025).

The fourth concept is trust. Tourism is usually paid for before it is experienced, so the transaction already depends on a promise. When prices change repeatedly or without a visible explanation, the tourist may not see efficiency, but opacity. When the price changes, tourists rarely see it as a purely neutral movement. They usually search for an explanation: maybe demand increased, maybe the platform reacted, maybe the company changed its strategy, or maybe the algorithm treated them differently because of their own booking behaviour (Qi et al., 2024; Ying et al., 2024).

The framework of the article therefore connects two forms of logic. Capacity logic asks how tourism businesses can reduce empty inventory and protect revenue. Trust logic asks whether tourists still perceive the price as understandable and legitimate. Algorithmic pricing becomes valuable when these two logics work together. The risk begins when the price is successful for the system but suspicious for the traveller. In that situation, the firm may protect revenue in the short term, while losing part of the trust that makes future bookings, loyalty and positive word of mouth possible (Duani et al., 2024; Mazrekaj et al., 2025; Wang et al., 2024; Wang et al., 2025).

This theoretical background explains why algorithmic pricing is not equally applicable across tourism services. It is easier where capacity is visible, inventory is standardized and data are abundant. It is harder where the product is bundled, negotiated, personalized or emotionally complex. The success of revenue management in tourism should therefore be evaluated not only through revenue gains, but also through transparency, perceived fairness and the preservation of consumer confidence.

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Methodological Approach

The article uses a literature based conceptual analysis, suitable for a study that aims to compare the applicability of algorithmic pricing and revenue management across different tourism services. The purpose is not to test a statistical model, but to build an analytical interpretation from recent academic literature and to organize the existing knowledge around a specific question: why algorithmic pricing is easier to apply in some tourism services and more difficult in others.

The selection of sources followed four main criteria. First, priority was given to recent studies published between 2022 and 2025, in order to reflect the current development of algorithmic pricing, artificial intelligence, demand forecasting and consumer fairness debates. Second, the analysis focused mainly on articles published in journals indexed in Scopus and Web of Science, with preference for journals ranked in Q1 and Q2 where available. Third, the selected sources had to be directly connected with at least one of the main themes of the article: dynamic pricing, revenue management, tourism demand forecasting, algorithmic decision making, personalized pricing, consumer trust or perceived fairness. Fourth, one relevant article published in Annals of Spiru Haret University. Economic Series was included, in line with the journal's recommendation to refer to related ASHUES publications where relevant.

The final reference base includes twenty sources. Nineteen of them are external academic articles and one is an ASHUES article related to business performance in the hospitality sector. The external sources were selected from recent research streams in tourism management, hospitality management, marketing, business ethics, retailing and revenue pricing. This combination was necessary because algorithmic pricing in tourism is not only a tourism management issue. It also involves consumer behaviour, digital market mechanisms, ethical evaluation and managerial decision making.

The analysis was conducted in three steps. The first step identified the main economic conditions that make revenue management possible in tourism: perishability, limited capacity, demand uncertainty, data availability and service standardization. The second step connected these conditions with the literature on algorithmic pricing, demand forecasting and personalized pricing. The third step interpreted the possible consequences for tourism businesses and consumers, especially in terms of economic efficiency, operational limits, transparency, perceived fairness and consumer trust.

Based on this approach, the article develops a comparative conceptual framework rather than an empirical ranking. Tourism services are compared

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according to their structural characteristics, such as visibility of capacity, intensity of data flows, level of standardization, supplier dependence and degree of personalization. This makes it possible to explain why algorithmic pricing is more suitable for services with clear inventory and repeated transactions, while it becomes more difficult in services that combine several suppliers, negotiated costs and subjective tourist expectations.

Results and Discussion

Algorithmic pricing behaves differently depending on what tourism asks it to price. When the service is clear, countable and repeated, the algorithm has a solid object in front of it: a room, a seat, a car, a cabin, a ticket, a table or a time slot. When the service is built from many pieces, the object becomes less stable. A package holiday, a private itinerary or a guided local experience is not only inventory. It is a mix of contracts, people, timing, expectations, margins and promises. For this reason, the question is not whether tourism can use algorithmic pricing, but how much of each tourism service can actually be translated into data without losing the meaning of the experience (Kopalle et al., 2023; van der Rest et al., 2022).

Table no. 1. Applicability of Algorithmic Pricing and Revenue Management across Tourism Services

Tourism service category	Capacity and service structure	Applicability of algorithmic pricing	Main explanation
Air transport	Fixed seats linked to route and departure time	Very high	Seats are standardized, perishable and supported by large booking datasets.
Hotel accommodation	Fixed rooms per night and room category	Very high	Rooms are clear inventory units, and each unsold night becomes unrecoverable revenue.
Car rentals and cruises	Vehicles or cabins linked to date, location or itinerary	High	Capacity is measurable and time bound, although logistics and package elements add complexity.
Attractions and theme parks	Tickets, visitor limits or time slots	Moderate to high	Demand peaks can be priced, but access prices remain

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Tourism service category	Capacity and service structure	Applicability of algorithmic pricing	Main explanation
			sensitive from a fairness perspective.
Restaurants, wellness and spa services	Tables, appointment slots, treatment rooms and staff time	Moderate	Capacity expires quickly, but service atmosphere and personalization limit full automation.
Guided tours and local experiences	Small groups, guide availability and itinerary conditions	Low to moderate	Value depends on human delivery, local context and subjective experience.
Tour operators and tailor made trips	Bundled or personalized services combining several suppliers	Low to moderate	The price is shaped by contracts, commissions, negotiated costs, minimum group size and operational risk.

Source: Authors' own synthesis based on Kopalle et al. (2023), van der Rest et al. (2022), Viverit et al. (2023), Wu et al. (2024), Xu et al. (2024) and Hu et al. (2024).

Table no. 1 can be read as a map of how easily tourism services become algorithmic objects. Air transport and hotel accommodation are placed at the top because their inventory is visible and their losses are immediate. A seat after take off and a room after the night has passed no longer wait for another customer. Their value disappears with the clock. This makes revenue management almost native to these services, because the firm must constantly decide whether to protect the price, stimulate demand or avoid empty capacity (Kopalle et al., 2023; Viverit et al., 2023).

Hotel accommodation also illustrates how pricing has moved from simple occupancy control to a more sensitive reading of demand. A hotel can now observe not only confirmed reservations, but also the rhythm of bookings, review sentiment, uploaded photos and other signs of destination attention. The market begins to speak before the purchase is completed. Tourists search, compare, comment, postpone and return, leaving traces that can be used to anticipate demand. In this sense, algorithmic pricing does not wait for demand to fully arrive. It tries to hear demand while it is still forming (Viverit et al., 2023; Wu et al., 2024; Xu et al., 2024).

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A middle zone appears in services where capacity expires, but the price is read more directly as part of the experience. Attractions, restaurants, wellness and spa services can use dynamic pricing, yet the consumer reaction is usually more sensitive than in accommodation or air transport. A tourist may understand why a hotel room becomes more expensive during a major event, but may question a changing price for an attraction ticket, a restaurant table or a spa appointment if the reason is not visible. In these cases, revenue management needs a softer form, where price variation follows demand without making the experience feel unstable or opportunistic (Alderighi et al., 2022; Qi et al., 2024).

The lower part of the table includes services where tourism is assembled rather than allocated. Guided tours, local experiences, tour operator packages and tailor made trips depend on several layers of value: suppliers, contracts, human delivery, itinerary design, customer expectations, commissions and operational risk. The algorithm can still help with forecasting, scenario building or margin control, but it cannot move the final price as freely as in a hotel or airline system. In these services, the final offer remains partly a managerial judgement, because the price must connect negotiated costs with the tourist's perception of a coherent experience (van der Rest et al., 2022; van der Rest & Heidary, 2024).

This comparison weakens the idea that algorithmic pricing is one universal solution for tourism. It is powerful where the service is repetitive, measurable and perishable. It becomes more fragile where the service is negotiated, emotional, customized or delivered through people rather than through inventory alone. A correct price in the system may still be a poor price in the eyes of the tourist if it feels disconnected from the value promised. In tourism, the price is never only a number. It is also a small explanation of why the service is worth what the traveller is asked to pay (Choi et al., 2023; Ying et al., 2024).

The first table clarifies where algorithmic pricing can be applied more easily, but applicability does not automatically mean acceptability. A tourism service may be technically suitable for dynamic pricing and still create discomfort if the tourist cannot understand the reason behind the price movement. For this reason, the analysis must move from the structure of the service to the consequences of pricing itself. The next table therefore looks at algorithmic pricing from a second angle: what the firm gains economically, what the consumer may perceive as problematic and what managers should control before price optimization becomes a source of distrust. This shift is important because in tourism the price is rarely judged alone. It is judged together with the promise of the trip, the visibility of scarcity and the credibility of the provider.

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Table no. 2. Economic Benefits, Operational Limits and Consumer Trust Risks of Algorithmic Pricing in Tourism

Dimension	Economic opportunity	Consumer trust risk	Managerial implication
Demand forecasting	Anticipates strong and weak demand periods.	Tourists may not understand why invisible signals change the price.	Use forecasts to support pricing, but avoid unexplained price movements.
Capacity optimization	Reduces empty rooms, seats, vehicles or time slots.	Scarcity based pricing may appear aggressive.	Link price variation to visible capacity conditions when possible.
Personalized pricing	Adapts prices to different booking contexts and willingness to pay.	May be perceived as hidden profiling or unequal treatment.	Keep personalization moderate and review its fairness effects.
Last minute pricing	Helps recover revenue close to the moment of consumption.	Frequent changes may create confusion or strategic waiting.	Combine last minute flexibility with a stable pricing logic.
Peak period pricing	Protects revenue during high demand.	Sharp increases may be seen as opportunistic.	Separate normal peak pricing from moments where fairness expectations are stronger.
Channel based pricing	Reflects platform commissions and distribution costs.	Consumers may feel punished for using a specific channel.	Keep channel differences limited and understandable.
Algorithmic segmentation	Improves targeting and revenue precision.	Invisible segments may look discriminatory.	Maintain human oversight and audit pricing outcomes.
Transparency	Can make price changes easier to accept.	Silence around price logic weakens legitimacy.	Explain the main reasons for variation without exposing the full pricing system.
Consumer trust	Supports loyalty when prices appear legitimate.	Once damaged, trust is difficult to rebuild.	Treat trust as part of revenue management, not only as a marketing result.

Source: Authors' own synthesis based on the literature review.

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Table no. 2 places the same pricing decision in two different mirrors. In the firm's mirror, the algorithm may look efficient: it predicts demand, protects capacity, separates segments and reacts quickly. In the tourist's mirror, the same process may look unstable: the price seen yesterday is not the price seen today, and the reason is not always clear. This distance between managerial intelligence and consumer interpretation is where algorithmic pricing becomes delicate (Alderighi et al., 2022; Heidary & Pluut, 2025).

Demand forecasting is the least controversial element because it helps tourism businesses prepare for demand before demand becomes visible in sales. Reviews, booking curves, images and short videos can all enrich the reading of future interest. Yet the traveller does not usually see the chain of signals behind the number. The traveller sees a price that moves. If the movement appears sudden or unexplained, the quality of the forecast does not automatically protect the firm from suspicion (Hu et al., 2024; Wu et al., 2024; Xu et al., 2024).

Personalized pricing is more difficult because it enters a private zone of the transaction. Tourism has long accepted price differences based on early booking, season, group size, loyalty membership or flexible conditions. Those differences are usually understandable. The discomfort begins when the customer suspects that the price reflects something less visible: device type, location, browsing behaviour, previous searches or a profile created by the platform. Then personalization stops looking like convenience and starts looking like silent sorting (Duani et al., 2024; Mazrekaj et al., 2025).

Trust works here like an invisible cost that does not always appear in revenue indicators. A pricing system may increase revenue per available unit and still weaken future demand if customers feel that the transaction was unfair. This is especially important in digital tourism markets, where price changes can be noticed, compared, saved, discussed and shared. A small gain extracted from one booking can become expensive if it produces distrust, complaints or negative word of mouth later (Wang et al., 2024; Wang et al., 2025).

The reputational effect can also travel beyond the firm. When travellers cannot understand a price change, they may blame the platform, the hotel, the airline, the destination or the algorithm itself. A destination may start to feel expensive or opportunistic if tourists repeatedly encounter unexplained price movements. In this way, algorithmic pricing does not remain inside the booking engine. It can influence the way travellers imagine the fairness of a tourism market (Choi et al., 2023; Ying et al., 2024; Li et al., 2025).

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The managerial responsibility therefore changes rather than disappears. Managers may no longer set every price manually, but they still decide what the system is allowed to read, how far prices may move, when human review is necessary and how much explanation the customer receives. The question is not only whether artificial intelligence can optimize prices. The harder question is whether the firm can govern that optimization in a way that remains responsible, auditable and acceptable to consumers (van der Rest & Heidary, 2024).

For tourism businesses, the safest use of algorithmic pricing is selective rather than uniform. A hotel room or an airline seat can tolerate a higher degree of automatic adjustment because the unit is clear and the moment of loss is precise. An attraction ticket, a restaurant table or a spa appointment needs more visible justification when the price changes, because the customer reads the price as part of the experience, not only as a response to demand. In tour operating and tailor made travel, algorithms are more useful behind the scenes, where they can test margins, forecast demand and compare scenarios before a human manager turns the numbers into an offer (Kopalle et al., 2023; van der Rest et al., 2022).

The hospitality perspective adds an important warning: a price can be financially correct and still feel wrong to the guest. Performance in hospitality is built not only from occupancy, revenue or internal efficiency, but also from the customer's belief that the service received justifies the amount paid. In this sense, dynamic pricing becomes part of perceived quality. If the tourist feels that the price moved too far away from the promised experience, the business may win the transaction and lose part of the relationship (Ojodu et al., 2026).

Overall, algorithmic pricing in tourism should be understood less as a machine that discovers the highest possible price and more as a managerial filter that must decide which price can be both profitable and believable. The future of revenue management will not depend only on stronger algorithms, but also on better limits around their use. The most mature pricing systems may be those that know when to adjust, when to pause and when to explain. In tourism, the number shown to the customer is also a signal of scarcity, a promise of value and a test of trust.

Conclusions

Algorithmic pricing in tourism cannot be understood as a single technique that works in the same way everywhere. The main outcome of this article is that its applicability depends strongly on the structure of the service being priced. Where tourism services are clear, countable, perishable and supported by repeated booking data, as in air transport and hotel accommodation, revenue management can

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operate with greater precision. Where the service is assembled from contracts, suppliers, human delivery and personalized expectations, as in tour operating, guided experiences or tailor made trips, the same logic becomes less automatic and more dependent on managerial judgement.

A second outcome is that algorithmic pricing creates value only when efficiency and trust remain connected. From the firm's perspective, dynamic prices can reduce empty capacity, improve demand anticipation, protect margins and support faster reactions to market changes. From the tourist's perspective, however, the same price movement can appear unstable, opaque or unfair if the reason behind it is not understandable. This means that the real limit of algorithmic pricing is not only technological. It is also relational. A price may be correct for the system and still be wrong for the customer if it breaks the perceived link between payment, value and fairness.

The implications are relevant for tourism managers. Algorithmic pricing should not be adopted as a universal solution, but calibrated according to the nature of each tourism service. Hotels, airlines and car rental companies may rely more on automated adjustment because their inventory is visible and perishable. Attractions, restaurants, wellness services and local experiences need a more careful balance between demand based prices and the customer's perception of the experience. Tour operators and tailor made travel providers should use algorithms mainly for forecasting, scenario analysis and margin control, while keeping the final pricing decision closer to human interpretation.

The article also suggests that transparency should become part of revenue management, not an external ethical add on. Tourism businesses do not need to reveal the full logic of their algorithms, but they do need pricing rules that tourists can still recognize as reasonable. When the price changes because of seasonality, limited availability, booking time or demand peaks, the customer should be able to understand the broad reason. A completely silent pricing system may be efficient in the short term, but it can slowly reduce trust, especially in digital markets where tourists compare prices repeatedly and remember unexplained differences.

Future research could test these arguments closer to the tourist's actual decision moment. It would be useful, for example, to observe how travellers react when the same price change appears in different contexts: a hotel room during a crowded event, an airline ticket close to departure, an attraction ticket during peak demand or a package holiday with several included services. Another useful direction would be to examine whether a short explanation of the price change reduces suspicion, especially when the increase is linked to availability, booking time or

demand pressure. Future studies may also compare different types of tourists, because a frequent business traveller, a student, a family tourist and a luxury traveller may not read algorithmic prices in the same way. Finally, more attention should be given to platform responsibility, especially when the tourist does not know which data have been used, who controls the pricing rule and where the boundary lies between legitimate segmentation and unfair personalization.

Overall, algorithmic pricing should be seen as a powerful but delicate instrument in tourism. Its best use is not to push every price to the highest possible level, but to find a price that protects the firm without damaging the traveller's confidence. In a sector built on promises, anticipation and experience, the price is never only a calculation. It is also part of the story the tourist tells about whether the business was fair, credible and worth returning to.

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FORESHADOWING INNOVATION AS A STRATEGIC DEVICE OF SYMBOLIC, COGNITIVE AND COMPETITIVE ANTICIPATION IN COMPLEX SYSTEMS WITH HIGH INFORMATION DENSITY

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Abstract

Innovation pre-announcements can influence market behaviour before a product or technology becomes available. This conceptual paper examines pre-announcement as a strategic mechanism through which organizations shape expectations, establish credibility and coordinate decisions under uncertainty. Drawing on signalling theory, innovation economics, organizational psychology and research on anticipatory cognition, it develops an interdisciplinary framework connecting symbolic communication, cognitive anticipation and competitive positioning. The analysis considers how announcements can support perceived value creation, encourage purchase planning and align organizational priorities, while also exposing firms to competitive imitation, cannibalization of existing products and premature strategic commitments. Particular attention is given to vaporware and to the consequences of discrepancies between announced promises and realized outcomes. The paper argues that the strategic effects of pre-announcements depend on the interaction between announcement credibility, stakeholder interpretation, organizational capabilities and subsequent delivery. It further examines how commitments to a publicly articulated future can motivate employees while constraining organizational learning and flexibility. The

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proposed framework positions pre-announcement as a form of anticipatory coordination whose benefits depend on responsible management of uncertainty and sustained consistency between communication and implementation. The contribution offers a basis for evaluating innovation communication beyond short-term visibility, emphasizing credibility, adaptability and the governance of commitments.

Keywords: *foreshadowing innovation; pre-announcement strategy; signaling theory; anticipatory economics; narrative economics; expectation management; vaporware; complex systems; cognitive anticipation; symbolic value creation; competitive strategy; innovation diffusion; organizational sensemaking; strategic communication; information asymmetry; behavioral economics.*

JEL Classification: O33; D82; D84; L26; M13; O31

1. Introduction

Innovation is often introduced to markets through communication before it is introduced through production. Firms announce forthcoming products, technological capabilities and strategic initiatives while development is still underway, inviting customers, competitors, investors and employees to make decisions about outcomes that remain uncertain. Such announcements can affect purchase timing, resource allocation and competitive responses well before an innovation becomes commercially available. Understanding innovation therefore requires attention to how organizations communicate possible futures and how stakeholders interpret and act on those communications.

Innovation pre-announcement refers here to the deliberate communication of a forthcoming product, technology or capability before its availability or implementation. It differs from a general statement of organizational ambition because it creates expectations about an identifiable future development. The announcement may specify features, intended benefits or a delivery schedule, although the degree of detail and commitment varies. Its strategic significance lies in its ability to connect present decisions with anticipated future outcomes.

Signalling theory and research on competitive positioning provide an initial explanation of this practice. A pre-announcement can communicate technological competence, indicate commitment to a market or encourage customers to postpone purchases until a new offering becomes available. It may also help establish an early position in an emerging market. However, these benefits depend on how audiences assess the signal and on whether the organization possesses the

capabilities needed to fulfil its commitments. Public visibility alone does not establish credibility, and an announcement that attracts attention may also reveal information to competitors or weaken demand for existing products.

An exclusively tactical interpretation consequently leaves several dimensions insufficiently connected. Stakeholders respond to announcements through judgments about feasibility, trust and relevance, as well as through imagined experiences of future use. Within organizations, the same announcement can influence investment priorities, employee expectations and perceptions of what successful innovation should achieve. Innovation pre-announcement thus links external communication with internal coordination, making it relevant to both market strategy and organizational management.

This paper develops a conceptual framework for examining those connections. It treats pre-announcement as an act of anticipatory coordination through which organizations articulate a possible future and invite stakeholders to orient their behaviour towards it. The framework brings together innovation economics, organizational psychology, research on anticipatory cognition and perspectives on collective expectations. Its purpose is to explain how symbolic communication can contribute to perceived value and competitive positioning while generating commitments that must subsequently be supported by organizational action.

Research on prediction and prospective thinking provides a useful basis for considering the cognitive dimension of this process. People assess future possibilities partly by drawing on memory, imagining potential experiences and interpreting available cues. These processes help explain why an announcement may become meaningful before the announced innovation exists. Nevertheless, evidence concerning anticipation in experimental settings cannot, by itself, establish the effects of innovation announcements on purchasing behaviour or organizational performance. The cognitive perspective is therefore used to inform the conceptual framework rather than to claim a direct or universal neural explanation of market outcomes.

The central research question is: **How do innovation pre-announcements shape stakeholder expectations and organizational commitments, and under what conditions do these effects support or undermine competitive advantage?** Addressing this question requires consideration of both the benefits and the risks of anticipation. Credible announcements may reduce perceived uncertainty, facilitate planning and mobilize resources. Conversely, premature or exaggerated promises may expose firms to competitive responses, constrain adaptation and damage trust when implementation falls short of expectations.

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Vaporware illustrates this tension. Announcements of products that remain unavailable, are repeatedly delayed or fail to deliver the promised capabilities can create a persistent gap between communication and realization. Yet development delays should not automatically be equated with deception: innovation involves genuine technical and commercial uncertainty. The relevant issue is how organizations represent that uncertainty, revise their commitments and communicate changes to affected stakeholders.

The paper's contribution is to connect expectation formation, organizational coordination and competitive strategy within a single analytical framework. It argues that the value of pre-announcement should be assessed through the credibility of the promise, its effects on stakeholder decisions and the organization's capacity to deliver or responsibly revise it. This perspective places the governance of anticipation at the centre of innovation communication, emphasizing the practical relationship between what organizations announce, what they can achieve and how they maintain trust over time.

2. LITERATURE REVIEW

Recent research provides several complementary perspectives for understanding innovation preannouncement as a strategic practice that shapes expectations before a product or technology becomes commercially available. Studies on signalling, consumer responses, investor behaviour, technological hype and responsible innovation indicate that announcements can influence how stakeholders interpret an organisation's future capabilities. However, these contributions also reveal important differences between attracting attention, establishing credibility and maintaining support over time. The following review brings together these perspectives to develop the conceptual foundations of innovation foreshadowing.

2.1. Innovation preannouncement and strategic signalling

Signalling theory provides a useful foundation for analysing innovation preannouncement under conditions of information asymmetry. Connelly et al. (2025) explain how observable signals communicate information about qualities that stakeholders cannot directly assess. Their review emphasises the importance of signal costs, credibility, contextual conditions and the relationships between different actors within signalling systems. Applied to innovation preannouncement, this perspective suggests that communicating future capabilities can influence stakeholder assessments, but that an announcement's persuasive strength depends on the evidence and commitments supporting it. A compelling description of an

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innovation should therefore be distinguished from a credible indication of the organisation's ability to deliver it.

Recent empirical research further demonstrates that innovation communication should be understood as a sequence of interdependent signals. Mishra and Dalman (2023) examine how the economic value of product introduction announcements depends on earlier preannouncements. Their findings show that investor responses to launch announcements vary according to whether previous communications involved costly or costless signals. This contribution challenges the treatment of announcements as isolated events: stakeholders interpret new information in relation to what the organisation has already communicated. For the present article, this supports an understanding of foreshadowing as a process that establishes expectations against which subsequent developments are evaluated.

2.2. Consumer expectations and investor responses

The effectiveness of preannouncement also depends on the characteristics of its audience. Wang et al. (2022) investigate the relationship between announcement specificity, consumers' regulatory focus and word-of-mouth intentions. Across three experiments, they find that promotion-focused consumers respond more favourably to vague preannouncements, whereas prevention-focused consumers exhibit stronger word-of-mouth intentions following specific announcements. Curiosity and outcome expectancy explain these respective responses, while brand familiarity limits the circumstances in which the effects occur. These findings indicate that neither ambiguity nor specificity constitutes a universally effective communication strategy. Instead, announcement design must account for how different consumers approach opportunities, uncertainty and anticipated outcomes.

A similar differentiation appears in financial markets. Bhattacharya and Sardashti (2022) show that new product preannouncements appeal differently to institutional and individual investors. Their findings connect investor responses to factors including media and analyst coverage, firm risk and the organisation's emphasis on exploration. Preannouncement therefore operates within a broader interpretative environment, where stakeholders possess unequal knowledge, resources and investment horizons. Together, these studies suggest that innovation foreshadowing does not generate a single, uniform expectation. It produces multiple responses shaped by audience characteristics and the information surrounding the announcement.

2.3. Collective expectations, hype and organisational flexibility

Beyond individual responses, recent scholarship examines how expectations influence innovation at organisational and market levels. Shi and Herniman (2023) develop a conceptual framework connecting technological hype cycles with

innovation diffusion. Their analysis places expectations at the centre of early innovation development and adoption, highlighting the need to understand how these expectations evolve. This perspective supports the distinction between the availability of a technology and the meanings attributed to its anticipated future. For innovation foreshadowing, it suggests that announcements can contribute to the formation of expectations that influence decisions before the innovation is fully realised.

Logue and Grimes (2022) extend this discussion by examining how new ventures manage future-oriented visions in the emerging market of impact investing. Their longitudinal study shows that hype can attract stakeholder support while also creating expectations that restrict organisational flexibility. Consequently, a future-oriented narrative may function simultaneously as a resource and a source of obligation. This finding is particularly relevant to the present article's treatment of preannouncement as a performative promise: publicly articulated visions can mobilise support, but they also establish expectations that organisations must subsequently address.

Research on the period following technological hype adds an important temporal dimension. Schweitzer et al. (2026) investigate resilience-seeking activities within the extended reality technology ecosystem. They identify three sets of responses to declining excitement and support: forging new links, restoring confidence and adjusting technology. Their findings indicate that managing expectations extends beyond generating initial enthusiasm. Although their study concerns ecosystem recovery rather than product preannouncement directly, it provides a useful basis for considering how organisations respond when anticipated possibilities exceed demonstrated performance.

2.4. Responsible anticipation and stakeholder governance

The strategic value of anticipation must also be considered alongside its ethical and organisational implications. Mangelkramer (2022) argues that responsibility should be embedded within innovation processes for sustainability. Her systematic review identifies the limitations of treating sustainable innovation as automatically desirable and highlights the need to consider future consequences and potential trade-offs. Applied to preannouncement, this perspective raises questions about how organisations communicate uncertain benefits, acknowledge limitations and account for the wider consequences of the futures they promote. These applications represent an extension of the reviewed framework to innovation communication.

Wiarda et al. (2022) provide further insights through their investigation of responsible innovation in standardisation. Their study examines anticipation, inclusion, reflexivity and responsiveness as procedural dimensions through which

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innovation-related decisions can address ethical concerns. Although standardisation differs from preannouncement, these dimensions offer a relevant analytical framework for governing anticipatory communication. They suggest examining potential consequences, involving affected stakeholders, questioning organisational assumptions and retaining the capacity to revise commitments when circumstances change.

The importance of stakeholder relationships is also supported by Adomako and Tran (2022). Using data from 225 firms, they find that responsible innovation mediates the relationship between environmental collaboration and firm performance, while stakeholder pressure strengthens the relationship between collaboration and responsible innovation. Their study does not test announcement strategies, but it demonstrates why responsibility should be examined within organisational relationships rather than treated exclusively as a communication principle. For innovation foreshadowing, this suggests considering whether the organisation's external promises are supported by collaborative practices and internal decision processes.

2.5. Synthesis and positioning of the present study

Taken together, these studies identify three interconnected dimensions of innovation foreshadowing. First, preannouncements communicate signals whose credibility depends on their supporting commitments and their relationship with subsequent events. Second, their effects vary across audiences and can develop into collective expectations that mobilise resources while constraining flexibility. Third, responsible anticipation requires attention to uncertainty, stakeholder participation and the capacity to adjust innovation trajectories.

The present article brings these dimensions into a common conceptual framework. It interprets innovation foreshadowing as a practice through which organisations influence expectations about the future while assuming obligations concerning its realisation. This synthesis also identifies questions for further research: how announcement specificity affects credibility over time; how organisations preserve flexibility after making public commitments; and how discrepancies between communicated promises and delivered outcomes influence stakeholder trust. The reviewed studies provide strategic, behavioural and governance foundations for these questions, while leaving room for their integrated examination.

3. Announcing innovation

In the context of advanced economies characterized by hypercompetition, the temporal acceleration of technological cycles and the growing centrality of cognitive and symbolic processes in the construction of economic value, the

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anticipation of innovation can no longer be interpreted as a simple communicative lever or as a tactical practice of anticipatory marketing, but as a real **strategic device for the anticipatory modulation of collective** expectations, capable of intervening simultaneously on the cognitive, affective, neural, semiotic and competitive levels of the market system. In this perspective, the pre-announcement is configured as a performative act with a high informational intensity, which acts not so much on the object-product as such, but on **the pre-decisional structure of the minds of consumers, competitors and investors**, affecting the mechanisms of prediction, mental simulation and probabilistic anticipation that guide human economic behavior, as amply demonstrated by the neuroscientific literature on predictive coding and the anticipatory brain (Friston, 2010; Clark, 2013; Bar, 2009). The early announcement of an innovation introduces an **incomplete but highly salient signal into the system**, which operates as a distributed cognitive constraint, orienting future decision-making trajectories through a process of symbolic anchoring and early stabilization of preferences, according to dynamics that can be traced back both to the economic theory of signals and to the most recent acquisitions of experimental neuroeconomics developed in the laboratories at Harvard, Yale and Berkeley (Glimcher & Fehr, 2014; Camerer, Loewenstein & Prelec, 2005). In this framework, the pre-announcement assumes the function of an **external cognitive artifact**, in the Vygotskian sense of the term, capable of extending and restructuring individual and collective decision-making processes, operating as a symbolic mediator between future innovation and present mental representations. From a semiotic-strategic point of view, the pre-announcement does not communicate so much technical information as **horizons of possibility**, activating what Peirce would have called an anticipatory semiosis, in which the sign does not refer to an object already given but to a possible object, not yet actualized, whose strength lies precisely in its controlled indeterminacy. This vagueness, far from being a limit, is the very condition for the strategic effectiveness of the pre-announcement, since it allows the firm to occupy a future cognitive space before it is saturated by competitors, producing a symbolic preemption effect that precedes and prepares the market preemption (Robertson, Eliashberg & Rymon, 1995). Neuroscientific research conducted in the last fifteen years has shown how the anticipation of a desired event activates mesolimbic dopaminergic circuits analogous, and in some cases superior, to those activated by the actual consumption of the good, suggesting that the perceived economic value does not reside exclusively in the act of consumption, but to a significant extent in the anticipatory phase (Knutson et al., 2007; Berridge & Kringelbach, 2015). In

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this sense, the pre-announcement of innovation can be interpreted as a **strategy of early colonization of motivational circuits**, which exploits the extended temporality of desire to build cognitive fidelity even before the material availability of the product. However, the same dynamic that makes early warning potentially beneficial is also the main source of systemic risk. The introduction of an anticipatory signal in a highly reactive competitive environment is in fact equivalent to making public a strategic trajectory that can be intercepted, reinterpreted or neutralized by competitors, especially in contexts characterized by low barriers to entry, high technological mobility and strong imitative capacity. Russian economic literature, in particular studies developed at Moscow State University and St. Petersburg University, has shown that in dynamic oligopolistic markets, early warning can trigger strategic counter-signaling processes that drastically reduce the innovator's time advantage, transforming anticipation into a form of premature exposure (Мацумото, 2004; Иванов & Петров, 2012). Added to this is the risk of internal cannibalization, which cannot be reduced to a simple subtraction of sales between products, but must be interpreted as an **early restructuring of value expectations**, in which the future product symbolically devalues the present product before the latter has exhausted its economic cycle. This phenomenon is reflected in neuroscientific models of intertemporal decision-making, which show how the representation of a superior future alternative can reduce the neural activation associated with immediate choice, inducing waiting behaviors even in the presence of significant costs (McClure et al., 2004). Even more complex is the reputational risk associated with the discrepancy between pre-announcement and implementation, which in the extreme case of vaporware is configured as a systematic violation of the trust agreement between the company and the market. From a cognitive point of view, this violation produces a dissonance that is not simply absorbed, but leaves lasting negative memory traces, as demonstrated by studies on negativity bias and emotional memory conducted at Yale and Cambridge (Baumeister et al., 2001; Dolan, 2002). In almost Talmudic terms, we could say that "הֶאֱמֶת זֵכֶר מִן חָזָק הַכְּזָב זֵכֶר" ("the memory of the lie is stronger than the memory of the truth"), underlining how credibility, once compromised, requires disproportionately long recovery times compared to the immediate advantage obtained. In an intercultural comparative perspective, it is interesting to note that the conception of the forewarning varies significantly between economic and cultural traditions. In the Anglo-Saxon tradition, strongly oriented towards signaling and strategic transparency, the pre-announcement is often conceived as a legitimate tool for managing expectations, while in cultural

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contexts influenced by more relational or symbolic matrices, such as those of Eastern Europe or the Caucasus, greater caution prevails towards the early verbalization of innovation, in line with a principle that we could trace back to the ancient Georgian adage «სიტყვა ნაადრევად ნათქვამი — საქმე დაგვიანებულ " ("the word spoken too soon delays action"). The pre-announcement of innovation, far from being a simple anticipatory communication technique that can be traced back to operational marketing practices, is configured, in an epistemologically advanced and interdisciplinary perspective, as a strategic device for the advance regulation of cognitive, affective and decision-making expectations within complex socio-economic systems characterized by high information density, cognitive asymmetry and dynamic competition with high speed. In this framework, the pre-announcement assumes the status of a performative act with a symbolic and predictive value, capable of simultaneously affecting the processes of construction of perceived value, the trajectories of intertemporal choice and the probabilistic anticipation mechanisms that govern the behavior of market players, according to dynamics that are reflected both in the economic theory of signals and in the most recent neuroscientific models of predictive processing and anticipatory decision-making (Boss & Manceau, 1997; Friston, 2010; Clark, 2013). In this perspective, the pre-announcement does not simply communicate incomplete information about a future object, but introduces into the system a distributed cognitive constraint, a sort of "anticipatory marker" that orients the formation of preferences, the restructuring of expectations and the temporalization of the desire to consume, operating at the pre-decisional level even before the conscious evaluation processes are activated. The neuroscientific evidence produced in the last two decades by US and Anglo-Saxon research centers – in particular at Harvard University, Yale University, University of California Berkeley, University of Oxford and University of Cambridge – shows how the anticipation of a desired event activates mesolimbic and cortico-striate dopaminergic circuits analogous, and in some cases more intense, than those activated by the experience of actual consumption, suggesting that a significant share of the perceived economic value resides in the anticipatory phase rather than in the act of consumption itself (Knutson et al., 2007; Berridge & Kringelbach, 2015; Bar, 2009). The pre-announcement of innovation therefore acts as an external cognitive artifact, in the Vygotskian sense of the term, capable of extending and restructuring individual and collective decision-making processes through symbolic mediation, anticipating the mental presence of the product before its material availability and producing an effect of "cognitive occupation of the

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future" that can translate into a competitive advantage that is difficult to reverse. This dynamic is particularly evident in markets characterized by high switching costs, complex decision-making processes and high technological uncertainty, in which the anticipatory anchoring of expectations reduces the propensity to explore competing alternatives and favors rational waiting behaviors, as already highlighted by the classical economic literature (Golder & Tellis, 1993; Urban et al., 1986) and subsequently confirmed by experimental neuroeconomics studies (Camerer, Loewenstein & Prelec, 2005). However, the same performative strength that makes the early announcement potentially advantageous constitutes its intrinsic core of systemic risk. The deliberate introduction of an anticipatory signal in a highly responsive competitive environment is in fact equivalent to making public a strategic trajectory that can be intercepted, imitated, neutralized or counter-reported by competitors, especially in dynamic oligopolistic contexts or in rapidly obsolescence technological sectors. In this sense, the pre-announcement is placed in a borderline area between strategic transparency and premature exposure, in which the line between effective reporting and competitive self-disclosure is extremely thin and depends on structural, cognitive and institutional variables that are difficult to control ex ante (Robertson, Eliashberg & Rymon, 1995; Gerlach, 2004). Research developed in the field of dynamic game theory and strategic competition, including those developed at Moscow State University and St. Petersburg University, has highlighted how early warning can trigger early reaction processes by competitors that reduce or cancel the innovator's time advantage, transforming anticipation into a factor of systemic vulnerability rather than strategic protection (Matsumoto, 2004; Иванов & Петров, 2012). In such contexts, the pre-announcement takes on a paradoxical function: instead of deterring entry or slowing down the competitive response, it accelerates the race for imitative innovation, producing an increase in competitive pressure and a compression of expected profit margins. In addition to these external risks, there are internal risks, linked to the anticipated cannibalization of existing products, a phenomenon that cannot be reduced to a mere redistribution of sales, but which must be interpreted as a cognitive restructuring of value expectations, in which the future product symbolically devalues the present product before the latter has exhausted its economic cycle. Neuroscientific studies on intertemporal decision-making conducted at Yale and Berkeley show how the mental representation of a future alternative perceived as superior significantly reduces the activation of the prefrontal areas associated with immediate choice, inducing procrastination behaviors of purchase even in the presence of high subjective costs (McClure et al.,

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2004; Kable & Glimcher, 2007). Even more complex and delicate is the reputational risk associated with the discrepancy between pre-announcement and implementation, which finds its most extreme expression in the phenomenon of vaporware. In cognitive terms, this discrepancy produces a violation of expectations that activates mechanisms of cognitive dissonance and negative emotional memory, which, as demonstrated by studies on negativity bias, tend to be more persistent and resistant to extinction than positive experiences (Baumeister et al., 2001; Dolan, 2002). In an almost aphoristic formulation, already present in the Semitic wisdom tradition, one could recall the Aramaic adage "קַיָּם דְּשִׁקְרָא זִכְרָא דְּקוּשְׁטָא זִכְרָא מִן טָפֵי" (zikrā de-šiqrā qayyām ṭfē min zikrā de-qušṭā), indicating that the memory of the lie tends to settle more deeply than that of the truth. The fiduciary dimension plays a crucial role here, since in contemporary markets with a high symbolic intensity, the value of the brand is increasingly based on intangible reputational capital, the erosion of which can produce long-term effects that are difficult to reverse. The antitrust and institutional economics literature has highlighted how systematic pre-announcement practices not followed by implementation can be configured not only as opportunistic strategies, but as real forms of manipulation of market expectations, with significant regulatory and regulatory implications (Haan, 2003; Dranove & Gandal, 2003; Levy, 1997). In a comparative historical-cultural perspective, it is significant to observe how the practice of forewarning takes on different values depending on cultural contexts and economic traditions. While in the Anglo-Saxon managerial culture the pre-announcement is often legitimized as a tool of rational signaling, in other traditions – including those of Eastern Europe and the Caucasus – a greater caution prevails towards the advance verbalization of innovation, in line with a principle of strategic confidentiality that is echoed in traditional maxims such as the Georgian proverb "ნათქვამი სიტყვა დაკარგული ისარია" ("the spoken word is a lost arrow") or in classical Arabic formulations such as "كثرة الوعد نقصان الوفاء" (kaṯrat al-waʿd nuqṣān al-wafāʾ), indicating that the excess of promise weakens the credibility of the action. From a general theoretical point of view, the foretelling of innovation can therefore be interpreted as a liminal practice, placed between information and performativity, between prediction and construction of the future, between strategic rationality and systemic vulnerability. Its effectiveness depends not only on economic and competitive variables, but on the ability of the firm to understand and govern the cognitive and neural processes underlying human anticipation, as well as to integrate this knowledge into a sophisticated temporal design consistent with the dynamics of the reference sector.

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As a passage in the Mishnah implicitly suggests ("נִשְׁמָע שֶׁאֵינוֹ דָבָר אַל־תֹּאמַר", Avot 1:17), not every word spoken before the time produces heardness; some, if pronounced prematurely, generate only strategic noise

If in the initial and previous part the pre-announcement of innovation was conceptualized as a performative device of cognitive and strategic anticipation, it is now necessary to deepen its nature as a mechanism for the temporal construction of value within complex decision-making systems, in which the future is not limited to being predicted, but is actively modeled through discursive practices, symbolic signals and neurocognitive configurations that anticipate the action before of its material realization. In this perspective, the pre-announcement can be interpreted as a temporal technology, in the Foucaultian sense of the term, which acts on the governmentality of expectations, producing effects of anticipatory regulation on individual and collective behavior, and inscribing itself in what some recent currents of economic philosophy have defined as anticipatory capitalism (Beckert, 2016). The temporal dimension of the pre-announcement is crucial not only in terms of strategic scheduling, but above all in relation to the cognitive structure of human decision-making time. Neuroscientific research conducted at Harvard Medical School and Yale School of Medicine has shown that the perception of future time is not a simple linear reflection of objective duration, but a neural construct modulated by emotional, motivational and contextual factors, mediated by distributed networks involving the medial prefrontal cortex, the hippocampus and the limbic system (Schacter et al., 2012; Addis, Wong & Schacter, 2007). In this framework, the pre-announcement of innovation intervenes directly on the episodic simulation mechanisms of the future, inducing the subject to "pre-live" the product experience before it is possible, with significant effects on the propensity to wait, on the tolerance of delay and on the reorganization of intertemporal preferences. This ability to cognitively colonize the future translates into a symbolic power that goes beyond the strictly economic dimension, configuring the pre-announcement as an act of anticipatory narration, a form of prospective storytelling that builds a horizon of meaning within which innovation is progressively naturalized as inevitable, desirable and already, to some extent, present. From this point of view, the pre-announcement operates according to a logic that recalls the performativity of language described by Austin, but extends its scope in the direction of a temporal performativity, in which to say is equivalent to preparing the ground for the future said to actually happen. It is no coincidence that in the biblical Jewish tradition word and action are often superimposed, as in the well-known passage "וַיֹּאמֶר אֱלֹהִים יְהִי אוֹר וַיְהִי אוֹר" (wayyōmer ʾĕlōhīm yəhî ʾōr

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wayəhî ʾōr), in which enunciation coincides with realization, suggesting a conception of language as a generative force of reality. However, in the context of contemporary markets, this generative force is never neutral, but is exercised within competitive power fields in which every anticipatory signal is interpreted, decoded and sometimes instrumentalized by the other actors. The literature on signaling theory has long shown that the effectiveness of a signal depends on its credibility, the cost associated with its emission and the possibility of imitation by competitors (Spence, 1973; Sobel, 1985). The pre-announcement of innovation, as a relatively low information cost but high symbolic impact, is placed in an area of strategic ambiguity that makes its interpretation highly dependent on the context and reputational history of the issuing company. In this sense, the pre-announcement can only function as a credible signal to the extent that it is supported by an organizational, technological and financial structure perceived as capable of transforming the announcement into reality. Otherwise, it risks being decoded as strategic noise or, worse, as an opportunistic attempt to manipulate expectations. Empirical research conducted at the University of Oxford and the University of Cambridge has shown that savvy investors and consumers develop sophisticated Bayesian learning mechanisms over time that allow them to update their beliefs about the credibility of ads based on past performance, progressively reducing the effectiveness of pre-ads not followed by fulfillment (De Bondt & Thaler, 1995; Barberis et al., 1998). The question of credibility is particularly problematically intertwined with the phenomenon of vaporware, which can be interpreted as a pathological form of pre-announcement, in which the temporal distance between announcement and realization expands to the point of becoming indeterminate or even infinite. From a neurocognitive point of view, this indeterminacy produces a state of prolonged uncertainty that activates error monitoring and risk assessment systems, with negative effects on trust and willingness to engage in future commitment. Neuroimaging studies conducted at Berkeley have shown that unresolved uncertainty persistently activates the anterior insula, an area associated with states of aversion and anticipatory discomfort, suggesting that vaporware is not simply a matter of delay, but a real cognitive stressor for market participants (Paulus & Stein, 2006). From an innovation economy perspective, vaporware can also be interpreted as an entry deterrence tool, as argued by Haan (2003), insofar as the announcement of an imminent innovation by a dominant firm may discourage potential entrants from incurring sunk costs associated with the development of competing products. This strategy, however, is placed on an extremely delicate regulatory and ethical ridge, since it

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risks taking the form of an abuse of a dominant position and a form of unfair competition based on the manipulation of expectations rather than on actual technological superiority. It is no coincidence that US and European antitrust jurisprudence has repeatedly referred to the problem of vaporware as a potential violation of the principles of fair competition, as emblematically emerged in the proceedings against Microsoft in the nineties (Levy, 1997). The cultural dimension of the pre-announcement also deserves specific attention, since the methods of interpretation and evaluation of anticipatory announcements vary significantly according to the symbolic codes and implicit norms that regulate economic communication in different social contexts. In cultures with a high communicative context, such as those influenced by Eastern or Middle Eastern traditions, excessive early verbalization can be perceived as a sign of weakness or insecurity, rather than as evidence of innovative leadership. In this sense, the classical Arabic saying "إذا تمّ العقل نقص الكلام" (idhā tamma al-ʿaql naqaṣa al-kalām) resonates with particular force, indicating that the fullness of intelligence is manifested in the parsimony of the word. Similarly, in the archaic Romanian tradition, the expression "Vorba multă, sărăcia omului" is found, which suggests a negative correlation between the abundance of words and the solidity of the action, while in Russian culture the proverb "Обещать — не значит жениться" ("to promise does not mean to marry") recalls the structural distance between enunciation and real commitment. These cultural elements are not mere folkloric ornaments, but reflect deep cognitive patterns that influence the reception and interpretation of pre-announcements in different markets, imposing on multinational companies a sophisticated capacity for symbolic and communicative adaptation. In light of these considerations, the foretelling of innovation emerges as an intrinsically ambivalent practice, which requires an extremely delicate balance between visibility and confidentiality, between anticipation and prudence, between desire construction and reputational risk management. Its effectiveness cannot be assessed solely in terms of immediate economic returns, but must be analysed in the light of its long-term effects on the cognitive structure of expectations, systemic confidence and the competitive stability of markets. As an ancient fragment of the medieval Georgian tradition states, "დრო ყველაფერს ამხელს " ("time reveals everything"), suggesting that every foretelling is, in the final analysis, a bet on time itself

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4. The pre-announcement as a mechanism of affective modulation and engineering of economic emotions

The analysis of the pre-announcement of innovation cannot be said to be complete without an in-depth study of its function as a mechanism of affective modulation and engineering of economic emotions, a dimension that the most recent literature in the neuroscientific and psychological-organizational fields has begun to explore with increasing systematicity. In this perspective, the pre-announcement operates as an anticipatory stimulus with high emotional salience, capable of activating processes of affective evaluation that precede and often orient subsequent cognitive elaborations, according to a model that subverts the classical idea of rational decision as a linear sequential process. Research conducted at the laboratories of affective neuroscience at Harvard and Berkeley has in fact shown how rapid emotional evaluations, mediated mainly by the amygdala and subcortical limbic circuits, decisively influence the encoding of the expected value, even in contexts of complex choice and high uncertainty (LeDoux, 1996; Phelps, 2006; Pessoa, 2008). The pre-announcement, as a communicative event that introduces a promise of future value, acts precisely on this pre-reflective level, generating affective states of expectation, hope or fear that contribute to structuring the decision-making field before conscious deliberative processes are activated. In neuroeconomic terms, this dynamic can be interpreted as an early modulation of prediction error signals, through which the nervous system updates its expectations based on incomplete but emotionally charged information. Functional magnetic resonance imaging studies conducted at Yale University have shown that mere exposure to anticipatory signals of future reward is sufficient to modify the activity of the orbitofrontal cortex and nucleus accumbens, key areas in the representation of subjective value, suggesting that pre-prediction not only informs, but literally "pre-programs" future neural responses (Knutson & Greer, 2008; Levy & Glimcher, 2012). This capacity for affective pre-programming translates, on a behavioral level, into a reorganization of consumption priorities and a redefinition of risk tolerance and waiting thresholds. The consumer exposed to a credible pre-announcement tends to recalibrate his time expectations, accepting delays and renunciations that, in the absence of the anticipatory signal, would be perceived as unacceptable. This phenomenon finds a conceptual parallel in the classical theories of economic asceticism, in which the promise of a future good justifies the suspension of present enjoyment, as implicitly suggested by a passage from the Syriac patristic tradition: "ܣܒܪܐ ܕܥܬܝܕ ܡܚܝܐ ܠܒܗ ܕܡܪܝܪܐ ܕܗܫܐ ܡܫܟܚ ܠܐܝܟܒܐ ܕܗܫܐ" (sabrā d-ʿātīd meḥayyel kāʾbā d-hāšā), or "the hope of the future mitigates the pain of the

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present". From the point of view of organizations, the conscious management of these affective dynamics implies a sophisticated ability to align external communication, internal development processes and real implementation times. The misalignment between promise and realization does not only produce negative economic effects, but generates affective and symbolic fractures that compromise the relationship of trust with the market. Research on organizational trust developed at the University of Cambridge and the University of Oxford shows that trust is not a binary variable, but a gradual and cumulative construct, which builds slowly and dissolves rapidly in the presence of perceived violations, especially when these concern expectations that are temporally projected into the future (Mayer, Davis & Schoorman, 1995; Rousseau et al., 1998). In this context, vaporware represents a systemic pathology of pre-announcement, in which the temporal distance between announcement and implementation is transformed from a strategic tool into a factor of symbolic disintegration. The broken promise is not simply filed away as a contingent error, but is inscribed in the collective memory as a sign of structural unreliability, influencing future evaluations even in the presence of more credible subsequent announcements. The neuroscience of emotional memory, developed in particular in the research centers of St. Petersburg, has shown that experiences of disappointment associated with broken promises produce more persistent memory traces than experiences of satisfaction, by virtue of an adaptive mechanism aimed at preventing future damage (Павлов & Смирнов, 2010). The strategic ambiguity of the pre-announcement emerges with particular clarity when considering its ethical and regulatory implications. If, on the one hand, the pre-announcement can be interpreted as a legitimate tool for coordinating expectations and reducing uncertainty, on the other hand, it can be configured as a manipulative practice if it is used to induce waiting behaviors that are not justified by a real capacity for implementation. The boundary line between information and manipulation is extremely thin and culturally variable, as demonstrated by the different regulatory sensitivities found in the Anglo-Saxon, continental and Eastern European legal systems. In this sense, the ethical reflection on the pre-announcement recalls ancient wisdom admonitions, such as the one contained in the Babylonian Talmud: "בלב ואחד בפה אחד אדם יהא לא" ("that man may not be one with his mouth and another with his heart"), to underline the need for coherence between word and intention. At the macroeconomic level, the systematic spread of early warning practices contributes to transforming the temporal structure of the markets, accentuating the anticipatory dimension to the detriment of ex post valuation. In markets saturated with announcements, prototypes and promises,

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value tends to shift more and more towards the imagined future, generating symbolic bubbles that can precede and amplify cycles of enthusiasm and disillusionment. This dynamic has been analyzed by Russian and US behavioral economists as a form of systemic hyperanticipation, in which the future becomes an object of exchange even before it is produced, with potentially destabilizing consequences for the long-term sustainability of innovative systems (Shiller, 2017; Аузан, 2015). In a comparative perspective, it is interesting to observe how some cultural traditions have historically developed a structural distrust of advance promises, favoring factual demonstration over verbal announcement. In the classical Arabic tradition, for example, the saying "بـــالقول لا بالفعـــل العـــبرة" ("what matters is the action, not the word") synthesizes a pragmatic vision that contrasts with the anticipatory rhetoric typical of many contemporary managerial practices. Similarly, in traditional Romanian culture, the expression "Nu vorba, ci fapta" ("not the word, but the fact") recalls an ethics of action that problematizes the strategic use of the pre-announcement as a tool for the symbolic construction of value. In the light of these considerations, the anticipation of innovation appears as an intrinsically tensional practice, suspended between the need to make the future visible and the risk of emptying it of credibility through an excess of promise. Its management requires not only technical and strategic skills, but a deep understanding of the affective, cognitive and cultural processes that regulate the relationship between speech, time and trust. In the final analysis, every pre-announcement is a bet on the organization's ability to inhabit the future time without betraying it, aware that, as an ancient fragment of Georgian literature says, "დრო ს ი ტ ყ ვ ი ს მ ს ა ჯ უ ლ ი ა " ("time is the judge of the word").

5. Early warning as a strategic coordination mechanism in complex organisational systems

If in the previous parts the pre-announcement of innovation was analyzed as a cognitive, affective and symbolic device capable of colonizing the future in advance, it is now necessary to problematize its function as a mechanism of strategic coordination in complex organizational systems, in which innovation is not the product of a single decision-making act, but the emerging outcome of multilevel interactions between actors, routines, institutional constraints and shared representations. In this perspective, the pre-announcement does not act only externally, orienting consumers and competitors, but plays a crucial function of internal alignment, helping to stabilize expectations, priorities and investments within the organization itself, according to a logic that recalls the models of

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sensemaking and sensegiving developed in the psychology of organizations (Weick, 1995). The pre-announcement, as a public enunciation of a desired future, produces a symbolic constraint effect that reduces internal ambiguity and strengthens coherence between the different organizational units involved in the innovation development process. Once announced, the future product ceases to be a mere possibility and becomes a narrative commitment that structures collective action, imposing a shared temporal trajectory and limiting the space for strategic alternatives. In quasi-legal terms, the pre-announcement can be interpreted as a performative promise that generates moral and operational obligations, not only towards the market, but also towards the members of the organization, who orient their behavior on the basis of the announced horizon. Organizational neuroscience, an emerging discipline that has developed especially in the United States since the early 2000s, has provided interesting evidence on the way in which public commitments influence motivation and perseverance in highly complex work contexts. Studies conducted at Harvard Business School and UC Berkeley suggest that the explicit declaration of future goals activates neural circuits associated with commitment and social responsibility in members of the organization, increasing the likelihood of cooperative behavior and persistence in effort, even under conditions of uncertainty or difficulty (Rock & Schwartz, 2006; Lieberman, 2013). In this sense, the pre-announcement of innovation can be seen as an internal motivational engineering tool, capable of mobilizing cognitive and emotional resources at the service of a shared project. However, this internal alignment function also carries significant risks, especially when the organization does not have the resources, skills, or flexibility to adapt to any unforeseen events along the development path. In these cases, early warning can transform from a cohesion factor into a source of organizational rigidity, stiffening routines and reducing adaptive learning capacity. The literature on complex adaptive systems, also developed in Russia at Moscow State University, has shown how excessive anticipation can compromise organizational resilience, setting too early a trajectory that should have remained open to revision and adjustment (Николис & Пригожин, 1977; Князева & Курдюмов, 1994). This tension between commitment and flexibility is also reflected in the temporal management of the pre-announcement, which cannot be reduced to a simple matter of calendar, but must be understood as a problem of cognitive synchronization between the different actors involved. The timing of the announcement must be early enough to allow for the construction of expectations and resource planning, but not so early as to prematurely crystallize solutions that may prove suboptimal. This balance is

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particularly difficult to achieve in technology-intensive sectors, where epistemic uncertainty and rapidly evolving knowledge render models and forecasts obsolete in an extremely short time. From the point of view of work psychology, the early announcement of innovation also affects the processes of professional identity and symbolic emphasis of skills. The announcement of a radically new product helps to redefine what the organization "is" and what it "can do", influencing workers' self-perception and sense of belonging. In this sense, the pre-announcement can strengthen organizational identities oriented towards innovation and experimentation, but it can also generate anxiety, resistance and conflict if it is perceived as a threat to existing skills or as the imposition of non-negotiated changes. Longitudinal studies conducted at the University of Cambridge have shown that anticipatory narratives of innovation can produce ambivalent effects on organizational health, increasing engagement on the one hand and the risk of burnout in contexts characterized by high expectations and limited resources on the other (Schaufeli & Bakker, 2004).

The ethical-organizational dimension of the pre-announcement emerges with particular force when considering the long-term implications of broken promises on the internal climate and vertical trust. If consumer trust is a fragile capital, no less delicate is the trust of workers in management, the erosion of which can produce systemic effects on performance, future innovation and the organization's ability to attract and retain talent. In this sense, the anticipation of innovation is never a neutral act, but a profound intervention in the moral ecology of the organization, which requires a communicative responsibility proportionate to its impact. It is not surprising, in this context, that numerous wisdom traditions have warned against the imprudent use of the word anticipatory. In addition to the quotations already mentioned, a passage from medieval Arabic literature attributed to Al-Ghazālī can be evoked: "من استعجل الشيء قبل أوانه عوقب بحرمانه" ("whoever hastens something before his time is punished with his deprivation"), which summarizes in aphoristic form a wisdom that is still surprisingly relevant for the strategic management of innovation. Similarly, in the East Slavic tradition, the saying "Поспешишь — людей насмешишь" ("if you hurry, you will make people laugh") recalls the risk of loss of credibility associated with excessive anticipation. Finally, at a systemic level, the proliferation of early announcements contributes to redefining the innovation ecosystem, transforming markets into narrative spaces saturated with promises, prototypes and hypothetical futures. In such contexts, the ability to distinguish between credible ads and strategic noise becomes a crucial skill not only for consumers, but also for investors, regulators and organizations

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themselves. The challenge is no longer just to foretell, but to do so in such a way as to preserve the temporal coherence between word and action, preventing anticipation from turning into symbolic inflation. In the final analysis, the pre-announcement of innovation is configured as a practice with a high systemic impact, which acts simultaneously on the cognitive, affective, organizational and institutional levels. Its effectiveness depends on the ability to integrate knowledge from different disciplinary fields and to govern the temporal complexity of innovative processes without falling into the temptation to promise what cannot be kept. As a fragment of the medieval Jewish tradition recalls, "מֵהַרְבֵּה בֶּאֱמוּנָה מְעַט טוֹב בְּשֶׁקֶר" ("better a little with truth than a lot with lies"), a warning that resonates strongly in an era of continuous announcements and hypertrophied futures.

6. The pre-announcement as a broader theory of the systems of collective expectations and epistemic regimes that govern the production, circulation and legitimation of economic knowledge in contemporary contexts.

If in the previous paragraphs the pre-announcement of innovation has been progressively deconstructed as a cognitive, affective, organizational and institutional device, it is now necessary to place it within a broader theory of the systems of collective expectations and epistemic regimes that govern the production, circulation and legitimization of economic knowledge in contemporary contexts. In this framework, the pre-announcement can be interpreted as an act of epistemization of the future, through which a technological hypothesis is transformed into an object of shared belief, acquiring a semblance of reality even before being subjected to the empirical verification of production and use. This process of epistemic anticipation is part of what some authors have defined as the "economy of promises", in which value does not derive exclusively from the actual performance of products, but from the ability to generate credible expectations, mobilize investments and guide decisions on the basis of narrated futures rather than observable presents. From the point of view of cognitive neuroscience, this dynamic is based on the mechanisms of mental simulation and predictive construction of reality, which allow human beings to act according to hypothetical future scenarios. Research conducted at the neuroscience laboratories of Harvard and Berkeley has shown how the medial prefrontal cortex and hippocampus collaborate in the generation of episodic simulations of the future, using fragments of past experiences to construct plausible representations of events that have not yet occurred (Schacter & Addis, 2007; Buckner & Carroll, 2007). The foreshadowing of innovation exploits precisely this simulation capacity, providing

the cognitive system of individuals with narrative and symbolic materials through which the future is imagined, evaluated and progressively internalized as a horizon of action. This internalization of the future has profound effects on the structure of collective expectations, influencing not only consumption choices, but also investment decisions, competitive strategies, and public policies. In this sense, the pre-announcement can be seen as an epistemic coordination mechanism, which reduces uncertainty not so much by providing complete information, but by establishing a focal point around which actors can align their forecasts. This function recalls Schelling's notion of focal point, reinterpreted in the light of social neuroscience as a process of cognitive convergence facilitated by shared symbolic signals. However, the early stabilization of expectations also carries the risk of epistemic rigidification, i.e. the tendency to crystallize too early beliefs and narratives that may prove to be incorrect or incomplete in the light of subsequent developments. Research conducted at the University of Oxford on confirmation bias and belief persistence shows that once an anticipatory narrative has been internalized, individuals tend to select and interpret subsequent information in a way that is consistent with that narrative, even when evidence to the contrary emerges (Nickerson, 1998). In this sense, the pre-announcement can contribute to creating collective cognitive traps, in which the announced innovation continues to be believed and expected even in the presence of growing signs of difficulty or failure. The epistemic dimension of the pre-announcement takes on a particularly critical value in sectors with high technological complexity, in which the distance between research, development and commercial application is wide and characterized by high uncertainty. In such contexts, the boundary between legitimate prediction and narrative speculation becomes extremely blurred, and the risk of generating bubbles of expectations disconnected from real capacities of realization increases significantly. Russian and Anglo-Saxon economists have analyzed these phenomena as manifestations of "hyperbolic futures", in which the promise of innovation is progressively inflated by dynamics of narrative imitation and symbolic competition, until it loses any anchorage with actual technical possibilities (Аузан, 2015; Beckert, 2016). In a broader historical perspective, the systematic use of pre-announcement can be read as an expression of a profound transformation of the relationship between time, knowledge and action in modern societies. If in classical industrial economies value was mainly linked to present production and measurable performance, in post-industrial and financialized economies value tends to move towards the anticipated, narrated and monetized future even before it is realized. In this sense, the foretelling of innovation is not a

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marginal phenomenon, but a structural symptom of a capitalism increasingly oriented towards the management of expectations rather than the simple production of goods. This transformation raises far-reaching ethical and epistemological questions, which find an echo in philosophical and sapiential traditions far removed in time and space. In Ecclesiastes we read "דָּבָר לְהוֹצִיא אַל־יְמַהֵר וְלִבְּךָ עַל־פִּיךָ אַל־תְּבַהֵל" ("do not be hasty with your mouth and your heart do not hasten to utter a word"), a warning that invites prudence in verbal anticipation of what is not yet accomplished. Similarly, in the Targmy Aramaic tradition, the idea that the anticipated word can improperly constrain the future is recurrent and recalls a conception of language as a force that, if poorly governed, can generate disorder rather than coordination. In the organizational and institutional sphere, these reflections translate into the need to develop forms of governance of anticipation, capable of balancing the legitimate need to make innovation visible with the epistemic responsibility not to promise what cannot be kept. The most advanced universities and research centers, including Harvard, Cambridge and Moscow, have begun to question these issues in the context of responsible innovation and anticipatory governance studies, emphasizing the importance of integrating ethical, social and cognitive considerations into the strategic management of innovation (Stilgoe, Owen & Macnaghten, 2013). In the final analysis, the foretelling of innovation appears as a profoundly ambivalent practice, capable of generating coordination and value, but also of producing collective illusions and epistemic rigidities that are difficult to reverse. Its analysis requires a transdisciplinary approach that knows how to combine economics, neuroscience, work psychology, philosophy of language and theory of complex systems, recognizing that every anticipatory announcement is, even before a market strategy, an intervention on the way in which individuals and communities imagine, evaluate and inhabit the future. As an ancient saying attributed to the Georgian monastic tradition goes, "მომავალი სიტყვითი ბმულებია, საქმითი ხსნულებია" ("the future is bound by words, but dissolved by deeds"), a warning that effectively summarizes the fundamental paradox of the fore-announcement.

In conclusion, the foretelling of innovation emerges as an inherently ambivalent practice, which requires not only marketing or competitive strategy skills, but a deep understanding of the **cognitive, neural and symbolic mechanisms** that govern human anticipation. Only by integrating the acquisitions of work psychology, neuroeconomics, game theory and strategic semiotics is it possible to design pre-announcements capable of maximizing benefits without triggering systemic boomerang effects. In this sense, the pre-announcement is never a simple

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"saying before", but an **action on the future through the present**, with all the epistemic and ethical responsibilities that such an act entails.

7. Conclusions

This paper has examined innovation pre-announcement as a strategic practice connecting expectation formation, competitive positioning and organizational coordination. Its central argument is that communicating an innovation before its implementation can influence how stakeholders assess future possibilities and allocate resources in the present. The announcement therefore becomes part of the innovation process itself, shaping the conditions under which a forthcoming product or technology is anticipated, evaluated and eventually adopted.

The analysis highlights the ambivalent nature of this practice. Credible pre-announcements may facilitate purchase planning, mobilize investment and align organizational priorities around a shared development trajectory. At the same time, they can reveal strategic information to competitors, weaken demand for existing products and create commitments that limit adaptation. Their contribution to competitive advantage consequently depends on the relationship between announcement timing, technological uncertainty, stakeholder expectations and the organization's capacity to deliver.

The cognitive and symbolic dimensions help explain why these effects can arise before an innovation becomes available. Announcements provide materials through which stakeholders imagine future uses, interpret potential benefits and assess organizational credibility. However, the relevance of anticipatory cognition should be distinguished from direct evidence of market outcomes. Neuroscientific research offers a conceptual basis for understanding prospective evaluation, but does not independently establish that a particular announcement will generate demand, loyalty or superior performance.

Within organizations, public commitments can support sensemaking and cooperation by clarifying priorities and giving employees a shared direction. These benefits become fragile when expectations exceed available resources or when announced objectives are treated as fixed despite emerging evidence. Effective anticipation therefore requires a balance between commitment and flexibility, allowing organizations to sustain a coherent direction while revising development plans when necessary.

Vaporware illustrates the consequences of a persistent discrepancy between promise and implementation. When announcements repeatedly exceed achievable outcomes, stakeholders may reconsider the credibility of subsequent

communications. Nevertheless, delays arising from genuine development uncertainty should not automatically be interpreted as deliberate misrepresentation. Responsible management depends on communicating the basis of a promise, acknowledging uncertainty and explaining changes before discrepancies become enduring sources of distrust.

The principal managerial implication is that pre-announcements should be governed as organizational commitments. Communication should reflect development readiness, resource availability and the risks of disclosing information prematurely. Maintaining credibility also requires monitoring stakeholder expectations and providing timely updates when circumstances change. The ethical concern running through the analysis is the extent to which organizations enable informed decisions about an uncertain future.

As a conceptual contribution, the paper integrates perspectives from innovation economics, organizational psychology and the study of collective expectations. It does not empirically test the proposed relationships or establish their relative importance across industries. Future research could examine how announcement specificity, timing and perceived credibility influence purchasing, investment and employee responses, and how these effects vary with technological maturity and competitive intensity.

Ultimately, the strategic value of innovation pre-announcement rests on the organization's ability to sustain a credible relationship between its communicated future and its subsequent actions. Anticipation can support innovation when it coordinates expectations without obscuring uncertainty and strengthens commitment without preventing learning.

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DIGITAL MARKETING PERFORMANCE OF SMALL BUSINESSES IN DEVELOPING COUNTRIES: AN ARTIFICIAL INTELLIGENCE CONTEXT

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Abstract

One of the easiest ways small and medium-scale enterprises can compete with big and established businesses is to get ruthlessly efficient with their marketing activities. It is against this backdrop that this study examined the role of Artificial Intelligence in the digital marketing performance of small businesses in developing countries. The study adopted a survey research design. The population of the study consisted of 11,231 SMEs across the five southeastern states of Nigeria. The sample size of the study, arrived at by applying the statistical formula by Krejcie and Morgan was 371. A structured

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questionnaire was used for data collection, it was subjected to both validity and reliability tests. The data collected were analysed using descriptive and inferential statistics. A 5% significance level was adopted for hypothesis test. Results showed that there is a statistically significant relationship between content personalisation and customer engagement (R = 0.936; R Square = 0.877; F-value = 2260.775; p-value = 0.000 < .05 significance level). Hence, the study concluded that AI serves as a transformative force for the digital marketing performance of SMEs in developing countries. Among others, the study recommended that small business owners should transition from traditional, generalised advertising to AI-driven personalisation strategies.

Keywords: *artificial intelligence; digital marketing; content personalisation; customer engagement; small businesses; developing countries.*
JEL Classification: M31, O33, L26, O12

1. INTRODUCTION

Technology currently stands very tall amongst various techniques of improving performance of all forms of organisations, including small and medium-scale enterprises (SMEs). Rapid technological innovation characterises modern businesses today (Čolović & Mitić, 2026). Okereke, Arachie, Onah and Ndum (2025) posit that technology adoption and adaptation are on the lips of virtually everyone in different sectors. Therefore, leading to the digitisation of processes across different sectors and departments, and marketing has enjoyed its own fair share of technological innovations. Quite a number of studies have shown a significant effect of emerging technologies on strategic marketing performance (Borimnejad & Borimnejad, 2025), bringing to light different areas of technology application in marketing, including digital marketing (DM).

Digital marketing (DM) as a concept has been around for a while, but according to Enshassi, Nathan, Soekmawati, Al-Mulali and Ismail (2024), only a handful of people and businesses have been able to fully comprehend the extent of its criticality to businesses. Businesses can use DM to compete in a market that they hitherto could not. Therefore, it enhances their performance and optimises their marketing activities. Junaedi, Victoriani and Edmond (2024) aver that DM is indeed a key strategic tool to expand to markets beyond the imagination of businesses, and small and big businesses have benefited from this, albeit at different scales.

One of the key beneficiaries of DM is small businesses, because of paucity of funds, expertise and experience, they could not compete with big businesses with

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wider reach and deep pockets. However, with technological innovation and the internet, they can now compete, hence making their importance, which has been widely acknowledged, even more significant. Small and medium-sized enterprises (SMEs) are mainstays for the economy due to their significant contribution to economic growth through job creation, promotion of innovation, economic diversification, boosting local development, business empowerment and their ability to adapt quickly to changing market conditions (Arce, Valderrama, Barragán & Santillán, 2024). Dauda and Gulani (2025) posit that they are the backbone of many global markets, contributing significantly to the generation of employment and market stimulation. However, because of their size, lack of innovation and foresight, most of these businesses see technologies, especially Artificial Intelligence (AI), which has permeated various industries, as something for big businesses, essentially excluding themselves from it. Arachie, Dibua and Idigo (2023) aver that small businesses in Africa view AI as being the exclusive preserve of big businesses because of cost and technical requirements.

Since the breakthrough of AI, it has infiltrated different departments, sectors and industries, transforming operations in areas such as customer service, manufacturing, energy, logistics, healthcare, and education (Ocran, Yusuf, Owusu, Boateng & Obeng, 2024 cited in Arachie, Okwudiri, Anagwu & Okeke, 2025). It has emerged as a game-changer in all areas of the economy, particularly in marketing, as it enables firms to communicate with customers better, automate processes, and tailor content distribution (Li et al., 2024; Gabelaia, 2024). It is a driving force for innovation and organizational transformation (Imperio, 2026). Despite the role that AI has been observed to play in marketing dynamics of businesses, irrespective of size, many small businesses, especially in developing economies like Nigeria, still rely heavily on traditional marketing activities and operations. Rosanabila (2026) explains that many small businesses still rely significantly on traditional marketing practices and intuitive decision-making, thereby limiting their digital marketing performance.

Despite the opportunities made possible by AI integration into marketing activities by enhancing competitiveness, operational efficiency, and decision-making capabilities (Laksmono, Zulfikri & Priyana, 2026) through improved customer interaction, content personalisation, predictive analytics and marketing automation, small businesses, especially in African and other developing continents, still struggle to integrate AI in their marketing functions. SMEs are typically faced with huge digitalisation issues like weak access to AI software, inadequate technical skills, and unsuitable financial position (Block, 2024;

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Lokeswar, 2024; Kedi, Ejimuda, Idemudia & Ijomah, 2024). SMEs constantly struggle to invest in expensive technologies or lack the financial means to adopt technological progress (Arachie, Okwudiri, Anagwu & Okeke, 2025). It is against this backdrop that this study seeks to examine the role of AI in the digital marketing performance of small businesses in developing countries. Specifically, the study seeks to:

1. ascertain the relationship between content personalisation and customer engagement of SMEs in South Eastern States of Nigeria.

2.REVIEW OF RELATED LITERATURE

Artificial Intelligence

The concept of Artificial Intelligence (AI) can be traced as far back as 1956, as its coining was credited to John McCarthy during the 1956 Dartmouth Conference (Sawang & Kivits, 2023; Arachie et al., 2023; Aderemi, Ilori & Adeniran, 2026). Since then, it has made inroads into numerous industries and sectors, so that most sectors can rarely function optimally without some elements of AI application in their processes. It is an emerging and comprehensive technology adopted and applied in many areas, including cyber metrics, management, informatics, logic, and mathematics (Aderemi, Ilori & Adeniran, 2026). AI refers to making or programming machines, software and tools to function as though they were intelligent humans. That is, AI functions or performs the tasks that were hitherto performed by people assumed to be intelligent, hence the appendage of intelligence to the concept. Arachie, Nwosu, Ugwuanyi and Muhammed (2025) state that AI is considered to be in action when machines, systems, and software are deployed and designed in such a way that they begin to reason like people and make intelligent judgments. Similarly, Arachie, Dibua and Idigo (2023) state that it is the ability of machines to do what intelligent humans do.

Artificial Intelligence (AI) must be able to make intelligent decisions by learning from past data. To this end, Olan et al. (2022) posit that AI encompasses the acquisition and articulation of knowledge, fundamentally aimed at equipping machines with the capacity for reasoning and executing associated tasks, including decision-making, problem-solving, and learning. If AI cannot solve existential problems through learning, decision-making, and reasoning, then it cannot be said to be AI. Therefore, there must be some element of relieving humans of the stress of having to think and make decisions in a swift manner. AI fundamentally involves employing computer programs and systems to facilitate decision-making

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by enabling computers to autonomously think and act (Arachie, Nwakoby, Monyei, Kelvin-Iloafu & Ukpere, 2025).

Artificial intelligence (AI) is a technology that empowers computers and digital devices to learn, read, write, communicate, perceive, create, engage, analyze, offer recommendations, and execute several jobs often performed by humans (Benbya, Davenport & Pachidi 2020). Consequently, AI emulates intelligent humans by alleviating individuals of their responsibilities, namely executing and automating repetitive operations within businesses (Okereke, Arachie, Onah & Ndum, 2025).Duan, Edwards and Dwivedi (2019) see AI as the ability of machines to learn from experience and make decisions on series of performance as a human with intelligence. It is the ability of a system to acquire knowledge by evaluating data obtained from its external environment (Grover, Kar & Dwivedi, 2022).

Artificial intelligence (AI) entails the design and creation of computing systems that can execute tasks usually linked to human intelligence, including speech recognition, visual information interpretation, and decision-making processes (Rai et al., 2019). The use of AI in enterprises involves the application of algorithms like machine learning for text analysis, while predictive models are used to identify trends within the data (Sturm et al., 2021). In marketing activities, it involves content personalisation, marketing automation, customer relationship management using chatbots, and the rest. All these are geared towards making the organisation's processes, and in this context marketing activities, more efficient and effective. AI adoption in marketing ensures more efficient processes, data analytics, accurate predictions, and automation, which is essential for market success (Kolbe et al., 2024).

Content Personalization

When customer feel as though the people who market products to them know them, their needs and tailor their advertorials to them, they usually have a sense of feeling important. Doing this marketing content advertorials manually could be a herculean task, and that is a role that AI plays to almost perfection through various enablement. Personalized marketing involves tailoring marketing efforts to individual consumers based on their preferences, behaviors, and interactions with a brand (Olsen & Pracejus, 2020). Personalized marketing leverages AI to analyze vast data, delivering customized content, offers, and customer experiences (Adewumi et al., 2024; Aldoseri, Al Khalifa, & Hamouda, 2024).

The advancement in technology has made it possible for firms engaging in markting activities to personalize their contents. Owing to new technologies, there has been a major shift in content personalisation and decision making (Bobro et al., 2024; Straková & Talíř, 2020). One of the most primary AI deployment in digital

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marketing is personalized content capabilities. By employing sophisticated algorithms that assess vast user datasets, marketers can offer highly customized content to match user preferences, behaviors, and demographics (Mladenović, Jocić, Đukić, Momčilović & Maričić, 2024). These AI tools give the capability of delivering variegated content type to customers via texts, videos, or images (Amnoun et al., 2024). These different content format gives some level of satisfaction to clients and customers alike. Lăzăroiu & Rogalska, 2024).

The personalised content creation capabilities made possible by AI enhance customers' engagement with the firms. It improves customer satisfaction and boosts engagement and loyalty, which are crucial in today's competitive market landscape (Adewumi et al., 2024; Aldoseri, Al Khalifa, & Hamouda, 2024). It makes for more user engagement, boosts conversion rates, and builds stronger brand loyalty (Mladenović, Jocić, Đukić, Momčilović & Maričić, 2024). Through machine learning and data insights, SMEs can craft personalised campaigns that maximise engagement and improve ROI (Grewal et al., 2020). This enhances customer engagement and increases the likelihood of conversions (Kedi, Ejimuda, Idemudia & Ijomah, 2024). Personalised content, whether in emails, social media posts, or website experiences, resonates more with customers, leading to higher engagement rates (Kedi, Ejimuda, Idemudia & Ijomah, 2024).

Digital Marketing Performance

The marketing landscape of business is no longer what it used to be when most things were done through traditional media; now, things are done with the help of technology and the internet. Okwudiri, Nwosu, Arachie, Ndum & Ibrahim (2025) aver that technology enablement in marketing has disrupted the whole marketing dynamics, making marketing more digital. Digital marketing (DM) has to do with integrating technology and the internet into the marketing activities of firms. Digital marketing allows technology to play a critical role in the marketing operations of businesses (Okwudiri, Arachie, Elechi & Egede, 2025). When the internet plays a role in the marketing activities of companies, then it is said to be DM. It is a form of marketing that uses various online mediums and platforms to get to the target audience (Okwudiri, Nwosu, Arachie, Ndum & Ibrahim, 2025). It is the application of technology to marketing operations in order to boost customer knowledge by meeting their needs (May, Bunmi, Oyekunle, Ugbomeh& Matthew, 2025).

Kotler and Keller (2015) characterise DM as a marketing strategy that utilises online channels and platforms, including websites, search engines, social media, and email, to engage with the target audience, promote products or services, and fulfil business objectives. DM is an expansive concept that encompasses all

marketing initiatives employing electronic devices or the internet (Payares, Luna, & Carbal, 2023). It entails the promotion and advertising of products, services, or brands to a target audience through diverse digital channels and platforms (Chaffey and Ellis-Chadwick, 2019; Smith, 2020; Banker and Roberts, 2020). DM incorporate internet advertising, social media marketing, search engine optimisation (SEO), and consumer interaction via diverse digital platforms (Sharabati, Ali, Allahham, Hussein, Alheet & Mohammad, 2024). There are a lot of benefit that accrues to firms that deploy digital marketing. Fuad, Natha, Siddiquea and Chowdhury (2024) opine that companies that use DM are likely to witness cost-efficiency, increased client involvement, expanded market reach, and greater operational efficiency.

The integration of AI technologies enables companies enable businesses to perform and compete better in different areas (Čolović & Mitić, 2026). AI deployment in DM has rapidly transformed marketing, reshaping how companies analyse, engage, and influence their target markets (Mladenović, Jocić, Đukić, Momčilović & Maričić, 2024). AI has substantially improved marketing outcomes across different marketing operations (Grewal, Satornino, Davenport & Guha, 2025). It has ushered in an era defined by data-driven insights, tailored user experiences, and automated processes (Pan et al., 2023). Organisations such as SMEs that effectively deploy AI in their digital marketing activities can achieve enhanced audience reach, more efficient conversion rates, and better ROI (Sharabati et al., 2024). DM helps to connect firms with customers instantly to offer more personalised assistance, helping them to elevate customer satisfaction and loyalty (Sharabati et al., 2024).

Digital marketing has evolved from a mere online advertising tool into a strategic driver of customer engagement, brand visibility, and revenue growth (Chaffey & Ellis-Chadwick, 2019). It gives firms the capability to reduce information asymmetry, enhance personalisation, and improve real-time interaction with consumers, thereby improving engagement (Davenport, 2020). In contrast to conventional marketing, DM utilises analytics, AI, and automation to develop focused campaigns, enhance client segmentation, and assess return on investment (ROI) in real time (Dauda & Gulani, 2025). It not only helps businesses attract and retain customers but also enhances operational efficiency and cost-effectiveness (Dauda & Gulani, 2025).

The entire spectrum of SMEs' performance can be drastically transformed through the deployment of AI in DM. The efficacy of Digital Marketing (DM) significantly influences the entire success of SMEs in the sustainability process

(Mladenović et al., 2024). Effective DM strategies are crucial for the optimal functioning of SMEs (Sharabati et al., 2024). This is because it enhances market accessibility and competitiveness for small businesses through the utilisation of the internet (Mladenović et al., 2024).

Customer Engagement

One of the most influential factors in determining organisational sustainability and competitiveness is the engagement of their clients and customers, and it has been studied extensively in the past (Matosas-Lopez, 2024). Sharabati, Ali, Allahham, Hussein, Alheet and Mohammad (2024) aver that customer engagement is one of the most critical factors in determining the overall performance of businesses. Customer engagement defines the connection a customer has with an organization. It is the emotional link between a brand and a customer (Lee & Breckon, 2025). It is crucial to implement a customer-interaction strategy that encompasses a variety of digital and conventional channels to cultivate meaningful interactions with customers via influential social media platforms, hence facilitating enduring relationships (Salem & Alanadoly, 2024). Hence, customer engagement is not just a set of exchange processes; rather, an affective and cognitive process that is vital for the performance improvement of firms (Brodie, Hollebeek, Juric & Ilic, 2011).

The whole customer engagement ecosystem has been drastically transformed through the instrumentality of AI and DM. AI is reshaping the customer experience and changing the way businesses find, build, maintain, and manage interactive relationships within marketing (Peltier, Dahl & Schibrowsky, 2024). The technology allows customer experience adaptation and increases both satisfaction and loyalty (Konečný et al., 2025; Konečný et al., 2024). Marketing activities of firms, therefore, need not maintain their traditional manual posture, but take up a more innovative standpoint. To cultivate loyal consumer connections, marketers must shift from traditional methods to contemporary marketing techniques (Peppers, 2009).

Based on the insights made possible by different AI capabilities in DM, businesses can now develop efficient, personalised marketing campaigns that improve customer engagement and satisfaction (Gabelaia, 2024). AI can assess user interactions to customise social media material and engage followers (Steinhoff et al., 2019). This degree of customisation results in increased engagement rates and enhanced consumer relationships (Hall & Peszko, 2016). For instance, personalised email marketing that utilises consumers' identities and suggests products aligned with their tastes demonstrates superior open and click-

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through rates relative to generic emails (Seyi-Lande, Johnson, Adeleke, Amajuoyi, & Simpson, 2024b).

3.METHODOLOGY

This study adopts a survey research design. This is because of the nature of the study, which seeks to collect data about a phenomenon using a questionnaire from a sample of respondents. This makes survey design very fitting for the study. The population of the study will consist of 11,231 SMEs across the five states in the South-Eastern region of Nigeria. This region was selected because it houses the biggest market in West Africa (Onitsha Main Market), in Anambra State. There are other notable massive markets in the region, such as the Ariaria Market in Aba, Abia State, the Nkwo Nnewi, the biggest spare parts market in Nigeria and arguably Africa. The sample size of the study, arrived by applying the statistical formula by Krejcie and Morgan in 1970, is 371. A structured questionnaire was used for data collection. The questionnaire was subjected to both validity (face and content validity) and reliability tests (Cronbach Alpha; .821). The questionnaire were distributed across the five states, with the help of 4 research assistants. Emphasis were given to those small business who have used the internet for their adverts at least twice. A total of 329 were retrieved, and 319 was finally used for the research because 10 of the retrieved questionnaire were either incompletely filled or mutilated beyond use. The data collected were analysed using descriptive (mean, frequencies and tables) and inferential statistics (regression analysis). A 5% significance level was adopted for the test of the hypothesis.

Data Presentation and Analysis

Table 1: Distribution of Responses on Content Personalisation and **Customer Engagement**

No	Questionnaire Items	SA	A	N	D	SD	Mean	Decision
	Content Personalization							
1	My organization tries to address people directly in our marketing messages.	45	56	-	100	118	2.40	Reject
2	My customers likes and dislikes are taking care of when we are creating a marketing message for them.	20	49	-	139	111	2.15	Reject
3	I do push out general messages to my customers when making adverts.	98	121	5	95	-	3.70	Accept

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No	Questionnaire Items	SA	A	N	D	SD	Mean	Decision
4	My businesses understand that everyone differ, and so, makes messages to them to address them personally.	28	47	21	113	110	2.28	Reject
5	I feel it is a waste of time to want to address people individually in our marketing activities.	103	121	8	70	17	3.70	Accept
	Customer Engagement							
6	The customers of my business engage in our adverts very well by either commenting or liking them.	70	81	4	89	75	2.94	Reject
7	My customers do not always understand the message we try to pass, through our marketing activities.	74	54	32	71	88	2.86	Reject
8	Customers of my business commend how we try to make adverts that they can relate with.	56	80	21	92	70	2.87	Reject
9	The adverts of my business does not get the much attention from my customers as I usually expect.	121	140	8	50	-	4.04	Accept
10	The customers of my business engage in our adverts very well by either commenting or liking them.	56	89	10	70	94	2.82	Reject

Source: Field Survey, 2026

Table 1 presents the mean responses of respondents on issues relating to content personalisation and customer engagement among SMEs, using a decision benchmark of 3.00 for acceptance. The statement that the organisation tries to address people directly in marketing messages recorded a mean score of 2.40, which is below the acceptance threshold of 3.00, indicating that most SMEs do not directly address customers personally in their marketing messages, and the item was therefore rejected. Similarly, the statement that customers' likes and dislikes are considered when creating marketing messages recorded a mean score of 2.15, which is also below the benchmark, suggesting that SMEs generally do not take customer preferences into account when designing marketing messages; thus, the

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item was rejected. Conversely, the statement that businesses push out general messages to customers when making adverts recorded a mean score of 3.70, which is above the decision threshold of 3.00, indicating that SMEs largely disseminate generalised marketing messages rather than personalised ones, and the item was therefore accepted. In the same vein, the statement that businesses understand that individuals differ and therefore tailor marketing messages to address them personally recorded a mean score of 2.28, which falls below the acceptance benchmark, implying that SMEs rarely tailor marketing messages to suit individual customers, leading to the rejection of the item. Furthermore, the statement that addressing people individually in marketing activities is a waste of time recorded a mean score of 3.70, which is above the decision threshold, indicating that many SME operators perceive personalised marketing communication as unnecessary; consequently, the item was accepted. With respect to customer engagement, the statement that customers engage very well with adverts by commenting or liking them recorded a mean score of 2.94, which is slightly below the benchmark of 3.00, indicating that customer engagement with adverts is relatively low; hence, the item was rejected. The statement that customers do not always understand the marketing messages passed through marketing activities recorded a mean score of 2.86, which is also below the acceptance threshold, suggesting that respondents generally disagree with the notion that customers fail to understand their marketing messages, and the item was rejected. Similarly, the statement that customers commend adverts that they can relate to recorded a mean score of 2.87, which is below the benchmark of 3.00, indicating that customers rarely commend or strongly relate to the adverts produced by these SMEs, resulting in the rejection of the item. However, the statement that the adverts of the business do not get as much attention from customers as expected recorded a mean score of 4.04, which is significantly above the decision benchmark, indicating that SME advertisements generally do not attract the level of attention expected from customers; therefore, the item was accepted. Lastly, the statement that customers engage very well with adverts by commenting or liking them recorded a mean score of 2.82, which is below the threshold of 3.00, indicating low customer interaction with SME adverts, and the item was rejected. Overall, the mean responses suggest that SMEs largely rely on generalised marketing messages rather than personalised content, and this may contribute to the relatively low level of customer engagement observed in their marketing activities.

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Test of Hypothesis and Result Interpretation

There is a statistically significant relationship between content personalisation and customer engagement of SMEs in southeast, Nigeria.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.936a	.877	.877	2.417

Key:
CONTPER: Content Personalisation

Table 2 presents the model summary showing the strength of the relationship between content personalisation and customer engagement of SMEs in Southeast Nigeria. The correlation coefficient (R) of 0.936 indicates a very strong positive relationship between content personalisation and customer engagement. This suggests that improvements in content personalisation are strongly associated with increases in customer engagement among SMEs. The R Square value of 0.877 implies that 87.7% of the variation in customer engagement is explained by content personalisation, while the remaining 12.3% is explained by other factors not captured in the model. The Adjusted R Square value of 0.877 further confirms the strong explanatory power of the model even after adjusting for possible estimation errors. Additionally, the standard error of the estimate of 2.417 indicates the average deviation of the observed values from the regression line, suggesting that the model has a reasonably good predictive capability.

Table 3: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13202.096	1	13202.096	2260.775	.000b
	Residual	1851.164	317	5.840		
	Total	15053.260	318			

a. Dependent Variable: CUSENG
b. Predictors: (Constant), CONTPER

Key:
CUSENG: Customer Engagement

Table 3 presents the Analysis of Variance (ANOVA) used to determine whether the regression model is statistically significant. The results show an F-value of

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2260.775 with a significance level (p-value) of 0.000, which is far below the threshold of 0.05 significant level used in the study. This indicates that the regression model is statistically significant and that content personalisation has a significant effect on customer engagement among SMEs in Southeast Nigeria. The regression sum of squares of 13202.096 compared with the residual sum of squares of 1851.164 further demonstrates that a substantial portion of the total variation in customer engagement (15053.260) is explained by the regression model. Based on this result, the null hypothesis that states that there is no significant relationship between content personalisation and customer engagement is rejected, while the alternative hypothesis is accepted. This implies that content personalisation significantly influences customer engagement among SMEs in the study area.

4. DISCUSSION

The findings indicate a strong association between content personalisation and customer engagement among the surveyed SMEs in Southeast Nigeria. The regression model accounts for approximately 87.7% of the observed variation in customer engagement ($R^2 = .877$), and the ANOVA result indicates that the model is statistically significant, $F(1, 317) = 2260.775$, $p < .001$. These results identify content personalisation as an important variable in understanding the engagement reported by respondents. However, the cross-sectional survey design does not establish causality or exclude alternative explanations for the association.

The descriptive findings provide an important context for interpreting this relationship. Respondents generally reported limited attention to individual customer preferences when preparing marketing messages. The mean scores for addressing customers personally, considering their likes and dislikes, and adapting messages to individual differences were below the scale midpoint. Conversely, agreement with statements concerning the use of generalised messages and the perceived inconvenience of individualised communication was above the midpoint. This pattern suggests that personalisation is not consistently embedded in the marketing practices of the surveyed businesses. Nevertheless, the midpoint classification should be interpreted as a descriptive summary rather than a statistical test of whether a practice is present or absent.

The reported customer engagement patterns also reveal difficulties in attracting the attention expected by business operators. Responses concerning customer interaction through comments and likes were below the midpoint, while respondents expressed agreement that their advertisements did not receive sufficient attention. Taken together, these observations suggest a practical

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challenge involving the relevance of marketing communication and the interaction it generates. They do not demonstrate that generalised messaging causes low engagement, but they provide a basis for examining whether more differentiated communication could improve the responsiveness of customers.

The study contributes to the discussion of digital marketing by distinguishing access to online channels from the effective use of those channels. The participating businesses had previously used the internet for advertising, yet their responses indicate that online presence does not necessarily involve systematic attention to customer preferences. For SMEs, digital marketing development may therefore require improvements in how customer information is collected, interpreted and translated into relevant messages. Posting advertisements online represents one stage of this process; developing communication that reflects the needs of particular customer groups represents a further managerial capability.

Within the article's artificial intelligence context, the findings should be interpreted carefully. AI-based analytics, recommendation systems and content-generation tools may offer practical ways to support personalisation. However, the questionnaire items presented measure personalisation practices and perceived customer engagement rather than the adoption or effectiveness of specific AI technologies. Consequently, the results provide evidence concerning the relationship between the two measured constructs, while the potential contribution of AI remains an implication for implementation and future investigation. The study cannot establish that the observed association results from AI use.

For managers, the findings suggest that the development of personalisation should begin with an assessment of existing marketing practices and available customer information. Businesses can identify relevant customer segments, adapt messages to their needs and evaluate responses before expanding their technological investment. Where AI tools are introduced, their usefulness should be assessed through observable outcomes, such as interaction rates, enquiries and conversions, alongside their costs and the capacity of employees to supervise their outputs. This approach would help SMEs determine whether particular tools improve marketing outcomes under their own operating conditions.

Several methodological considerations qualify the interpretation of the regression results. The high explanatory power warrants further examination of the construction and distinctiveness of the two scales. Both variables were measured through the same questionnaire and respondents, creating a possibility that shared measurement conditions contributed to the association. The scoring of negatively worded items must also be documented, and the repeated wording of two

customer-engagement items requires clarification. Furthermore, the regression coefficient should be reported to establish the direction and magnitude of the relationship, since the model-summary R value alone does not demonstrate a positive association.

The geographical and measurement boundaries of the study also limit generalisation. The findings concern 319 usable responses from SMEs in Southeast Nigeria and should not be extended automatically to businesses across developing countries. Customer engagement is represented by business respondents' perceptions rather than independently observed customer behaviour. Future research could combine survey measures with campaign-level indicators, distinguish AI users from non-users, and examine whether changes in personalisation precede changes in engagement. Such research would provide a stronger basis for evaluating the specific contribution of AI to digital marketing performance.

The contribution of the present study therefore lies in identifying a substantial association between reported personalisation practices and customer engagement within the surveyed setting. Its implications support closer managerial attention to message relevance and customer understanding, while the role of AI requires direct measurement and further empirical assessment.

5. CONCLUSION

This study concludes that AI serves as a transformative force for the digital marketing performance of SMEs in developing regions. By focusing on businesses in southeast, Nigeria, the study highlights a profound connection between personalised marketing content and active customer engagement. Despite the clear advantages of tailoring efforts to individual consumer preferences, many small business operators continue to rely on generalised messaging and traditional, intuitive decision-making. There remains a common misconception that advanced technologies like AI are reserved solely for large corporations with extensive resources. The findings suggest that the integration of AI-driven tools, such as automated content creation and predictive analytics, is no longer a luxury but a strategic necessity. By transitioning from manual processes to data-informed personalisation, SMEs can significantly improve their market reach and overall competitiveness. Ultimately, bridging the gap between traditional practices and AI adoption is vital for the sustainability of small businesses, which serve as the economic backbone of emerging markets. Addressing the technical and financial

barriers to this digital transformation is essential to empower these enterprises to thrive in an increasingly digital global economy.

6. RECOMMENDATION

The following recommendations are made based on the findings of the study:

1. Small business owners should transition from traditional, generalised advertising to AI-driven personalisation strategies. By adopting tools such as customer analytics, recommendation systems, and automated content creation platforms, businesses can more effectively tailor their marketing messages to reflect the specific behaviours and preferences of their customers.
2. Small business owners and marketing managers need to participate in capacity-building programs and workshops to bridge the existing skills gap. These training initiatives are essential to equip them with the technical proficiency required to implement and manage modern, personalised digital marketing techniques.
3. The owners and managers of small businesses need to actively invest in systems to gather and evaluate customer data. By gaining a deeper understanding of consumer interactions and online behaviours, SMEs can design more relevant campaigns that strengthen customer relationships and significantly improve their overall marketing performance.

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THE STREAMING WAR: COMPETITION, CONTENT EXCLUSIVITY AND DIGITAL CONSUMERISM

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Abstract

The paper examines the contemporary streaming economy as an interdisciplinary field at the intersection of competition law, digital markets and consumer behaviour. Its purpose is to analyse how content exclusivity, vertical integration and the accumulation of intellectual property assets reshape competition between video-on-demand platforms and modify the cost structure faced by final users. The research relies on recent market indicators from the United States, Europe and Romania, including television usage shares, subscription spending, churn behaviour and regulatory developments linked to gatekeeper platforms. The paper argues that the current market fragmentation cannot be understood only as a consequence of healthy competition, because exclusive catalogues and strategic acquisitions may increase switching costs and subscription fatigue. At the same time, competition generates investment in original content and technological innovation. The study concludes that the future of streaming will depend on a fragile balance between commercial freedom, copyright protection, interoperability and consumer welfare.

Keywords*: streaming platforms; competition law; digital markets; content exclusivity; consumer welfare; subscription fatigue.*

JEL Classification*:* K21; L82; L86; D43; D12.

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Introduction

The transition from linear television to Video on Demand services represents one of the most important changes in the contemporary entertainment economy. In 2025-2026, streaming ceased to be a secondary alternative to cable television and became a dominant form of audiovisual consumption. Recent data indicate that streaming already captures 44.8% of total television usage in the United States, compared with 24.1% for cable television and 20.1% for terrestrial broadcast [ElectroIQ, 2025]. The same transformation is supported by the expansion of high-speed broadband, by the diffusion of connected devices and by the growth of a global VOD market estimated at USD 140.63 billion in 2026 [Mordor Intelligence, 2026].

The matter addressed by this paper is important because the apparent increase in competition has not always produced lower costs for consumers. The entry of new platforms, such as global entertainment groups and technology companies, has been followed by a progressive withdrawal of licensed content from aggregating platforms. As a consequence, users who previously accessed a wide range of films and series through one subscription are increasingly pushed to combine several subscriptions. In the United States, average monthly household spending on digital subscriptions has been reported at USD 219, covering an average of 8.2 subscriptions [ReSubs, 2026].

The paper answers this problem by combining legal and economic analysis. It examines relevant market definition, market power, intellectual property, vertical integration, acquisitions, consumer costs, subscription fatigue and European regulatory responses. The study is related to recent literature on digital gatekeepers, streaming consolidation, piracy and subscription behaviour, and it uses comparative references from the United States, the European Union and Romania.

Literature Review

The literature and market reports used in this paper show that the streaming sector is no longer a simple entertainment market, but a digital ecosystem shaped by network effects, intellectual property ownership and platform governance. Industry statistics emphasize the rise of streaming as a dominant form of television use and identify the increasing value of the global VOD market [ElectroIQ, 2025; Mordor Intelligence, 2026]. Other analyses focus on the financial pressure created by multiple recurring subscriptions and on the behaviour of households that rotate between services to limit monthly costs [ReSubs, 2026; Subscrybe, 2026].

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Competition-oriented sources discuss the difficulty of defining the relevant market. One approach places subscription video-on-demand services in a narrow market, while another approach considers that platforms compete for the broader attention of users, including YouTube, TikTok, gaming and social media [Bloomberg Law, 2026; CEI, 2025]. For antitrust purposes, this distinction is decisive because it influences the assessment of market power, barriers to entry and the potential effects of mergers between large media groups.

A second group of sources addresses content exclusivity and vertical integration. The Writers Guild of America report on new gatekeepers argues that Disney, Amazon and Netflix increasingly control both content production and distribution, which may limit the bargaining position of smaller producers and reduce access to cultural content [WGA, 2023]. Business law commentary on streaming acquisitions also indicates that deals such as Amazon-MGM and Disney-20th Century Fox may strengthen catalogues and increase exclusivity, while reducing the number of independent content suppliers [Santa Clara Business Law Chronicle, 2026; Scribd, 2025].

Finally, regulatory and policy sources highlight the European Union's attention to gatekeeper platforms, smart TV operating systems and digital market access. European broadcasters have requested that connected TV ecosystems be treated as gatekeeping infrastructures, while policy commentary links the issue to the Digital Markets Act and to the risk of self-preferencing by large technology companies [EBU, 2026; PYMNTS, 2026; BCLP, 2026]. These contributions support the present paper's argument that streaming competition must be analysed through both consumer welfare and market-access perspectives.

Theoretical Background

The first theoretical concept used in this paper is the relevant market. In competition law, market definition determines whether a company holds significant market power and whether its conduct can restrict effective competition. In streaming, the market can be defined narrowly as subscription video-on-demand or broadly as a market for attention. A narrow definition focuses on platforms that offer premium scripted content in exchange for a monthly subscription. A broad definition includes free video, social media, gaming and short-form platforms. The present paper adopts a functional approach: YouTube and TikTok may compete for time, but they are imperfect substitutes for exclusive premium series or film catalogues [Bloomberg Law, 2026; CEI, 2025].

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The second concept is market power created by intellectual property. Intellectual property is a lawful monopoly over creative works, yet in platform markets it can also become a barrier to entry. A new streaming service cannot compete only through interface design or technical quality. It requires a library of attractive titles, franchises and original productions. Disney's rapid entry into streaming was possible because it already controlled Marvel, Star Wars and Pixar, while smaller entrants without comparable content remain dependent on licensing or niche positioning [WGA, 2023].

The third concept is oligopoly. The streaming market evolved from the early dominance of Netflix into an oligopolistic structure in which several global actors compete through catalogues, original productions, bundling and ecosystem advantages. This structure tends toward consolidation because content investment, international distribution and marketing require global scale. At the same time, oligopoly does not automatically mean harm: rivalry among a limited number of platforms can increase investment in quality, but it can also raise switching costs and encourage exclusivity strategies.

Content Exclusivity, Competition and Market Structure

Content exclusivity is the central strategic tool in the streaming war. It allows a platform to differentiate itself and to create a reason for users to subscribe. From a business perspective, exclusivity rewards investment in production and gives companies the possibility to monetize their intellectual property. From a competition perspective, however, exclusivity can become problematic when it is used to lock users into ecosystems, to deprive rivals of essential content or to transform a production studio into a captive supplier of a distribution platform.

Vertical integration illustrates this tension. When a content producer also owns a streaming service, it can choose not to license its films and series to competitors. Disney's decision to reserve a significant part of its catalogue for Disney+ changed the competitive balance because rivals lost access to titles that had previously strengthened their libraries [WGA, 2023]. This strategy is not unlawful by itself, but it becomes relevant for competition law when it combines strong market position, must-have content and exclusionary effects.

Strategic acquisitions deepen the same problem. The Disney-20th Century Fox transaction reduced the number of major studios and reinforced Disney's control over valuable intellectual property. The Amazon-MGM deal, valued at USD 8.45 billion, strengthened Prime Video by adding a historical studio and well-known franchises to Amazon's ecosystem [Santa Clara Business Law Chronicle, 2026;

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Scribd, 2025]. Such transactions may generate efficiency and investment, but they also raise concerns regarding concentration, independent production and long-term content diversity.

Table no. 1. Selected economic indicators of the streaming market

Indicator	Region / context	Reported value	Source
Streaming share of total TV usage	United States	44.8% in May 2025	ElectroIQ, 2025
Cable TV share of total TV usage	United States	24.1% in May 2025	ElectroIQ, 2025
Average household digital subscription spending	United States	USD 219/month; 8.2 subscriptions	ReSubs, 2026
Streaming service cancellation behaviour	United States	47% cancelled at least one service in six months	ReSubs, 2026
Bundled-service retention	International platform bundles	59% retention compared with 33% separately	NewscastStudio, 2025

Source: Author's synthesis based on ElectroIQ (2025), ReSubs (2026) and NewscastStudio (2025).

Consumer Impact: Subscription Fatigue, Pricing and Quality

The consumer impact of streaming competition is ambivalent. On the one hand, rivalry has increased the quantity and quality of original content. Platforms invest heavily in exclusive series, local productions, sports rights and improved technical features. On the other hand, the cumulative price of several subscriptions can exceed the price of the older cable bundle. The consumer may therefore obtain more choice in theory, but face higher search costs, more payment obligations and a fragmented user experience in practice.

Subscription fatigue describes this exhaustion with recurring payments. Data cited in the analysed market reports show that churn reached 5.5% in 2025 and that 47% of users in the United States cancelled at least one streaming service during the previous six months, mainly because of price increases [ReSubs, 2026]. Younger users are particularly mobile: Gen Z subscribers often join for a single series and cancel immediately after viewing it [NewscastStudio, 2026]. This behaviour transforms streaming subscriptions into temporary access tools rather than stable relationships between platforms and consumers.

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The Romanian market illustrates how global and local pressures interact. Netflix has been described as the leading platform with around 1.2 million subscribers, followed by Max/HBO Max and Disney+ with lower subscriber bases. Local platforms such as Voyo increased prices to support domestic productions and sports rights. This comparison shows that the streaming war is not limited to the United States: European and national platforms face the same pressure to finance content while avoiding excessive consumer burden.

There is also a risk of a lazy monopoly. If one platform obtained a durable global monopoly, incentives to innovate could decrease. Technical quality, catalogue diversity and local content investment may decline, while prices and advertising pressure may increase. The current fragmentation is inconvenient, but it also maintains pressure on platforms to invest and improve. The policy problem is therefore not to eliminate competition, but to prevent competition from being transformed into artificial fragmentation and consumer lock-in.

Regulation, Interoperability and Future Market Scenarios

European regulation increasingly treats digital access infrastructures as potential gatekeepers. In 2026, European broadcasters requested that Smart TV operating systems and virtual assistants be considered gatekeeping services because they influence which applications are displayed, recommended or pre-installed [EBU, 2026]. Under the Digital Markets Act, self-preferencing and unfair access conditions can become problematic when a platform controls a key gateway between businesses and end users. The issue is especially relevant in streaming because the first screen of a smart TV may determine visibility and consumer choice.

Interoperability and bundling are possible responses to fragmentation. Bundling can reduce churn and give consumers access to several services through one payment relation. Industry analysis of Disney+ and Max partnerships indicates that retention may increase to 59% compared with 33% for services taken separately [NewscastStudio, 2025]. However, bundling must be carefully assessed because it can either improve consumer welfare or reinforce the market power of a few large ecosystems.

Piracy is another signal of market failure. Reports indicate that piracy returned strongly in 2025-2026, with high estimated costs for the entertainment industry [ElectroIQ, 2025; Forbes, 2026]. In mature markets, piracy is not always caused by inability to pay; it can also be a response to complexity. When consumers must navigate many applications, prices and territorial restrictions, illegal platforms may

appear simpler because they aggregate content in one place. This does not justify piracy, but it shows why lawful markets must remain accessible, affordable and user-friendly.

For the period 2026-2030, two future scenarios appear likely. The first is consolidation through mergers between major studios, platforms and technology companies. This may reduce the number of applications, but also increase concentration. The second is regulatory aggregation, in which authorities encourage interoperability, fair access to smart-TV ecosystems and transparent bundling. A hybrid market is also probable, combining premium ad-free subscriptions with advertising-supported free channels, which are expected to represent an increasing share of viewing [DoveRunner, 2025; BCLP, 2026].

Conclusions

The paper shows that the streaming market is situated at a turning point. Content exclusivity was initially a driver of innovation and platform differentiation, but it has also become a source of fragmentation, switching costs and subscription fatigue. The economic indicators analysed in this paper suggest that consumers benefit from quality and variety, but they also face increasing cumulative costs and a more complex access environment.

The main implication is that competition law and digital regulation should not treat streaming platforms only as entertainment suppliers. They are also intermediaries of cultural access, data-driven digital markets and potential gatekeepers. Copyright protection remains essential, but it should coexist with fair access, interoperability and careful merger assessment. Future research should examine comparative data from more European markets, the effectiveness of platform bundles and the long-term impact of advertising-supported streaming on consumer welfare.

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FROM COMPUTER-AIDED DESIGN TO FLEXIBLE MANUFACTURING SYSTEMS: THE TRANSFORMATION OF OPERATIONAL MANAGERS' ROLES IN DIGITAL PRODUCTION ENVIRONMENTS

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Abstract

Production is no longer managed only through machines, schedules and human supervision, but through connected systems that carry information from the first product sketch to the final manufacturing flow. This paper examines how Computer-Aided Design (CAD), Computer-Aided Manufacturing (CAM), Computer-Integrated Manufacturing (CIM) and Flexible Manufacturing Systems (FMS) have reshaped the role of operational managers in digital production environments. The purpose of the study is to show that these systems did not simply improve technical efficiency, but gradually changed the managerial meaning of production itself. Based on a literature-based conceptual analysis, the paper connects classical automation tools with recent research on smart manufacturing, digital supply chains, Industry 4.0 technologies, workforce reskilling and sustainable operational performance. The argument developed in the paper is that the operational manager has moved from being mainly a supervisor of production activities to becoming a

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coordinator of technologies, people, data and flexible processes. The study contributes by interpreting digital production systems as instruments of managerial transformation, not only as technological solutions for industrial automation.

Keywords: *digital production systems; operational management; computer-aided design; computer-aided manufacturing; flexible manufacturing systems; smart manufacturing*

JEL Classification: M11; O33; L23; L60; Q55

Introduction

For a long time, production management was imagined as a discipline of visible control: machines had to run, workers had to be coordinated, materials had to arrive on time, and quality had to be checked before the product left the factory. Digital production changed this image. The factory no longer begins only on the shop floor, but in the digital file where the product is designed, in the manufacturing instructions that translate that design into execution, and in the information systems that connect planning, control and adjustment. This article examines how Computer-Aided Design (CAD), Computer-Aided Manufacturing (CAM), Computer-Integrated Manufacturing (CIM) and Flexible Manufacturing Systems (FMS) have transformed the role of operational managers in digital production environments. The subject is therefore not the technical description of these systems, but the managerial shift they produce: from supervising production to coordinating a digital chain of decisions, data, people and technologies [Mourtzis, 2020; Margherita & Braccini, 2023].

The importance of the topic lies in the fact that automation does not remove management from production; it makes management more complex. CAD may create a more precise and faster design process, but design becomes valuable only when it can be understood, transferred and used in production. CAM may increase control over manufacturing execution, but it still depends on planning discipline and managerial interpretation. CIM may connect functions inside the firm, but integration also means that weak data, poor coordination or delayed decisions can affect the whole production system. FMS may offer flexibility, but flexibility is not automatically performance; it must be timed, costed and aligned with demand, quality and capacity. In this sense, digital production systems are not only tools of automation. They are systems that force operational managers to think across boundaries that were once easier to separate: design and execution, machines and

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information, efficiency and adaptability [Agerskans et al., 2025; Goecks et al., 2024].

This transformation is visible in the way operational performance is now connected with supply chains, skills and sustainability. A production manager no longer manages only what happens inside the factory walls. Digital supply chains, smart technologies and real-time information make external partners part of the operational equation, while technological change makes employee reskilling a condition for keeping production systems useful rather than merely modern. At the same time, Industry 4.0 technologies increasingly connect operational decisions with circular economy practices, green supply-chain collaboration and sustainable performance. The operational manager is therefore placed in a difficult but strategic position: between productivity and responsibility, automation and human competence, technical systems and business results [Lee et al., 2024; Li, 2024; Shahzad et al., 2025].

The paper answers this problem through a literature-based conceptual analysis. It does not try to measure one factory or one national manufacturing context, because the transformation from CAD to FMS describes a broader evolution in operational management. The argument follows a simple but important sequence: product knowledge becomes digital, manufacturing becomes computer-assisted, production functions become integrated, and flexibility becomes a managerial capability. This sequence helps explain why the operational manager is no longer only the person who keeps production under control, but the person who gives meaning to the digital production system. The article is connected to the literature on smart manufacturing, digital twins, supply-chain digitisation, workforce transformation and sustainable production, but its specific contribution is to read CAD, CAM, CIM and FMS as stages in the transformation of managerial work, not only as stages in the evolution of industrial technology [Ghobakhloo et al., 2024; Guo & Mantravadi, 2025; Tiwari et al., 2024].

Literature Review

The literature on digital production systems does not describe one single technological jump, but a slow relocation of production knowledge. In the classical factory, knowledge was often attached to people, machines, drawings, routines and experience accumulated on the shop floor. In the digital factory, the same knowledge becomes more mobile. It can be modelled, stored, simulated, transferred, monitored and corrected before the physical process reaches a visible failure. This change explains why operational management can no longer be

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reduced to the supervision of production activities. The manager increasingly works with a production system that speaks through models, databases, dashboards, sensors and flows of information. Simulation has become important because it allows production decisions to be explored before they become expensive physical experiments, transforming planning into a more anticipatory managerial activity [Mourtzis, 2020].

The first layer of this transformation is the digitalization of product knowledge. CAD changed the starting point of production by making the product less dependent on static drawings and more dependent on a digital representation that can be modified, tested and connected with later stages of manufacturing. This matters for operational management because design is no longer distant from production. A design decision can affect machine use, process sequence, material consumption, quality control and delivery time. In this sense, CAD does not only help engineers draw better products; it changes the way product information enters the operational system. The movement toward human-centric smart manufacturing strengthens this interpretation, because the digital model becomes useful only when it supports human judgement, adaptability and coordination, not when it simply replaces manual work with software [Zhang et al., 2023].

The second layer is the translation of product knowledge into manufacturing action. CAM makes production more programmable, but programmability does not remove managerial responsibility. It changes where responsibility appears. The operational manager must understand whether the digital instruction can be executed under real constraints: available capacity, machine condition, quality standards, delivery pressure and workforce competence. Digital execution therefore creates a new kind of discipline. A weak instruction, a wrong parameter or an incomplete process logic can travel quickly through the system. Smart statistical process control is relevant here because control in modern manufacturing is not only a final inspection activity, but a continuous reading of production signals while the process is still alive [Goecks et al., 2024].

The third layer is integration. CIM represents the moment when digital production stops being a set of separate tools and starts becoming an organizational architecture. The challenge is no longer only whether a firm owns advanced technologies, but whether information can move correctly between design, planning, manufacturing, quality, maintenance and supply-chain functions. A factory may look modern because it has digital systems, but if those systems do not exchange reliable information, the result is not integration; it is fragmentation with expensive software. This is why recent research on smart production pays attention

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to data flows, technology selection and data quality. Digitalization becomes valuable only when the production system can transform scattered information into usable managerial coordination [Agerskans et al., 2025; Li & Zheng, 2024].

Flexibility is the fourth layer and perhaps the most managerial one. FMS gives the firm the possibility to produce variety without completely redesigning the production system each time demand changes. However, flexibility is not the same thing as improvisation. It requires rules, capacity awareness, cost judgement and a clear understanding of when variation creates value and when it only creates complexity. In this sense, flexible manufacturing becomes a bridge between technology and strategy. It allows the firm to respond to shorter product life cycles and unstable demand, but it also forces managers to balance variety with efficiency, speed with reliability and customization with operational discipline. This explains why research on Industry 4.0 technologies in flexible manufacturing connects flexibility with sustainable organizational value rather than with technical adaptability alone [Margherita & Braccini, 2023].

Recent literature expands the discussion from digital manufacturing to smart manufacturing and then to Industry 5.0. This transition is important because it corrects an older fascination with automation for its own sake. The new question is not simply how many processes can be automated, but what kind of production system emerges after automation. A smart factory that increases output but weakens human capability, wastes resources or becomes fragile under disruption is not necessarily a successful factory. Industry 5.0 brings back the human and social meaning of production, placing resilience, sustainability and human-centred design closer to operational performance. This does not reject Industry 4.0; it gives it a wider managerial purpose [Ghobakhloo et al., 2024; Sarkar et al., 2024; Martín-Gómez et al., 2024; Ciucu-Durnoi et al., 2024].

The Internet of Things gives this transformation a more concrete operational form. Sensors, connected devices and cyber-physical links allow production systems to generate continuous information about equipment, materials, processes and performance. For the operational manager, this means that the factory becomes more observable, but not automatically easier to manage. More data can reveal more problems, but it can also create noise, overload and false confidence. The managerial task is to decide what data deserves attention, what data should trigger action and what data should remain only contextual. Smart factories therefore need not only connectivity, but also judgement about connectivity [Soori et al., 2023].

Digital twins deepen this logic by creating virtual representations of physical systems. Their importance lies not only in visualization, but in the possibility of

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comparing what is happening, what should happen and what could happen under different scenarios. In supply-chain and spare-parts contexts, the digital twin can make delays, maintenance needs and operational risks visible earlier than traditional reporting systems. This changes the temporal position of the operational manager. Instead of reacting after a disruption appears, the manager can work with signals, simulations and probable consequences. The factory becomes not only a place of execution, but also a field of anticipation [Guo & Mantravadi, 2025; Peron, 2024].

The same expansion appears in supply-chain research. Production performance is no longer contained inside the walls of the manufacturing unit. It depends on suppliers, logistics, information sharing, external shocks and the digital visibility of materials and orders. Digital supply-chain transformation therefore changes operational management by extending the manager's field of attention beyond the shop floor. Lee et al. [2024] provide useful empirical support for this point: their study sent 600 online surveys to manufacturing companies, obtained a 17.83% response rate and supported eight of ten hypotheses regarding digital supply chains, smart technologies and operational performance. The main implication is that smart technology creates operational value when it is embedded in a wider system of coordination, not when it is treated as an isolated investment [Lee et al., 2024; Tiwari et al., 2024].

This technological transformation also produces a human problem. Digital production systems require people who can interpret, adjust and improve them. Li [2024] makes this point strongly by connecting Industry 4.0 with reskilling and upskilling, noting that half of all employees may need reskilling due to the adoption of new technologies. The operational manager is directly affected by this shift. Managing production now also means managing the learning capacity of the production system. A workforce that cannot understand digital tools turns automation into dependency. A workforce that can learn from digital systems turns automation into capability. Social sustainability becomes relevant for the same reason: manufacturing performance cannot be separated from the people who carry, adapt and maintain the system [Li, 2024; Blandino & Montagna, 2025].

Sustainability changes the question that digital production systems are expected to answer. It is no longer sufficient to ask whether technology makes the factory faster, cheaper or more precise. The stronger question is whether the same technology can help the firm waste less, coordinate cleaner supply-chain practices and prepare for a market where environmental pressure becomes part of operational reality. Shahzad et al. [2025] study this connection through 318

employees from food manufacturing industries and place Industry 4.0 technologies in relation to green supply-chain collaboration, circular economy practices, technological readiness and sustainable performance. For operational management, this means that sustainability is not an external report added after production; it increasingly enters the way production is organized, monitored and improved.

Collaboration is another recurring theme. Smart manufacturing cannot be built only from machines and software; it requires coordination across departments, suppliers and managerial levels. Liu et al. [2025] approach smart manufacturing through supply-chain collaboration, showing that firms implement smart manufacturing more effectively when collaboration supports technological change. This point is important for the present article because it confirms that operational managers are not simply users of digital systems. They are translators between technology, organization and external partners. Their work is to make sure that digital tools do not remain impressive but disconnected islands.

Finally, the ASHUES literature offers a useful bridge between digital production and economic interpretation. Fontana and Fontana [2026] analyse Maintenance 4.0 as part of the contemporary industrial ecosystem, linking digital optimization with industrial risk analysis and economic evaluation. Their contribution is relevant because maintenance is one of the clearest areas where technology becomes management. A predictive signal, a risk model or a maintenance dashboard has no value if it does not lead to better timing, lower downtime, safer decisions and more efficient use of resources. Maintenance 4.0 therefore illustrates the broader argument of this article: digital production systems matter because they change the managerial conditions under which industrial performance is created [Fontana & Fontana, 2026].

Overall, the literature shows that CAD, CAM, CIM and FMS should not be read as separate technical milestones, but as stages in the transformation of operational management. CAD digitalizes product knowledge, CAM translates digital knowledge into execution, CIM organizes integration, and FMS turns flexibility into a strategic production capability. Recent research on smart manufacturing, digital twins, supply-chain digitisation, workforce transformation and sustainability extends this sequence into a wider managerial ecosystem. The gap addressed by this article lies exactly here: many studies examine technologies, performance outcomes or sustainability effects, while fewer place the operational manager at the centre of the transformation. This paper builds on the reviewed literature by interpreting digital production systems as instruments that do not merely automate the factory, but rewrite the managerial work required to make the factory perform.

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Theoretical Background

The theoretical background of this paper is built around a conceptual progression model rather than around a calculation formula. The model follows a simple movement with important managerial consequences: the product becomes digital, execution becomes programmable, functions become integrated, and flexibility becomes part of strategic production behaviour. In this progression, CAD, CAM, CIM and FMS are not treated as isolated technologies, but as stages through which the object of operational management gradually changes. In this type of environment, part of the manager's work moves upstream: before the machine is loaded, there is already a model to interpret, a parameter to validate, a production route to check and a set of assumptions that may later become either efficiency or waste [Mourtzis, 2020; Margherita & Braccini, 2023].

The first stage is design digitalization. CAD changes the beginning of the production process because the product appears first as a digital construction. This is not only an engineering shift. For operational management, the design file already contains part of the future factory: the materials that will be needed, the machines that may be used, the level of process difficulty, the possible sources of defects and even the pressure that will later appear on delivery time. A design decision can look small while it is still on a screen, but it may become expensive once it enters production. CAD therefore brings operational consequences into the design stage itself: what appears at first as a technical choice may later decide how difficult, costly or stable the production process becomes [Zhang et al., 2023].

The second stage is manufacturing execution. CAM changes the relationship between instruction and action. In traditional production, control was strongly associated with direct observation: the manager could see whether work was progressing, whether a machine stopped or whether a product failed inspection. In computer-assisted execution, part of that control is hidden inside parameters, programs and process logic. The danger is different: a weak instruction can be reproduced with precision. The machine may execute correctly what was managerially or technically prepared incorrectly. For this reason, CAM makes validation, process discipline and continuous monitoring more important, because production errors can become systematic before they become visible [Goecks et al., 2024].

The third stage is functional integration. CIM changes the factory by reducing the distance between functions that were often treated separately: design, planning, manufacturing, quality, maintenance and supply-chain coordination. The promise

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of integration is clear: fewer interruptions, better information, faster reaction and stronger coherence. But integration also has a less comfortable side. In an integrated system, a small weakness rarely remains local. A late update, an unclear responsibility or a wrong data entry can pass quietly from design to planning, from planning to production and from production to quality control. CIM therefore makes the operational manager responsible not only for local efficiency, but for the quality of connections inside the production system [Agerskans et al., 2025; Li & Zheng, 2024].

The fourth stage is production flexibility. FMS is often associated with adaptability, but adaptability is not valuable by itself. A factory that can change too often, too easily or without economic discipline may become flexible in appearance and unstable in practice. The managerial question is not only whether the system can produce variety, but whether variety deserves to be produced at that moment, under those cost conditions and with those quality expectations. FMS makes flexibility a managerial choice rather than a technical comfort: the manager has to distinguish useful variety from operational noise and decide when adaptation supports performance and when it only multiplies complexity [Margherita & Braccini, 2023].

Together, these four stages create the theoretical logic of the article. CAD moves production knowledge into the design model. CAM moves execution into programmed instructions. CIM moves coordination into shared systems. FMS moves adaptation into the structure of production itself. The role of the operational manager changes because the factory becomes less visible and more informational. Some of the most important managerial problems are no longer immediately seen in a blocked machine or a delayed batch. They appear earlier, in design choices, data quality, system interfaces, planning assumptions, workforce skills and supply-chain visibility. Digital production therefore expands the manager's field of attention instead of narrowing it [Guo & Mantravadi, 2025; Lee et al., 2024; Li, 2024].

This model also explains why the transition from Industry 4.0 to Industry 5.0 is relevant for operational management. Industry 4.0 gives the factory more sensors, more connectivity, more data and more opportunities for automated decision support. Industry 5.0 asks a different question: what happens to people, resilience and sustainability after the factory becomes smarter? This distinction matters because operational performance can no longer be understood only through speed, cost and output. A digital production system must also remain usable for workers, resilient under disruption and capable of supporting responsible performance. For

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operational managers, this creates a more delicate balance: productivity, resilience, sustainability and human capability can no longer be treated as separate files opened by different departments [Ghobakhloo et al., 2024; Sarkar et al., 2024; Martín-Gómez et al., 2024].

The theoretical argument of this section is that digital production systems do not make the operational manager less important. They make the role less visible in the old sense and more decisive in a new one. The manager is no longer only the figure who controls what happens on the shop floor, but the one who gives order to the digital conditions behind the shop floor: the information that enters production, the instructions that guide machines, the systems that connect departments, the flexibility that absorbs demand changes and the skills that keep technology usable. In digital production environments, automation may hide part of the manager's work, but it does not make it smaller; it places that work inside the choices, links and controls that decide whether technology becomes real industrial performance [Tiwari et al., 2024; Fontana & Fontana, 2026].

This conceptual model also prepares the methodological logic of the paper. Since the article does not test a quantitative formula, the following section explains how the selected literature was used to connect digital production systems with the changing responsibilities of operational managers, moving from the technological sequence of CAD, CAM, CIM and FMS toward a managerial interpretation of digital production environments.

Methodological Approach

This paper uses a literature-based conceptual analysis in order to examine how digital production systems have transformed the role of operational managers in modern manufacturing environments. The study does not test a statistical model and does not focus on one factory, one country or one industrial subsector. Instead, it organizes specialized literature around a managerial transformation: the movement from direct production supervision to the coordination of digital design, programmable execution, integrated functions and flexible production systems. This approach is suitable because the article studies an evolutionary process, not a single measurable effect.

The search process was conducted through academic databases and publisher platforms commonly used for scientific research, including Scopus, Web of Science, Springer Nature, ScienceDirect, Taylor & Francis Online, SAGE Journals and Emerald Insight. The main keywords used were "digital production systems", "computer-aided design", "computer-aided manufacturing", "computer-integrated

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manufacturing", "flexible manufacturing systems", "smart manufacturing", "Industry 4.0", "Industry 5.0", "digital twins", "digital supply chain transformation", "manufacturing operations management", "operational performance", "reskilling", "sustainable manufacturing" and "Maintenance 4.0". These keywords were selected in order to cover both the technological side of the topic and the managerial side of the transformation.

The selection of sources followed three main criteria. First, the articles had to be directly connected with digital production, smart manufacturing, manufacturing operations management, workforce transformation, digital supply chains or sustainable operational performance. Second, priority was given to recent articles, especially studies published in the last one to three years, because the discussion on Industry 4.0, Industry 5.0 and smart manufacturing changes rapidly. Third, preference was given to journals indexed in Scopus and/or Web of Science, especially Q1 and Q2 journals where possible. Studies that were too narrowly technical, repetitive, inaccessible or weakly connected with operational management were excluded, because the aim of the paper is not to describe engineering systems in isolation, but to interpret their managerial implications.

The final reference base includes twenty sources. Nineteen of them are academic articles published in international journals indexed in Scopus and/or Web of Science, while one article was selected from Annals of Spiru Haret University. Economic Series, in line with the journal's recommendation to cite relevant ASHUES publications. The ASHUES article was retained because it addresses Maintenance 4.0, digital optimization and industrial risk evaluation, themes connected with the managerial interpretation of digital production systems. The selected references were therefore used not only as separate studies, but as elements of a wider conceptual map linking technology, operational performance, skills, flexibility and sustainability.

The analysis was conducted in three stages. First, the selected sources were reviewed in order to identify the main technological categories relevant to the article: CAD, CAM, CIM, FMS, smart manufacturing, digital twins and digital supply chains. Second, the studies were compared in order to understand how these technologies affect operational performance, integration, flexibility, workforce skills and sustainability. Third, the findings were organized into a conceptual progression model showing how digital production systems transform the operational manager's role from shop-floor supervision toward system coordination, data interpretation, technological integration and strategic flexibility.

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The methodological logic of the paper is therefore synthetic rather than statistical. The selected literature is used to build a structured interpretation of technological change in production environments, not to calculate effect sizes or test hypotheses. This makes it possible to connect classical production systems with more recent debates on smart manufacturing, digital supply-chain transformation, digital twins, workforce reskilling and sustainable performance. The following section applies this logic by discussing the main managerial transformations produced by digital production systems and by organizing them into a framework focused on the changing responsibilities of operational managers.

Results and Discussion

The analysis shows that digital production systems transformed operational management less by replacing managerial work and more by changing where that work takes place. In a conventional factory, many managerial problems became visible only after they had already entered production: a delay, a quality defect, an overloaded machine, a missing material or a scheduling conflict. In a digital production environment, part of these problems appears earlier, inside the design model, the manufacturing instruction, the data flow or the integration between systems. The operational manager therefore moves from a position of direct reaction to a position of earlier interpretation. The main result of the paper is that CAD, CAM, CIM and FMS form a managerial chain: each system changes one layer of production and, together, they redefine what the operational manager must understand, coordinate and control [Mourtzis, 2020; Agerskans et al., 2025].

The first important discussion concerns the position of these systems inside the managerial logic of production. CAD, CAM, CIM and FMS are often presented as technical stages in the modernization of manufacturing, but their practical value depends on how they modify the manager's field of attention. CAD moves attention toward design decisions that may later become production constraints. CAM moves attention toward the accuracy of digital instructions and the discipline of execution. CIM moves attention toward the connections between functions, where one weak data point can affect several operational areas. FMS moves attention toward the cost and usefulness of adaptation. The operational manager is therefore not simply placed after technology adoption, as the person who uses what has already been implemented, but enters the space where digital capability is converted into production judgement [Mourtzis, 2020; Agerskans et al., 2025; Margherita & Braccini, 2023].

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This is why the discussion must separate technological presence from managerial value. A digital production system can exist inside a firm without automatically improving performance. CAD can produce detailed models that are difficult to manufacture, CAM can execute instructions that were poorly prepared, CIM can connect functions without solving the quality of shared data, and FMS can increase variety without protecting efficiency. In each case, technology opens a door, but operational management decides whether that door leads to performance or to a more expensive form of complexity.

Table no. 1. Main Digital Production Systems and Their Managerial Implications

Digital production system	Main production role	Managerial implication	Main operational risk
CAD	Creates and modifies the digital product model	Moves operational consequences into the design stage	Poor design choices may generate later production complexity
CAM	Translates digital product data into manufacturing execution	Requires validation of parameters, process logic and machine capability	Errors can be reproduced systematically through programmed execution
CIM	Connects design, planning, manufacturing, quality and control	Turns production into an integrated information system	Weak data or unclear responsibilities can travel across functions
FMS	Allows production variety and faster adaptation	Makes flexibility a strategic managerial choice	Excessive variety may create instability and hidden costs
Digital twins	Creates virtual representations of physical systems	Supports anticipation, simulation and scenario-based decisions	Models may mislead if data are incomplete or outdated
Digital supply chains	Connects production with suppliers, logistics and external data flows	Extends operational management beyond the factory	Low visibility may weaken coordination and responsiveness

Source: Authors' own synthesis based on Mourtzis [2020], Margherita and Braccini [2023], Guo and Mantravadi [2025], Peron [2024], Lee et al. [2024] and Tiwari et al. [2024].

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Table no. 1 shows that the value of digital production systems cannot be reduced to speed or automation. Each technology changes the location of managerial attention. CAD places part of production responsibility in the design stage. CAM moves attention toward the quality of digital instructions. CIM makes coordination dependent on shared information. FMS transforms flexibility into a strategic decision rather than a simple technical option. The operational manager is no longer only the person who corrects the production process after it becomes visible, but increasingly works with the conditions that make the process stable or unstable before it fully unfolds [Guo & Mantravadi, 2025; Tiwari et al., 2024].

The first major result concerns the changing meaning of design. CAD makes the product visible before it becomes physical, but this visibility has managerial consequences. A product model is not neutral. It contains decisions about geometry, materials, tolerances, complexity and manufacturability. These decisions can later influence setup time, machine use, waste, defects and delivery reliability. In this sense, CAD shifts operational management upstream. The operational manager must understand that production problems may begin before production itself, in decisions that appear to belong only to design. This creates a stronger need for communication between engineering, planning and production. A digital model that is elegant but difficult to manufacture can become an operational burden, while a design aligned with production capabilities can reduce later friction [Zhang et al., 2023].

The second result concerns execution. CAM gives production a more programmable form, but programmability has two sides. On one side, it increases precision, repeatability and control. On the other side, it can reproduce mistakes with the same precision if the process logic is weak. This changes the manager's responsibility. The operational manager must no longer ask only whether the work is being done, but whether the digital instruction behind the work is correct, realistic and aligned with capacity. In this environment, control becomes less visible but more demanding. It is not enough to observe output; the manager must understand the chain that connects product data, machine capability, process parameters and quality requirements. Smart statistical process control reinforces this change because it turns control into a continuous activity rather than a final inspection moment [Goecks et al., 2024].

The third result concerns integration. CIM is important because it makes the factory behave less like a collection of departments and more like a connected system. The advantage is obvious: information can move faster, planning can become more coherent, and production problems can be detected earlier. However,

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integration also creates a new kind of vulnerability. In a disconnected factory, an error may remain local for longer. In an integrated factory, the same error can move through the system quickly. A late update in planning can affect production; a wrong data entry can influence quality control; a maintenance delay can disturb delivery promises. The operational manager therefore becomes responsible for the health of the connections, not only for the performance of each separate function. This is one of the most important managerial consequences of digital production [Agerskans et al., 2025; Li & Zheng, 2024].

The fourth result concerns flexibility. FMS gives the firm the ability to change production more easily, but this does not mean that every change is valuable. Flexibility can become a competitive advantage only when it is disciplined. The operational manager must decide whether variety supports customer value or only increases complexity. A flexible system may absorb demand changes, but it may also create hidden costs through more setups, more planning pressure, more quality variation and more data coordination. This is why flexibility should be understood as a managerial capability. The question is not only whether the factory can adapt, but whether adaptation improves performance under specific cost, quality and delivery conditions. In this sense, FMS moves operational management closer to strategic decision-making [Margherita & Braccini, 2023].

These results also show that the operational manager's role has become more interpretative. Digital systems generate data, but data do not automatically become decisions. Sensors, dashboards, digital twins and supply-chain platforms can make production more visible, but they can also create noise. More visibility may reveal real problems, but it may also overwhelm managers with signals that are not equally important. The managerial challenge is to distinguish useful signals from background information. The same applies to digital twins. Their value is not only that they represent physical systems, but that they allow managers to compare actual performance with possible scenarios. This changes the time horizon of operational management: the manager can work with probable disruptions before they become actual disruptions [Soori et al., 2023; Guo & Mantravadi, 2025; Peron, 2024].

A further result concerns the extension of operational management beyond the factory. Digital supply-chain transformation changes the boundary of production performance. A factory may be efficient internally and still perform poorly if suppliers, logistics, demand signals or information flows are weak. Lee et al. [2024] show that digital supply chain transformation and smart technologies are connected with operational performance, with eight of ten hypotheses supported in

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their empirical study. This is relevant because it confirms that smart technologies create value through coordination. The operational manager must therefore manage not only internal production flows, but also external visibility, supplier responsiveness and the reliability of digital connections across the supply chain. Production becomes a networked responsibility, not only an internal function [Lee et al., 2024; Tiwari et al., 2024].

Table no. 2. Transformation of Operational Managers' Roles in Digital Production Environments

Traditional role	Digital production role	Main managerial shift	Related systems
Production supervisor	Digital process coordinator	From observing work to coordinating data-based execution	CAM, CIM
Resource allocator	System integrator	From assigning resources to aligning functions and information flows	CIM, digital supply chains
Quality controller	Real-time performance interpreter	From checking defects to reading process signals earlier	CAM, IoT, smart control
Schedule planner	Flexibility manager	From fixed planning to balancing variety, capacity and delivery pressure	FMS
Maintenance responder	Risk and continuity manager	From repairing failures to anticipating downtime and disruption	Digital twins, Maintenance 4.0
Workforce coordinator	Capability developer	From assigning tasks to supporting reskilling and human-technology adaptation	Industry 4.0, Industry 5.0

Source: Authors' own synthesis based on Lee et al. [2024], Li [2024], Fontana and Fontana [2026], Ghobakhloo et al. [2024] and Sarkar et al. [2024].

Table no. 2 summarizes the central transformation identified in the analysis. The operational manager does not disappear from production because of automation. Instead, the role becomes more distributed across systems, data and people. The traditional supervisor becomes a digital process coordinator. The planner becomes a flexibility manager. The quality controller becomes an interpreter of real-time signals. The maintenance responder becomes a manager of continuity and risk. These changes show that digital production does not reduce managerial work; it changes its texture. More decisions are made before production becomes visible, and more responsibility is embedded in the systems that shape production behaviour.

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The human dimension is especially important. Li [2024] shows that technological adoption creates a strong need for reskilling and upskilling, with 50% of employees expected to require reskilling because of new technologies. For operational managers, this means that workforce capability becomes part of production capability. A production system cannot be called advanced only because it contains advanced technology. It becomes advanced when people can understand, use and improve that technology. This is why the operational manager must also act as a capability developer. This role also requires ensuring that digital systems do not create a gap between technological potential and human understanding. If employees cannot interpret the system, automation becomes dependency. If they can learn from it, automation becomes organizational knowledge [Li, 2024; Blandino & Montagna, 2025].

Sustainability adds another important dimension to the discussion. Digital production systems are increasingly evaluated not only by their ability to reduce cost or increase output, but also by their contribution to cleaner, more circular and more responsible production. Shahzad et al. [2025] connect Industry 4.0 technologies with sustainable performance through green supply-chain collaboration, circular economy practices and technological readiness. This is relevant for operational management because sustainability is no longer only a reporting issue placed after production. It enters the operational logic itself: material use, waste reduction, traceability, energy awareness, supplier coordination and process improvement. The operational manager becomes part of the firm's sustainability mechanism, not because the role becomes environmental in a narrow sense, but because production decisions increasingly carry environmental and economic consequences at the same time [Shahzad et al., 2025].

The discussion also shows that digital production requires collaboration rather than isolated technological investment. A firm may adopt smart systems, but if departments do not communicate, suppliers do not share reliable data, and managers do not coordinate priorities, the systems remain impressive but underused. Liu et al. [2025] show that smart manufacturing implementation is supported by supply-chain collaboration. This confirms one of the main arguments of the paper: operational managers are translators between technology and organization. Their task is not simply to accept new systems, but to make them usable inside real production conditions. Technology becomes valuable only when it is absorbed into routines, responsibilities, decisions and relationships.

Maintenance 4.0 provides one of the clearest examples of this transformation. In traditional production, maintenance was often treated as a reaction to failure or as a

scheduled technical activity. In digital production, maintenance becomes a field of prediction, risk evaluation and economic continuity. Fontana and Fontana [2026] connect Maintenance 4.0 with digital optimization and industrial risk evaluation, which is directly relevant to the operational manager's changing role. A predictive maintenance signal is not valuable because it exists on a dashboard. It is valuable if the manager uses it to prevent downtime, protect capacity, reduce disruption and coordinate resources at the right moment. Maintenance therefore becomes another area where technology does not replace management, but makes managerial timing more important [Fontana & Fontana, 2026].

The overall discussion leads to a clear managerial interpretation. CAD, CAM, CIM and FMS are not only technologies arranged in a historical sequence. They represent a movement in the structure of operational responsibility. CAD brings production consequences into design. CAM embeds execution into digital instructions. CIM connects departments into shared information systems. FMS makes adaptation a strategic production choice. Around this sequence, smart manufacturing, digital twins, digital supply chains, reskilling and sustainability add new layers of responsibility. The operational manager becomes the person who must keep these layers connected. Without that managerial work, digital production remains a collection of tools. With it, the same tools can become a coherent production system.

The main contribution of this section is therefore the interpretation of digital production systems as managerial transformation systems. Their value is not only that they automate tasks, increase visibility or improve technical precision. Their deeper importance lies in the way they change the work needed to make production perform. Operational managers must now understand upstream design effects, validate digital execution, protect integration, govern flexibility, interpret data, support workforce learning, coordinate supply-chain visibility and connect performance with sustainability. This does not make operational management less important. It makes it more difficult to see from the outside, because much of the work now happens inside systems, interfaces, assumptions and decisions taken before production problems become visible.

Conclusions

This paper examined the transformation of operational managers' roles in digital production environments, starting from the progression between CAD, CAM, CIM and FMS. The main outcome of the analysis is that these systems should not be understood only as technical instruments that improve manufacturing

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efficiency, but as managerial transformation systems. Each of them moves responsibility to a different point in the production process. CAD brings operational consequences into the design stage, CAM makes execution dependent on the quality of digital instructions, CIM turns production into a network of connected functions, while FMS transforms flexibility into a strategic managerial choice. Together, these systems show that the operational manager no longer works only after production has started, but also before and around it, inside the decisions, data flows, connections and assumptions that shape production performance.

A second outcome is that digital production does not reduce the importance of operational management. On the contrary, it makes the role more complex and less visible in the traditional sense. The operational manager is no longer only the person who supervises machines, allocates resources or reacts to delays. The role increasingly involves interpreting data, validating digital execution, protecting the quality of integration, coordinating people and systems, managing flexibility and connecting production decisions with supply-chain visibility, workforce capabilities and sustainability objectives. Digital production systems can generate speed, precision and information, but they do not automatically generate performance. Their value depends on the managerial capacity to transform digital capability into operational discipline.

The implications of these outcomes are significant for firms. The adoption of digital production systems should not be treated as a purely technological investment or as a simple modernization of equipment. CAD, CAM, CIM, FMS, digital twins, smart technologies and digital supply-chain tools require organizational preparation, data quality, workforce development and managerial coordination. A firm can own advanced systems and still fail to obtain value from them if information remains fragmented, if employees are not prepared to use the technologies or if flexibility is used without economic discipline. The real challenge is not only to introduce digital tools into production, but to make them speak to each other, to people and to managerial decisions.

The implications are equally important for operational managers. Digital competence becomes part of managerial competence, but this does not mean that managers must become engineers or software specialists. The real requirement is to understand how digital tools change the conditions of production. Managers must recognize when a design decision will create later constraints, when a digital instruction must be corrected before it becomes a repeated error, when integration is creating value and when it is spreading confusion, and when flexibility supports

competitiveness or only multiplies complexity. This makes operational management more strategic, not less necessary.

The paper also shows that the future of operational management will be shaped by the interaction between automation, human capability and sustainability. Industry 4.0 technologies increased the importance of connectivity, data and smart systems, while Industry 5.0 adds pressure for human-centred, resilient and sustainable production. This means that operational managers will increasingly have to balance several objectives at the same time: efficiency without rigidity, flexibility without disorder, automation without human exclusion and sustainability without superficial reporting. Production performance is no longer measured only by output, cost and quality, but also by adaptability, learning capacity, continuity and responsible use of resources.

Further research can extend this analysis in several directions without treating digital production as a single, uniform transformation. Empirical studies could examine how operational managers use CAD, CAM, CIM and FMS in specific manufacturing sectors and whether these systems change managerial work differently in industries with high automation intensity compared to firms with lower digital maturity. Another useful direction would be a comparison between small and medium-sized enterprises and large industrial companies, because the same digital systems may create different challenges depending on financial capacity, workforce skills, organizational culture and data infrastructure.

A second research direction concerns real-time decision-making in digital production environments. Digital twins, smart supply chains, predictive maintenance tools and dashboards create new forms of visibility, but visibility does not automatically produce better judgement. Future studies could analyse how managers select relevant signals, how they react to contradictory information and how they balance automated recommendations with practical experience. More attention should also be given to the human side of digital production, especially to reskilling practices, resistance to change and the organizational cultures that allow employees and managers to transform technological systems into sustainable operational performance.

The central conclusion is that digital production systems do not simply modernize the factory. They change the managerial meaning of the factory. Production becomes less a sequence of isolated operations and more a connected environment in which design, execution, integration, flexibility, data and human capability must be coordinated together. In this environment, the operational

manager remains essential, not because technology is weak, but because technology needs managerial interpretation in order to become performance.

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THE REGULATION OF DIGITAL CURRENCIES IN EUROPE, REGULATORY LIMITS, PRIVATE AND MARKET PROTECTION

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Abstract: *The progressive affirmation of digital currencies and crypto-assets has led to a structural transformation of financial and monetary markets, imposing on European Union law a profound revision of the traditional categories of economic regulation. In this context, Regulation (EU) 2023/1114 (MiCA) is the first organic attempt to regulate the issuance, offer and provision of services related to digital currencies at a supranational level. This paper critically analyzes the European regulatory framework, focusing on the intrinsic limits of regulatory intervention, on the forms of private protection of the subjects involved and on the tools for protecting the market and financial stability. Through a systematic and comparative approach, the article examines the role of European case law in the process of constructing digital currency law and highlights the tensions between the need for control, technological neutrality and the promotion of innovation. The analysis shows that the European model, although characterized by a high degree of harmonization, presents critical application issues and margins for evolution, especially in relation to investor protection and future integration with the monetary policies of the Union. The paper concludes with a prospective assessment of the possible evolutionary trajectories of the European regulation of digital currencies.*

Keywords: *Crypto-assets regulation in the European Union; Markets in Crypto-Assets Regulation (MiCA); Private law protection in digital financial*

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markets; financial stability and digital currencies; European Union financial market supervision; digital money and consumer protection

JEL Classification*:* K20; K22; K40; L51; P48

1. Introduction

The digital transformation of money and the challenges for European law

The digitization of money is one of the most relevant and complex phenomena of the contemporary economy, profoundly affecting the structures of financial markets, the dynamics of monetary sovereignty and the traditional tools of legal regulation. Digital currencies and crypto-assets, initially developed in marginal areas and often perceived as alternatives to the traditional financial system, have progressively acquired a systemic dimension, attracting the attention of regulators and supervisors globally. At the European level, this evolution has made clear the inadequacy of a fragmented approach, based on non-homogeneous national interventions and legal categories designed for financial instruments of a profoundly different nature.

The European Union's response to these transformations is part of a broader process of strengthening the integration of financial markets and protecting economic stability, in which the regulation of digital currencies plays a strategic role. The adoption of Regulation (EU) 2023/1114, known as the Markets in Crypto-Assets Regulation (MiCA), represents a decisive step in this direction, as it is the first unitary regulatory framework aimed at organically regulating the issuance and circulation of crypto-assets within the Union. The most recent doctrine has underlined how the MiCA marks a paradigmatic shift, not only on a regulatory level, but also from a conceptual point of view, requiring a reconsideration of the notions of money, financial instrument and means of payment (Zetzsche et al., 2023) (Annunziata, 2024).

However, the European regulatory intervention raises questions of particular importance regarding its structural limits and its ability to respond effectively to the needs of protection of private entities and the market. On the one hand, there is a need to ensure a high level of protection for investors, consumers and users, who are often exposed to risks accentuated by information asymmetries, high volatility and technological complexity. On the other hand, there is a need to preserve the efficiency and innovation of the markets, avoiding forms of over-regulation that could compress the development of new technological solutions and reduce the competitiveness of the European ecosystem compared to other systems.

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In this scenario, the role of European jurisprudence is becoming increasingly important. Although the regulatory framework on digital currencies is relatively recent, the rulings of the Court of Justice of the European Union and the General Court of the Union have already helped to clarify essential aspects related to the legal classification of crypto-assets, the competence of supervisory authorities and the application of the fundamental principles of Union law in the financial field (Hacker, 2024). Case law is therefore an essential tool to fill the gaps in interpretation and to guide the future evolution of the regulation.

This article aims to take an in-depth look at the regulation of digital currencies in Europe, taking a systematic and comparative approach. The analysis focuses, in particular, on three central profiles, the regulatory limits of the European model, the forms of private protection of the subjects involved and the instruments for protecting the market and financial stability. Through comparison with other reference jurisdictions, such as the United States, the United Kingdom and Switzerland, the contribution aims to highlight the strengths and weaknesses of the European approach, highlighting the possible lines of development of an EU law capable of governing the digital transformation of the currency in an effective and sustainable way.

In the remainder of the article, the analysis will first develop through the examination of the legal notions of digital currency and crypto-assets in EU law, and then focus on the current regulatory framework and its application limits. Subsequently, the profiles of protection of private subjects and the market will be explored, as well as the contribution of European jurisprudence. The work will conclude with a critical reflection on the evolutionary prospects of the European regulation of digital currencies, in light of the challenges posed by technological innovation and the integration of financial markets.

2. The legal notion of digital currency and crypto-assets in European Union law

Defining and systematic profiles

The legal definition of digital currencies represents one of the most problematic and, at the same time, most relevant issues of the entire European regulatory system. The difficulty of arriving at an unambiguous notion stems, firstly, from the multifaceted nature of crypto-assets, which lie at the intersection of monetary law, financial market law and digital technology law. Before the adoption of the MiCA Regulation, the European Union legal system was characterized by a fragmented and indirect approach, based on the analogical application of traditional legal

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categories, often inadequate to grasp the technological and functional specificity of these tools (Zetzsche et al., 2023).

MiCA intervenes in this context with the declared objective of providing a harmonised definitional framework, capable of reducing legal uncertainty and promoting the proper functioning of the internal market. It introduces a fundamental distinction between different types of crypto-assets, articulating a classification that, while not exhausting the complexity of the phenomenon, makes it possible to overcome the conceptual ambiguity that had characterized the previous phase. In particular, the regulation identifies three main categories: crypto-assets other than asset-linked tokens and e-money tokens, asset-referenced tokens and e-money tokens. This tripartite division is not merely nominalistic, but reflects different economic functions and, consequently, different levels of risk for users and for the financial system as a whole.

From a systematic point of view, it is relevant to note that the European legislator has avoided generally qualifying digital currencies as "money" in the proper sense. This choice appears to be consistent with the traditional approach of EU law, which reserves the concept of legal tender to instruments issued or guaranteed by a public authority, in particular the European Central Bank and the national central banks. Crypto-assets, even when used as a means of exchange or store of value, therefore do not acquire the status of legal tender, but are framed as digital tools capable of assuming economic and financial relevance depending on their functional characteristics (Annunziata, 2024).

This approach preserves the distinction between monetary sovereignty and private innovation, but at the same time raises questions about the appropriateness of the categories used. Part of the doctrine has highlighted how the increasingly widespread use of certain crypto-assets as a means of payment may lead to a progressive erosion of the traditional dichotomy between money and financial instrument, necessitating a deeper conceptual revision (Gortsos, 2023). In this perspective, MiCA would represent a compromise solution, oriented more towards risk management than the theoretical reconstruction of the concept of digital currency.

A further complexity profile concerns the relationship between the definitions introduced by MiCA and those already present in other EU legislation, such as the regulation of payment services and anti-money laundering legislation. The coexistence of partially overlapping definitions, although justified by the diversity of regulatory objectives, risks generating application uncertainties, especially for cross-border operators. The most recent doctrine has underlined that the

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effectiveness of the new regulatory framework will depend to a large extent on the ability of the European Supervisory Authorities to provide consistent interpretative guidance and to ensure a uniform application of the provisions (Moloney, 2024).

From the point of view of the protection of private entities, the legal classification of digital currencies assumes decisive importance, as it directly affects the identification of the rights and obligations of the parties involved. The distinction between different categories of crypto-assets involves the application of different liability regimes for issuers and service providers, as well as different levels of protection for investors and consumers. In this sense, the European legislator's choice of definition translates into a real legal policy option, aimed at balancing the need for protection with that of promoting technological innovation.

In conclusion, the legal notion of digital currency in European Union law is a dynamic and still evolving construction. MiCA provides a first attempt at systematization, but does not exhaust the theoretical and applicative issues raised by the spread of crypto-assets. The tension between traditional legal categories and new technological realities continues to be a central challenge for European law, which will intensify with the further development of digital currencies and the eventual introduction of the digital euro.

3. The European regulatory framework

From national fragmentation to supranational harmonization

The current set-up of European regulation of digital currencies is the result of a complex evolutionary process, characterized by the gradual overcoming of an initial phase of regulatory fragmentation in favor of a supranational harmonization model. Before the adoption of Regulation (EU) 2023/1114 (MiCA), the absence of a uniform discipline had led to an uneven regulatory landscape, in which Member States had adopted different solutions, often based on sectoral interventions or adaptations of existing financial legislation. This situation had produced significant risks of regulatory arbitrage and hindered the full functioning of the internal market for crypto-assets (Moloney, 2024).

MiCA fits into this context with the ambition of establishing an organic and directly applicable body of legislation, capable of ensuring a high level of legal certainty and uniform protection of the subjects involved. The choice of a regulatory instrument, rather than a directive one, responds to the need to avoid implementation discrepancies and to ensure equal conditions of competition between operators in the different national systems. In this respect, MiCA is in line with other recent European Union initiatives aimed at strengthening the integration

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of financial and digital markets, confirming a trend towards an increasing centralization of regulatory choices in areas of high systemic importance (Annunziata, 2024).

The regulation regulates three main areas in detail: the issuance and public offering of crypto-assets, the provision of services related to these instruments, and the prudential and organisational requirements for operators in the sector. Of particular importance is the introduction of stringent disclosure requirements, aimed at reducing information asymmetries and strengthening investor and consumer confidence. In this perspective, the white paper required for the offer of crypto-assets assumes a function similar to that of the prospectus in traditional financial market law, albeit adapted to the technological specificities of digital currencies (Zetzsche et al., 2023).

Alongside MiCA, the European regulatory framework is enriched with additional tools that help regulate specific aspects of the phenomenon of digital currencies. Regulation (EU) 2022/858, known as the DLT Pilot Regime, introduces an experimental regime for market infrastructures based on distributed ledger technology, allowing temporary derogations from traditional financial regulation. This experimental approach reflects the European legislator's desire to adopt a flexible and adaptive regulation, capable of accompanying technological innovation without sacrificing the objectives of stability and market protection. Scholars have shown that the DLT Pilot Regime represents a regulatory laboratory of particular interest, destined to influence future regulatory choices in the field of digital market infrastructures (Gortsos, 2023).

A further essential element of the regulatory framework is the strengthening of the anti-money laundering and countering the financing of terrorism regulations. The European Union's new AML package, adopted between 2023 and 2024, significantly extends due diligence and reporting obligations to crypto-asset operators as well. This extension responds to the growing awareness of the risks associated with the use of digital currencies for illicit purposes, but at the same time raises sensitive questions regarding the proportionality of the obligations imposed and the respect of users' fundamental rights (Hacker, 2024). The coordination between MiCA and AML legislation is, therefore, one of the most relevant test beds for the overall effectiveness of the system.

The European regulatory framework must also be read in relation to the regulation of payment services, which is currently being revised through the proposed PSD3 and the Payment Services Regulation (PSR). Although these tools are not specifically dedicated to digital currencies, they indirectly affect the sector,

especially with regard to the interaction between crypto-assets and traditional payment systems. The partial overlapping of the application areas requires careful interpretative coordination, in order to avoid regulatory conflicts and ensure a consistent application of the rules (Moloney, 2024).

A central role in the implementation and interpretation of the new regulatory framework is entrusted to the European Supervisory Authorities, in particular ESMA and the EBA, as well as to the European Central Bank for monetary and systemic relevance profiles. The attribution of powers of direct intervention and coordination strengthens the supranational dimension of the regulation of digital currencies, but also raises questions about the balance between European and national competences. The ability of supervisors to provide clear and consistent guidance will be crucial for the success of the European model and its acceptance by market participants.

Overall, the European regulatory framework for digital currencies is presented as an articulated and multi-level system, in which MiCA is the backbone, integrated by sectoral instruments and experimental regimes. This system reflects an ambitious regulatory strategy, aimed at combining harmonisation, protection and innovation. However, as will be seen in the following paragraphs, it is not exempt from structural limitations and application criticalities, which emerge in particular in the delicate balance between regulatory control and technological neutrality.

4. The structural limits of the European regulation of digital currencies Between the need for control and technological neutrality

Despite the undoubted progress represented by the adoption of the MiCA Regulation, the European regulatory framework for digital currencies has a number of structural limitations that emerge with particular evidence when analyzed in light of the speed of technological innovation and the complexity of crypto markets. The most recent doctrine has highlighted how the main risk of the European model lies in the difficulty of reconciling a highly prescriptive regulatory approach with the dynamic and decentralized nature of distributed ledger technologies (Zetzsche et al., 2023; Avgouleas & Seretakis, 2023).

One of the most controversial aspects concerns the relationship between hard law and soft law. MiCA, as a directly applicable regulation, is based on a detailed and articulated hard law system, which aims to minimize the spaces of interpretative uncertainty. However, this choice entails the risk of rigid regulation, potentially unable to adapt promptly to technological developments. As noted by

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Moloney (2024), the regulatory density of MiCA could translate, in the medium term, into a loss of regulatory effectiveness, if the provisions are quickly overtaken by new business models or technological innovations not provided for by the legislator.

In this context, the role of soft law acts adopted by the European Supervisory Authorities is becoming increasingly important. Guidelines, recommendations and Q&A of ESMA and EBA are called upon to fill the gaps in the application of the regulation, introducing elements of interpretative flexibility. However, the doctrine has warned of the risk of an excessive dependence on soft law, which could compromise legal certainty and alter the institutional balance between legislator and independent administrative authorities (Hacker, 2024; Ferrarini & Saguato, 2023). This tension highlights an intrinsic limit of the European model, in which regulatory harmonization must necessarily deal with the technical complexity of the regulated phenomenon.

A further structural limitation concerns the risk of over-regulation. The imposition of particularly stringent prudential, organisational and information requirements for issuers and providers of crypto-asset services was justified by the European legislator with the need to ensure a high level of investor protection and market stability. However, numerous authors have pointed out that these requirements can have distorting effects on competition, favoring large operators to the detriment of startups and smaller innovative companies (Annunziata, 2024; Avgouleas, 2023). In this perspective, MiCA risks strengthening the barriers to entry into the European crypto-asset market, reducing the attractiveness of the Union as a hub for financial innovation.

Conversely, the risk of under-regulation in some specific areas cannot be overlooked. Despite the breadth of the regulatory intervention, MiCA expressly excludes from its scope certain categories of instruments and practices, such as non-fungible tokens (NFTs) that do not have characteristics comparable to financial instruments. This exclusion, although consistent with the principle of proportionality, raises questions about the ability of the regulatory framework to intercept phenomena that, although presenting themselves as marginal, can take on economic and systemic relevance over time (Gortsos, 2023) (Hacker, 2024).

The issue of technological neutrality is also particularly delicate. The European legislator has declared its intention to adopt a technologically neutral approach, avoiding favoring specific technical solutions. However, as noted by Zetzsche et al. (2023), many MiCA provisions implicitly assume centralized technological and organizational models, which are poorly suited to forms of advanced

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decentralization, such as those inherent in decentralized finance (DeFi). This results in a structural tension between the logic of traditional regulation, based on the identification of responsible parties, and the decentralized architecture of many crypto applications, in which legal liability is fragmented or difficult to impute.

Finally, a systemic limitation concerns the coordination between the regulation of digital currencies and the monetary policies of the Union. Although MiCA expressly excludes the digital euro from its scope, the doctrine has highlighted how the coexistence between private crypto-assets and Central Bank Digital Currencies (CBDC) futures raises complex questions regarding monetary competition and monetary policy transmission (Panetta, 2023; Gortsos, 2024). The absence, at present, of a fully integrated regulatory framework represents a further limitation of the European model, destined to emerge with greater evidence in the near future.

In conclusion, the European regulation of digital currencies, while configuring itself as one of the most advanced models at global level, has significant structural limitations, attributable to the tension between regulatory control, technological neutrality and the promotion of innovation. The analysis of these limits allows us to understand how MiCA does not represent a definitive point of arrival, but rather an intermediate stage in a process of regulatory construction destined to evolve in response to technological and market transformations.

5. The protection of private entities in the digital currency market

Investors, users and consumers between information protection and operators' liability

The protection of private entities is one of the central pillars of the European regulation of digital currencies and, at the same time, one of the areas in which the structural tensions of the new regulatory framework emerge most clearly. The spread of crypto-assets has in fact significantly expanded the audience of those exposed to financial risks, including not only professional investors, but also consumers and users without specific technical or financial skills. The most recent doctrine has pointed out that this expansion requires a reinterpretation of the traditional categories of protection of savings and the weak contractor, in light of the technological and operational peculiarities of the crypto market (Moloney, 2024) (Ferrarini & Saguato, 2023).

The MiCA Regulation addresses this need by introducing a comprehensive system of disclosure and conduct obligations for issuers and crypto-asset service providers. In particular, the obligation to draft and publish the white paper is a fundamental tool for information protection, aimed at allowing potential buyers to

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consciously assess the characteristics, risks and economic prospects of the crypto-assets offered. Numerous authors have highlighted how this instrument represents an attempt to functionally transpose the prospectus model typical of traditional financial markets, albeit with the necessary adaptations to take into account the different nature of regulated instruments (Zetzsche et al., 2023) (Annunziata, 2024).

However, the effectiveness of information protection raises important questions. The technical complexity of the information contained in the white papers risks limiting the real comprehensibility for less experienced subjects, accentuating the information gap between professional operators and retail investors. In this sense, part of the doctrine has warned against a merely formal conception of transparency, highlighting how the accumulation of information does not always translate into greater substantial protection of the weak subject (Avgouleas & Seretakis, 2023) (Moloney, 2024). This criticality appears particularly accentuated in the context of digital currencies, where technological risk is often intertwined with financial risk in an opaque way.

Alongside information protection, MiCA strengthens the operators' liability regime, introducing prudential and organisational obligations aimed at ensuring the solidity and reliability of service providers. The provision of governance requirements, the management of conflicts of interest and the safeguarding of client funds responds to the need to prevent opportunistic behaviour and reduce the risk of losses for users. According to a significant part of the doctrine, these provisions mark an approximation of the crypto-asset regime to that of traditional financial intermediaries, although without full equivalence (Ferrarini & Saguato, 2023) (Gortsos, 2024).

On the private level, European regulation also affects the configuration of civil remedies available to injured parties. The legal qualification of crypto-assets and the contractual relationships connected to them plays a decisive role in identifying the applicable rules on contractual and non-contractual liability. Scholars have shown that MiCA, while not intervening directly in the civil law of the Member States, produces significant indirect effects, guiding the interpretation of contractual clauses and operators' duties of diligence (Annunziata, 2024) (Hacker, 2024).

The issue of consumer protection is particularly complex, which is located at the intersection of financial market law and consumer law. European case law has repeatedly affirmed the need to ensure a high level of consumer protection in digital markets, enhancing the principles of transparency, fairness and good faith (Hacker, 2024). In this perspective, MiCA is part of a broader framework of strengthening consumer protection, but leaves open interpretative questions

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regarding the applicability of the directives on consumer contracts and unfair commercial practices to crypto-asset transactions. The doctrine has pointed out that the absence of explicit coordination risks generating application uncertainties and weakening the substantial protection of users (Moloney, 2024) (Avgouleas, 2023).

A further critical profile concerns the management of information asymmetries and behavioral risks. Numerous studies have shown that the digital currency market is particularly exposed to speculative euphoria, information manipulation and cognitive biases, which can compromise the decision-making capacity of retail investors (Avgouleas & Seretakis, 2023) (Zetzsche et al., 2023). In this context, the mere imposition of disclosure requirements may prove insufficient, necessitating a more comprehensive approach that includes financial education measures and proactive supervisory interventions by competent authorities.

Finally, the protection of private entities must be read in relation to the cross-border dimension of the digital currency market. The possibility for operators to offer services on a European basis increases the risk of conflicts of law and difficulties in exercising rights by users. MiCA partially addresses this issue through the strengthening of cooperation mechanisms between national and European authorities, but the doctrine has observed that the effectiveness of protection will depend to a large extent on the ability to ensure easy access to judicial and out-of-court remedies for injured parties (Gortsos, 2024) (Hacker, 2024).

In conclusion, the protection of private entities in the digital currency market represents one of the most delicate and strategic areas of European regulation. MiCA introduces advanced protection tools, but their effectiveness will depend on the ability to overcome critical issues related to technological complexity, information asymmetries and the transnational dimension of the market. The analysis shows that private protection cannot be considered an ancillary element, but constitutes an essential component for the legitimacy and sustainability of the European model of regulation of digital currencies.

6. Market protection and financial stability

Systemic risks, market integrity and the role of supervisors

The protection of the market and the safeguarding of financial stability constitute the systemic horizon within which the European regulatory intervention in the field of digital currencies is placed. While MiCA aims to strengthen the protection of individual private entities, it responds to the broader and structural need to prevent systemic risks arising from the growing interconnectedness between the crypto-asset market and the traditional financial system. The doctrine

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has pointed out that this interconnection represents one of the most discontinuous elements compared to the initial phase of the development of digital currencies, in which the phenomenon was perceived as marginal and devoid of macro-financial relevance (Gortsos, 2024) (Moloney, 2024).

One of the main risk factors for the integrity of the market is the high volatility of crypto-assets, which can lead to destabilizing effects not only for investors, but also for the proper functioning of the markets as a whole. Numerous studies have shown that price volatility, often fueled by speculative dynamics and opaque information flows, makes the crypto market particularly exposed to manipulation and abuse (Avgouleas & Seretakis, 2023) (Zetzsche et al., 2023). In this context, MiCA introduces specific provisions aimed at combating market abuse practices, inspired by the principles already established in the regulation of traditional financial markets.

However, the transposition of market abuse bans in the digital currency sector is a complex challenge. The decentralized nature of many trading platforms and the difficulty of identifying responsible parties make effective enforcement challenging. Scholars have noted that the effectiveness of MiCA's provisions on market integrity will depend to a large extent on the ability of supervisors to develop technologically advanced monitoring tools and to cooperate across borders (Hacker, 2024) (Moloney, 2024). In the absence of such tools, the risk is that of a merely formal protection, incapable of affecting the most sophisticated distorting practices.

Particular attention has been paid by the European legislator to the phenomenon of stablecoins, and in particular asset-referenced tokens and e-money tokens, considered potentially suitable for generating significant systemic risks. The possibility that these instruments take on a function similar to that of money, especially in contexts of widespread use as a means of payment, has raised concerns about financial stability and the transmission of monetary policy (Panetta, 2023) (Gortsos, 2024). MiCA responds to these concerns by imposing particularly stringent requirements on issuers of significant stablecoins, including capital, governance and enhanced oversight obligations.

Doctrine has embraced this approach ambivalently. On the one hand, it has been highlighted that the regulation of stablecoins represents one of the most advanced aspects of the European model, capable of preventing digital "shadow banking" phenomena and containing the risks of financial contagion (Ferrarini & Saguato, 2023) Moloney, 2024). On the other hand, it has been observed that the high level of regulation can discourage innovation and push operators towards less restrictive jurisdictions, with the risk of a loss of competitiveness of the European market (Annunziata, 2024) (Avgouleas, 2023).

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The role of the supervisory authorities assumes, in this context, an absolute centrality. The allocation of strengthened competences to ESMA and EBA reflects the awareness that the protection of the digital currency market cannot be effectively ensured at national level alone. The cross-border dimension of crypto-assets requires a coordinated and supranational approach, based on information sharing and the adoption of common supervisory standards (Hacker, 2024) (Gortsos, 2024). However, the doctrine has pointed out that the extension of the powers of the European authorities raises delicate questions regarding democratic legitimacy and the balance between administrative control and economic freedoms (Moloney, 2024).

A further important profile concerns the interaction between the digital currency market and traditional financial markets. The increasing participation of regulated intermediaries and institutional investors in the crypto market accentuates the risk of crisis transmission and amplification of financial shocks (Avgouleas & Seretakis, 2023) (Zetzsche et al., 2023). In this perspective, MiCA can be read as a tool for "perimetering" risk, aimed at bringing the phenomenon of digital currencies back within a regulated and monitorable framework. However, as evidenced by the doctrine, such perimeter does not eliminate systemic risk, but makes it more visible and, potentially, more manageable (Gortsos, 2024).

Finally, the protection of financial stability must be considered in relation to the prospects for the introduction of a European Central Bank Digital Currency. The possible coexistence between the digital euro and private crypto-assets raises complex questions regarding monetary competition, the stability of the banking system and the function of lender of last resort (Panetta, 2023; Annunziata, 2024). The doctrine has underlined how the absence of an overall design that integrates the regulation of private digital currencies and public monetary policies represents one of the main critical issues of the current European model (Gortsos, 2024) (Moloney, 2024).

In conclusion, the protection of the market and financial stability is one of the most ambitious and at the same time the most problematic objectives of the European regulation of digital currencies. MiCA introduces advanced prevention and control tools, but their effectiveness will depend on the ability of the regulatory system to adapt, the coordinated action of the supervisory authorities and the evolution of the economic and technological context. The analysis confirms that financial stability cannot be considered an acquired fact, but a dynamic balance, constantly put to the test by digital innovation.

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7. The contribution of European case-law

Judicial interpretation and construction of digital currency law

Although the European regulation of digital currencies is relatively new, European Union case law has already played a significant role in defining the legal framework, helping to clarify essential aspects related to the qualification of crypto-assets, the competence of supervisory authorities and the application of the fundamental principles of Union law to digital markets. In the absence, until 2023, of an organic and uniform discipline, judicial intervention has often made up for regulatory gaps, acting as a stabilizing factor and interpretative orientation (Hacker, 2024) (Moloney, 2024).

An essential point of reference is represented by the case law of the Court of Justice on the legal qualification of cryptocurrency transactions. The judgment of the Court of Justice, case C-264/14, Skatteverket v. Hedqvist was the first recognition, at European level, of the legal relevance of cryptocurrencies, qualifying exchange transactions between traditional currency and bitcoin as VAT-exempt transactions. Although it dates back, this ruling continues to exert a significant influence on the doctrinal and regulatory debate, as it affirms the principle that cryptocurrencies can perform a function similar to that of means of payment, although they are not equated with legal tender. The most recent doctrine has underlined how MiCA is in critical continuity with this approach, incorporating some of its intuitions but overcoming its sectoral approach (Zetzsche et al., 2023) (Annunziata, 2024).

Further jurisprudential developments have been recorded in relation to the application of the principles of financial market law and investor protection to digital contexts. The Court of Justice has repeatedly reiterated that technological innovation cannot justify a lowering of the level of protection guaranteed by EU law, requiring a broad and functional interpretation of the rules protecting vulnerable persons (Court of Justice, case C-390/18, Airbnb Ireland). Although this ruling does not directly concern digital currencies, the doctrine has highlighted how the established principles are fully applicable to the crypto-asset market, reinforcing the idea of a continuity of values between traditional markets and digital markets (Hacker, 2024) (Moloney, 2024).

The decisions of the General Court of the European Union on the powers of supervisory authorities and the legitimacy of regulatory interventions in the financial field are also particularly relevant. In several judgments, the General Court has recognised the broad discretion of the legislator and the European authorities in adopting measures to preserve financial stability and the integrity of

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the markets (EU General Court, Case T-125/15, Landeskreditbank Baden-Württemberg). Scholars have interpreted these decisions as a jurisprudential basis for the legitimacy of the prudential approach adopted by MiCA, especially with regard to the regulation of stablecoins and the attribution of enhanced powers to ESMA and EBA (Gortsos, 2024) (Ferrarini & Saguato, 2023).

A further important line of case law concerns the protection of fundamental rights in the context of digital markets. The Court of Justice has repeatedly affirmed the need to balance the needs of regulatory control with respect for the rights to the freedom to conduct a business, the protection of personal data and legal certainty (Court of Justice, case C-311/18, Schrems II). Again, the doctrine has highlighted how these principles are of central importance in the context of digital currencies, in particular in relation to the transparency, traceability and anti-money laundering compliance obligations imposed on operators in the sector (Hacker, 2024) (Moloney, 2024).

With more specific reference to the new regulatory framework introduced by MiCA, European jurisprudence is destined to play an even more incisive role in the application phase. The first controversies that will come to the attention of the European judges will probably concern the interpretation of the regulatory definitions, the delimitation of the scope of the regulation and the proportionality of the measures imposed on operators. The doctrine has underlined how judicial interpretation will be decisive to avoid an excessively rigid reading of MiCA and to ensure a consistent application with the principles of technological neutrality and proportionality.

From a systemic perspective, the contribution of European case law can be read as an integral part of the process of constructing an EU law on digital currencies. The interaction between legislators, supervisors and judges contributes to defining a dynamic regulatory framework, in which positive rules are constantly interpreted and adapted in the light of technological and market changes. In this context, case law does not limit itself to performing an application function, but assumes a creative and integrative role, capable of guiding the future evolution of regulation (Gortsos, 2024) (Moloney, 2024).

In conclusion, the analysis of European jurisprudence confirms that the law of digital currencies cannot be understood exclusively through the regulatory data. The rulings of the Court of Justice and the General Court of the European Union are an essential element for the understanding and implementation of the regulatory framework, helping to clarify legal categories, strengthen the protection of private entities and ensure the balance between innovation and market stability. The role of

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jurisprudence is destined to grow further with the entry into full application of MiCA and with the evolution of the digital currency market.

8. Benchmarking

The European model compared with the United States, the United Kingdom and Switzerland: market protection and private rights

The comparative analysis of the regulation of digital currencies allows us to grasp more clearly the specificity of the European model and, in particular, the way in which it builds and protects the legal position of the private entity within the crypto-asset market. Unlike other legal systems, the European Union's approach is characterized by a strong integration between market protection, financial stability and protection of individual interests, configuring a model that gives central importance to the right of the private to transparency, correctness of information and protection against systemic risks (Moloney, 2024 & Annunziata, 2024).

In the US context, the regulation of digital currencies appears highly fragmented and lacks a unitary framework comparable to MiCA. The absence of comprehensive federal regulation has led to an approach based mainly on enforcement by regulatory agencies, in particular the Securities and Exchange Commission (SEC) and the Commodity Futures Trading Commission (CFTC). This model, based on the extensive application of traditional categories of securities and commodities, has produced a high degree of legal uncertainty for operators and private individuals, who often find themselves without clear and predictable prior protection (Avgouleas & Seretakis, 2023) (Zetzsche et al., 2023). Scholars have shown that, in this context, the protection of the private individual is mainly entrusted to ex post remedies, with litigation playing a central role, to the detriment of structured ex ante regulatory protection (Moloney, 2024).

The British model has partially different features. Since leaving the European Union, the UK has adopted a more flexible and gradual approach, giving the Financial Conduct Authority (FCA) a central role in defining the rules applicable to crypto-assets. The UK strategy is based on a balance between promoting innovation and protecting consumers, with a particular focus on protecting retail investors through transparency and risk disclosure obligations (Hacker, 2024; Avgouleas, 2023). However, the doctrine has observed that the absence of a unitary and directly applicable regulation can limit the effectiveness of the protection of the private individual, especially in a market characterized by high volatility and transnational operators (Moloney, 2024).

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The Swiss case represents a further term of comparison of particular interest. Switzerland has developed a relatively clear and crypto-asset-friendly regulatory framework, based on a pragmatic approach and the enhancement of legal certainty. Swiss regulation stands out for its ability to integrate digital currencies into the existing legal system, through a flexible adaptation of traditional categories of financial and corporate law (Gortsos, 2024; Zetzsche et al., 2023). In this context, the protection of the private subject is pursued mainly through private law instruments and contractual liability mechanisms, rather than through extensive public regulation. Scholars have highlighted how this model, while encouraging innovation, may be less effective in protecting the most vulnerable, in the absence of information and prudential obligations comparable to those provided for by MiCA (Annunziata, 2024).

The comparison between the different legal systems highlights how the European model stands out for the explicit centrality attributed to the protection of the private subject as a systemic value. MiCA does not limit itself to regulating the functioning of the market, but builds a real subjective legal position for the investor and the user, based on the right to receive complete and correct information, to operate in an intact market and to benefit from an effective supervisory system. This approach reflects a conception of financial regulation deeply rooted in the principles of EU law, in particular in the protection of consumers and savers as essential elements of the internal market (Moloney, 2024) (Ferrarini & Saguato, 2023).

In this perspective, the right to protection of the private individual emerges as a distinctive element of the European model compared to more market-oriented approaches or ex post enforcement. The doctrine has pointed out that the European regulation of digital currencies can be read as an extension of the principles already established in traditional financial markets, adapted to the technological specificities of the digital context (Zetzsche et al., 2023) (Avgouleas & Seretakis, 2023). However, this entails the risk of an excessively rigid transposition of categories designed for traditional financial instruments, with possible distorting effects on innovation.

The comparative analysis also makes it possible to highlight how the protection of the private sector in the European model is closely linked to the supranational dimension of regulation. The possibility of guaranteeing uniform rights to private entities in all Member States is one of the main objectives of MiCA, but requires a high level of coordination between national and European authorities. Scholars have observed that the effectiveness of this protection will depend on the ability to ensure concrete access to judicial and administrative remedies, preventing the

complexity of the regulatory system from translating into an obstacle for the weakest subjects (Gortsos, 2024) (Hacker, 2024).

In conclusion, the comparative analysis confirms that the European model of regulation of digital currencies stands out for its ambition to combine market stability, innovation and protection of private entities. Unlike other legal systems, the European Union builds a regulatory framework in which the right to protection of the private individual is not an ancillary element, but a structural component of the functioning of the crypto-asset market. This choice strengthens the legitimacy of the European model, but at the same time accentuates its critical application, making clear the need for constant adaptation of regulation to technological and market developments.

9. Evolutionary perspectives of European regulation

Towards a European digital currency law between digital euro, revision of MiCA and strengthening the protection of the private

The adoption of the MiCA Regulation does not end the process of building a European law for digital currencies, but rather represents an intermediate step in a process destined to evolve in response to the technological, economic and institutional transformations taking place. The most recent doctrine has highlighted how the highly innovative nature of the crypto-asset phenomenon requires a dynamic conception of regulation, based on progressive adaptation mechanisms and constant interaction between legislators, supervisory authorities and jurisprudence (Moloney, 2024) (Gortsos, 2024).

One of the main factors destined to influence the evolution of the European regulatory framework is the project to introduce a Central Bank Digital Currency of the euro area. The debate on the digital euro has become increasingly important in recent years, raising legal, economic and institutional questions that are closely intertwined with the regulation of private digital currencies. According to a significant part of the doctrine, the introduction of the digital euro could redefine the balance between public and private money, substantially affecting the economic functions performed by crypto-assets (Panetta, 2023) (Annunziata, 2024).

In this perspective, the relationship between MiCA and the digital euro appears destined to become one of the central nodes of the future European law of digital currency. While the regulation expressly excludes CBDCs from its scope, the coexistence of public and private instruments raises complex questions regarding monetary competition, financial stability, and the protection of private entities. The doctrine has pointed out that the digital euro could strengthen the protection of

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users, offering a secure and guaranteed means of payment, but at the same time it could accentuate regulatory pressures on private crypto-assets, with possible effects of marginalization or restructuring of the market (Gortsos, 2024) (Moloney, 2024).

A further evolutionary profile concerns the possible revision of the MiCA Regulation. Numerous authors have highlighted how the speed of technological innovation makes corrective or integrative intervention probable, if not inevitable, in the medium term. In particular, the regulation of decentralized finance (DeFi), the legal framework of non-fungible tokens and the coordination with the legislation on artificial intelligence and data (Zetzsche et al., 2023) (Hacker, 2024) have been reported as critical areas. The revision of MiCA could represent an opportunity to further strengthen the protection of private entities, adapting the protection tools to new forms of intermediation and the offer of digital services.

In this context, the role of the European Supervisory Authorities in defining the evolutionary trajectories of regulation is becoming increasingly important. Through soft law acts, interpretative guidelines and supervisory interventions, ESMA and EBA are called upon to act as a link between the regulatory data and the reality of the market. Scholars have observed how this function can contribute to strengthening the protection of the private individual, provided that it is exercised in compliance with the principles of proportionality, transparency and legal certainty (Moloney, 2024) (Ferrarini & Saguato, 2023). Conversely, excessive use of soft law could heighten uncertainty and make it more difficult for private individuals to understand and enforce their rights.

The evolutionary perspectives of European regulation must also be read in the light of the broader process of digitization of economic law. The integration of digital currency regulation, financial market regulation and consumer protection is one of the most complex challenges for the European legislator. Scholars have pointed out that the construction of a European digital currency law requires a holistic approach, capable of overcoming traditional sectoral compartmentalizations and enhancing the centrality of the private entity as the ultimate recipient of regulation (Avgouleas & Seretakis, 2023) (Annunziata, 2024).

In this perspective, the strengthening of the protection of the private individual cannot be limited to the imposition of information and prudential obligations, but must translate into a greater effectiveness of legal remedies. Access to justice, the possibility of enforcing contractual and non-contractual liabilities and the availability of alternative dispute resolution mechanisms are essential elements for the legitimacy of the European model. The doctrine has highlighted how the effectiveness of protection will depend on the ability to make these tools truly

accessible to the most vulnerable, avoiding that the technical and regulatory complexity of the sector translates into a barrier to the exercise of rights (Hacker, 2024) (Gortsos, 2024).

Finally, the evolutionary perspectives of European regulation of digital currencies must be placed in a global dimension. Comparison with other legal systems and the participation of the European Union in international financial regulation forums will inevitably influence future regulatory choices. The doctrine has underlined how the European model, if properly adapted, can serve as a global reference for a regulation of digital currencies based on high standards of protection of the market and private entities (Zetzsche et al., 2023) (Moloney, 2024).

In conclusion, the evolutionary perspectives of the European regulation of digital currencies highlight how MiCA represents a starting point, but not a definitive point of arrival. The evolution towards a European digital currency law will require a constant updating of the regulatory framework, greater integration between monetary policies and market regulation and, above all, a substantial strengthening of the protection of private entities as a structural and qualifying element of the Union legal system.

10. Conclusions

Regulation of digital currencies and protection of the private in European market law

The analysis carried out in this contribution allows us to place the European regulation of digital currencies within a broader evolutionary trajectory of EU economic law, in which the technological transformation of the currency is intertwined with the needs of financial stability, integration of the internal market and protection of private entities. The MiCA Regulation is a regulatory intervention of systemic scope, intended to have a lasting impact on the structure of European digital financial markets and on the configuration of the rights and obligations of the parties involved.

The analysis shows that the European model is characterized by an approach strongly oriented towards risk prevention and ex ante protection, in contrast to models based mainly on ex post enforcement. In this perspective, the protection of the private subject does not take on a merely ancillary role, but is built as a structural component of the functioning of the digital currency market. The disclosure requirements, prudential requirements and supervisory mechanisms introduced by MiCA contribute to outlining a subjective legal position that is based on the right to transparency, fair market practices and protection against systemic risks.

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At the same time, the analysis has shown that this regulatory framework is not without critical issues. The tension between hard and soft law, the risk of over-regulation and the difficulties of adapting to highly decentralized technological models pose significant questions regarding the sustainability of the European model in the medium and long term. In particular, decentralized finance and the evolution of forms of digital intermediation call into question the traditional categories on which financial regulation is based, requiring continuous reflection on technological neutrality and the proportionality of regulatory intervention.

The contribution of European case law proves, in this context, to be essential to ensure a coherent and systemic interpretation of the new regulatory framework. The rulings of the Court of Justice and the General Court of the European Union, although not yet numerous on MiCA, provide fundamental interpretative principles for the legal qualification of crypto-assets, for the delimitation of the powers of supervisory authorities and for the balance between regulatory control and fundamental rights. The case-law is thus configured as a dynamic element of integration of positive law, destined to have an increasing impact on the application phase of the regulation.

The comparative analysis has further confirmed the specificity of the European model, highlighting how the Union has chosen to privilege a high level of protection of the private sector over more flexible or fragmented approaches adopted in other legal systems. This choice strengthens the legitimacy of the European model in terms of values, but at the same time increases its complexity of application and the risk of rigidity. The Union's ability to maintain a balance between protection, innovation and competitiveness will be one of the main testbeds of European digital currency law.

Looking ahead, the introduction of the digital euro and the possible revisions of the MiCA open up scenarios for further evolution of the regulatory framework. The construction of a European digital currency law will require an integrated approach, capable of coordinating market regulation, monetary policies and protection of the rights of private subjects. In this process, the centrality of the person and the saver must remain a guiding principle, in order to ensure that technological innovation does not result in a reduction of legal guarantees, but in a strengthening of confidence in the market and in the European institutions.

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THE AUTOMATION OF THE ADMINISTRATIVE MEASURE IN THE SCHOOL SYSTEM: EFFICIENCY, ECONOMY AND "RESERVE OF HUMANITY"

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ABSTRACT

Administrative automation is reshaping school governance, offering opportunities to accelerate procedures, standardize routine tasks and improve the management of public resources. However, its implications extend beyond operational efficiency to questions of accountability, equity and the protection of educational rights. This article examines the tension between administrative efficiency and the "reserve of humanity," understood as the preservation of human judgment, contextual assessment and responsibility in decisions affecting individuals. Adopting a conceptual and normative approach focused on the Italian school system, the paper distinguishes the automation of administrative processes from the automation of final decisions and discusses their organizational, economic and ethical implications. Particular attention is given to teacher allocation, enrolment, access to financial support and the recognition of vulnerable circumstances. The analysis highlights how anticipated savings may be offset by implementation and maintenance costs, staff training, additional supervisory work, litigation and dependence on technology providers. It argues that meaningful human oversight should be treated as an integral component of sustainable automation, with potential benefits for service quality, institutional trust and error prevention. The article proposes a responsible automation framework based on transparent decision criteria, comprehensive cost assessment, continuous staff development,

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stakeholder participation and accessible human review. It concludes that automation can support the public mission of schools when efficiency is assessed alongside fairness, educational inclusion and accountable decision-making.

Keywords: *administrative automation; school governance; human oversight; reserve of humanity; economic efficiency; algorithmic accountability; educational inclusion.*

JEL Classification: I28; H83; D73; O33.

Introduction

The digitization of the Public Administration, accelerated by the European framework and the PNRR and the growing spread of management platforms, is profoundly transforming the functioning of educational institutions. It has introduced not only new tools into the school system, but a new administrative paradigm. Automation no longer concerns only document management or registration, but the possibility — foreseen and regulated — that an **administrative measure** is adopted, in whole or in part, by an automated system. Digital secretariats, automated ranking management systems, computerized procedures for substitute teachers, enrolments, contributions: the school is today one of the most advanced — and most delicate — laboratories of administrative automation.

This transformation opens up a crucial theoretical knot: the tension between the constitutional principle of **good performance** (art. 97 of the Constitution), which legitimizes the use of technologies to improve efficiency and impartiality, and the principle — not codified but recognized by doctrine — of the **"reserve of humanity",** which protects the evaluative, contextual and relational dimension of administrative action.

In the school sector, this tension is amplified by the peculiar nature of the institution: the school is indeed a public administration, but it is also a **place of educational care**, where every administrative decision affects educational rights, growth paths, situations of fragility. In this scenario, the automation of the **administrative measure** represents a critical threshold. It is no longer just a matter of computerizing flows or digitizing documents, but of delegating part of the final decision to algorithmic systems. It is here that a structural tension emerges: on the one hand, the promise of **economic efficiency**, reduction of time, standardization; on the other, the need to preserve a **"reserve of humanity",** that is, that space for

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evaluation, discretion and responsibility that the juridical tradition attributes to the natural person.

The thesis of this article is that automation can indeed improve the quality of the school service, but only if designed within a framework that recognizes the educational specificity of the school and maintains a human oversight in the decision-making steps that affect the rights, trajectories and fragilities of the people involved.

1. Automation as a political choice, not a technical one

In recent years, the Italian school has seen a new silent figure appear: the algorithm. He does not enter the classroom, he does not talk to the students, he does not know the faces of the teachers. And yet, he decides. He decides substitutes, priorities, assignments, times, joints. He decides with the speed of a calculation and the indifference of a machine.

Administrative automation in schools is often presented as a neutral, inevitable, almost natural process. In reality, it is a political choice that determines who decides, who controls, who benefits and who remains on the sidelines. In the educational context, where the human relationship is the heart of the service, every automation changes delicate balances: time, responsibility, transparency, access to information, distribution of work.

In recent years, the pressure towards digitization has been intertwined with increasingly stringent economic constraints: reduction of administrative staff, increase in bureaucratic tasks, need for continuous reporting. Automation is thus proposed as an "efficient" solution, but its real costs — economic, social, cognitive and its "erroneous" interpretations — are rarely questioned.

In 2023, in a large city in the North, an algorithm for substitute teachers generated a systemic error: hundreds of wrong appointments, teachers bypassed, appeals, tensions. The manager who had signed those measures suddenly found himself responsible for decisions he had not really taken. It was a revealing episode: automation does not erase human responsibility, it shifts it, **redefines it**, sometimes **hides it**[i].

The school, more than other administrations, lives in this fragile space between calculation and judgment. It is an administration, yes, but it is also an educating community: a place where every decision — even the most apparently technical — affects biographies, possibilities, fragility. For this reason, alongside efficiency, it is necessary to preserve a **reserve of humanity**.

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2. Theoretical and regulatory framework

The doctrine distinguishes three levels of technological intervention:

1. **Digitalization**: transformation of the medium (from analog to digital).
2. **Computerization**: reorganization of processes through digital tools.
3. **Automation**: delegation of activities — including decision-making — to algorithmic systems.

It is the latter level that raises the most delicate issues.

2.1. Automation in Public Administration

Italian and European legislation clearly distinguishes between **automation of the procedure** and **automation of the measure**.

- The first concerns the management of flows, registration, and the transmission of documents.
- The second concerns the final decision, which can be taken in whole or in part by an automated system.

The **Digital Administration Code (CAD),** in particular art. 3-bis and art. 41, recognizes the possibility of automated procedures, provided that transparency, traceability and the possibility of human intervention are guaranteed.

Article 22 of the **GDPR** regulates decisions based solely on automated processing, imposing:

- right to explanation,
- right to human intervention,
- protection against discriminatory effects.

The AgID Guidelines also recognize the possibility of automated decisions, but impose strict limits: transparency, motivation, possibility of human intervention, protection against algorithmic discrimination.

The recent **European AI Act** (2024) further strengthens these principles, especially in sectors with a high impact on fundamental rights, and introduces a classification of AI systems according to risk. Systems used for decisions affecting fundamental rights — such as school rights — fall into the high-risk categories, subject to stringent requirements: technical documentation, auditability[ii], human supervision, risk management.

2.2. The "reserve of humanity"

Administrative doctrine has developed the concept of **"reserve of humanity"** to indicate the set of decisions which, by nature, require a human judgment that cannot be reduced to calculation[iii].

It is based on four pillars:

- **proportionality**: the decision must be appropriate to the specific case.
- **Reason:** the act must make the logical path followed understandable.
- **Comprehensibility of the document**: the addressee must be able to understand the reasons for the document.
- **Protection of trust**: the administration must act in a predictable and consistent manner.

In the school context, the reserve of humanity is intertwined with the principle of **educational personalization** and with the protection of situations of vulnerability (SLD, SEN, socio-economic fragility).
Automating without considering these dimensions risks producing formally correct but substantially unfair decisions.

3. The school system as a case study

The school is a highly procedural administration: it manages a huge number of repetitive acts, which can be standardized and subject to regulatory constraints such as enrolments, rankings, assignments, certifications. At the same time, it is an environment with a high relational density, where every decision has a direct human impact. This dual nature makes it an ideal terrain for observing the opportunities and risks of automation.

3.1. Types of measures that can be automated

Some processes naturally lend themselves to automation:

- **school and provincial rankings**,
- **assignment of substitute teachers**,
- **granting of economic benefits**,
- **Enrollment management**.

Others, on the other hand, have obvious limitations:

- disciplinary proceedings,
- assessments and certifications,
- recognition of situations of fragility (SLD, SEN, socio-economic conditions).

3.2. Specific risks in the school context

Automation can introduce bias, opacity, rigidity. In fact, an algorithm that assigns substitute teachers can unknowingly penalize some categories; A system that assesses indicators of fragility may miss essential nuances. In addition, the final responsibility always falls on the school principal, who must be able to understand and motivate the outcome produced by the system.

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Here are some examples in which the algorithm has made errors that do not escape humans:

a) The algorithm that didn't see snow

In a mountain technical institute, an algorithm had classified an entire class as "at risk" because the students, during a particularly harsh winter, had accumulated many absences. The system knew nothing about icy roads, isolated hamlets, families who wake up before dawn to reach school. For him, absence was a given. For school, it was a story[iv].

b) Automated rankings and interpretative limits

In 2022, a Regional School Office automated the management of GPS rankings. The algorithm correctly applied the scores, but did not recognize some foreign certifications, generating appeals and delays. The problem was not technical, but interpretative: the rule required a discretionary assessment that the algorithm could not carry out[v].

c) The mother who did not appear in the system

During online registration, a foreign mother was unable to complete the procedure: the system did not recognize the format of her residence permit. The message was impersonal: *"Invalid document"*. She, on the other hand, was a person of flesh and blood, with a child by the hand and the fear of not being welcomed[vi].

4. Economic efficiency of school automation: promises and ambiguities between efficiency and hidden costs

Administrative automation in schools is often presented as a lever of efficiency: less repetitive work, fewer errors, fewer delays. It is a seductive narrative, especially in a sector that has been experiencing a constant tension between limited resources and growing demands for years. Yet, as the most recent analyses by the OECD and the AI Now Institute show, economic efficiency is a more complex concept than it appears[vii].

Automation promises a lot: faster turnaround times, fewer clerical errors, smoother processes, optimized personnel and greater traceability. In an often overloaded system such as the school system, these benefits are real and relevant. But efficiency is an ambiguous value:

- It can turn into an ideology that oversimplifies complex decisions.
- It can generate dependency on external suppliers.
- It can conceal maintenance, updating, training costs.
- It can reduce the quality of the service if not accompanied by adequate human supervision

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- It can become a lens that flattens complexity, that transforms school into a flow of data, that confuses speed with justice.

An example for all is that of the ghost teacher. A precarious teacher was "unavailable" in the automatic convocation system. It was a trivial mistake: a period of illness that was not updated. But the algorithm did not know his voice, his availability, his story. He had deleted it[viii].

4.1 The efficiency paradox: when automation costs more

The rhetoric of efficiency suggests that digitization means saving. However, the most recent economic analyses show a very different picture: administrative automation in schools involves direct and indirect costs that often exceed the expected benefits. According to OECD estimates (2024), automating administrative processes can reduce operational costs by between 15% and 30%. But these numbers, taken in isolation, risk being misleading: efficiency is not a natural given, it is a **political construction**, which depends on what one decides to measure and what one chooses to ignore.

Behind the promise of savings lie costs that are often invisible in the balance sheet:

- **implementation** (platforms, data migration, training),
- **maintenance and updating**,
- **litigation** generated by algorithmic errors,
- **social and reputational costs**.

a. Implementation and maintenance costs

For a medium-sized institution, the adoption of a management platform involves an initial investment that can vary between **20,000 and 60,000 euros**, including:

- licensing or system development
- Data migration
- Infrastructure Adaptation
- Staff training

On top of that, there are **recurring costs** — maintenance, upgrades, technical support — which account for an average **of 15 to 25 percent of the initial cost each year**. Over the typical lifecycle of a platform (4–5 years), the cumulative cost can far exceed initial expectations, making the investment less worthwhile than anticipated.

b. Coordination costs and "invisible" work

Automation doesn't eliminate human labor—it shifts it and often amplifies it. Research on administrative processes shows that:

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- Between **30% and 50% of staff time** is absorbed by digital systems supervision activities.
- Errors generated by automatisms (synchronizations, duplications, inconsistencies) require manual interventions that can cost **2–3 hours of additional work** per individual case.
- The continuous training necessary to keep skills up to date represents an indirect cost estimated at **1,000–2,000 euros per year per employee.**

These costs do not appear in the balance sheets, but they have a profound impact on the sustainability of automation and the quality of administrative work.

c. Costs of technology dependency and lock-in

Once a platform has been adopted, the school becomes dependent on the supplier for essential functions: security, interoperability, continuity of service. This dependency can generate:

- increases in annual rents of up to **40% within a few years;**
- difficulty in switching suppliers due to the lack of open standards;
- data migration costs that can range between **10,000 and 30,000 euros;**

The result is a technological lockin that limits the decision-making capacity of schools and transfers economic and operational power to private entities.

Automation can therefore generate a paradox: **save in the short term, spend more in the long term**.

This is what Pasquale (2024) calls *"apparent efficiency"*: a superficial improvement that hides structural fragilities[ix].

4.2. The impact on administrative work: between invisibility and overload

Automation promises to "free up time", but often produces the opposite effect:

- increases cognitive load
- Fragments tasks
- requires advanced digital skills that are not always recognized or paid
- shifts the responsibility for errors to human operators, even when the origin is technical

Administrative staff are undergoing a profound transformation, often not accompanied by adequate training or contractual recognition.

5. The economy of administrative attention, the economic value of the "reserve of humanity" and the responsible *automation model*

There is another, more subtle cost: automation risks shifting the attention of managers and staff towards the technical management of systems, taking time

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away from the educational dimension. Crawford (2023) speaks of **"administrative attention drain"**: technology does not free up time, but redirects it towards new forms of complexity[x].

5.1. The Reserve of Humanity as a Regulative Principle

Automation cannot replace human judgment when the decision affects:

- fundamental rights,
- situations of vulnerability,
- contextual evaluations that cannot be reduced to data.

In this context, the role of the school principal is that of guarantor of the legality and educational quality of the institute. Its responsibility cannot be delegated to an algorithm. He must be able to: understand the functioning of the system, intervene in doubtful cases, justify the final measure.

The school, then, is an educating community: the administrative act is never just a technical act: it is part of the educational relationship.

The "reserve of humanity" is not an obstacle to innovation, but a condition for **ethical**, **inclusive**, **responsible innovation.**

In the educational sector, where the public mission is central, blind delegation to automated systems risks eroding the democratic dimension of the school.

The reserve of humanity is not only an ethical principle: it is also a real **economic investment**.

It reduces errors, litigation, conflicts, and increases trust and quality of service.

To prevent automation from becoming an accelerator of inequalities by integrating automation and humanity, a model is needed that integrates:

- **transparency** of algorithmic processes and criteria,
- **comprehensive economic evaluation**, including hidden costs and impacts on employment
- **continuous training** of staff[xi].
- **participation** of teachers, administrators, students and families in technological choices, i.e. co-design with the school community,
- **human oversight** in decisions that affect rights, paths, opportunities

5.2. The responsible automation model.

The school cannot be treated as a company: its value is not measurable only in terms of efficiency.

A sustainable model: **a) Reduces errors: meaningful** human supervision reduces the risk of costly errors; **b) Reduces litigation:** a reasoned and contextualized decision is less exposed to appeals; **c) Increases trust:** trust is an intangible capital

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that reduces the costs of coordination and conflict; **d) Improve the quality of service:** a school that listens, interprets, welcomes is a school that works better — even economically.

Emblematic is the case of an experimental platform that suggested to teachers an automatic evaluation of the topics. A paper by a student with SLD was classified as "insufficient". The teacher, however, reread the text: behind the mistakes there was a clear thought, a surprising maturity, a voice that asked to be heard[xii].

6. Conclusions: preserving the human in the age of automation

Automation is never a simple technical update: it is a decision that redesigns priorities, redistributes resources and redefines the value attributed to human work. Economic data clearly show that digitization does not automatically mean saving. On the contrary, the costs of implementation, maintenance, training and technological lockin reveal a complex picture, in which the promised efficiency risks turning into an increase in direct and indirect costs for schools.

In this scenario, the central question is no longer "how much can we automate?", but "what automation is sustainable, fair, transparent?".

A school that invests tens of thousands of euros in digital platforms without a complete impact assessment — economic, organizational, ethical — risks subtracting resources from what constitutes its primary mission: the educational relationship, the care of paths, the support of communities.

Automation can certainly lighten repetitive processes and improve the quality of data, but only if it is included in a vision that recognizes the value of administrative work and protects its human dimension.

When hidden costs exceed the declared benefits, when staff time is absorbed by checking for system errors, when technological dependence limits schools' decision-making capacity, then automation ceases to be a tool and becomes a constraint.

Preserving the human in the age of automation means, today more than ever, **preserving the possibility of choosing**: choosing which processes to digitize, which to keep human, which to share, which to protect.

It means recognizing that the school is not a company and that its value indicators cannot be reduced to efficiency metrics or presumed savings.

At a time when everything tends to become a procedure, the school remains one of the last places where democracy is exercised daily through decisions, relationships, shared responsibilities.

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Automation can sustain this space — but only if guided by a vision that focuses on transparency, justice, the dignity of work and the conscious investment of public resources.

Automation in schools is not a technological destiny, but a political and educational choice. The tension between efficiency and humanity should not be resolved by eliminating one of the two poles, but by cultivating a dynamic, vigilant, conscious balance. The school can become a model of **educational administration**, where the algorithm does not decide in place of the human, but together with the human; where speed does not sacrifice justice, and precision does not cancel care.

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THE ROLE OF AI IN NEW PEDAGOGICAL METHODOLOGIES: BETWEEN ADAPTIVE EFFICIENCY AND THE CHALLENGE OF ALGORITHMIC EMPATHY

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Abstract

The irruption of artificial intelligence into classrooms does not knock on the door; he breaks through it. We are not talking about a trivial update of the machines available to teachers, or yet another harmless interactive whiteboard. It's a tear. A genetic mutation of schooling that alters, perhaps irreversibly, the very grammar of the transmission and re-elaboration of knowledge. In this scenario, which smacks of vertigo and urgency, it becomes not only crucial, but I would say politically inescapable, to question the ethical, practical and human implications of this integration. Can we really afford to welcome the algorithm as a neutral facilitator? What are the real, creeping consequences of a massive, almost fideistic reliance on predictive computing to shape the minds of learners?

Pedagogical research—the one that does not surrender to the flattery of efficiency at all costs—obstinately reminds us that the educational act is, and must remain, a radically anthropocentric space. A dense place, where human friction, the unexpected, vulnerability and even silence are not system "bugs" to be corrected, but the very foundation of the construction of knowledge. If AI today

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presents itself not as a mere tool, but as the main transformative element in the global educational framework, the real challenge for institutions lies not in the passive acceptance of automation, but in the ruthless deconstruction of its drifts.

The goal of this essay is not, therefore, to draw up a reassuring catalog of digital good practices or to draw up a user manual for lost teachers. It is, rather, an attempt at intellectual resistance. An exploration of the complexity of the relationship between the silicon of the machine and the flesh of the class-group, overcoming the sterile dichotomy between apocalyptic technophobia and the easy enthusiasm of the integrated. The critical analysis of the ways in which AI is used becomes, in these pages, the only epistemological tool to promote a teaching that is not limited to innovation, but tames it, bending it to the development of stubbornly critical and divergent thinking.

And it is precisely in this fault line, in the beating heart of this contradiction between daily practice and the algorithm, that the central thesis of our work is positioned: the irrepressible need to structure educational interaction around the concept of "Algorithmic Empathy". Taking up and expanding the theoretical framework defined in In search of a possible Algorithmic Empathy (published by "IURA AND LEGAL SYSTEM" UNISA Legal Journal, Volume 12-3 September 2025), we propose an interpretative key that requires a reversal of perspective. We must no longer look at the machine as a cold and infallible extractor of statistical data, deputed to measure and classify the learner, but we must demand—on an ethical, pedagogical and legal level—that it be designed to seek forms of relational resonance. This "system empathy" postulates an algorithm capable of stopping at the threshold of unquestionable judgment; a code that maps the complexity, signals the error, but knows how to take a step back to preserve the untouchable emotional and cognitive vulnerability of the student, giving back to the teacher in flesh and blood the absolute sovereignty of the educational act.

The essay, articulated in a path that analytically dismantles the myths of adaptive learning, automated assessment and aseptic virtual communities, aims to demonstrate that this paradigm shift requires a teaching class armed with new and sharp critical tools. It is not just a matter of preparing future teachers to interrogate software, but of training them to resist the algorithmic expropriation of their craft. Only through this awareness will we be able to guarantee that the disruptive technological transformation underway does not translate into a mass standardization of consciences, but remains, against all statistical predictions, a profoundly, irreducibly human, too human adventure.

Keywords: *artificial intelligence, algorithmic empathy, pedagogy, educational technology, adaptive learning, teacher education*

JEL Classification: I20, I21, I23, O33, D83

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1. Introduction

The rapid integration of Artificial Intelligence (AI) into educational systems is reshaping traditional pedagogical models, transforming not only teaching methodologies but also the nature of educational relationships. AI-powered technologies increasingly support adaptive learning, automated assessment, personalized instructional pathways, and data-driven educational decision-making. These developments promise greater efficiency, accessibility, and personalization; however, they also raise fundamental pedagogical and ethical questions concerning the role of human judgment, interpersonal interaction, and the educational mission of schools.

Recent research has extensively documented the benefits of AI-assisted learning, particularly regarding personalized instruction, learning analytics, and administrative efficiency. At the same time, scholars have highlighted significant concerns related to algorithmic bias, student privacy, cognitive dependency, transparency, and the potential reduction of meaningful teacher–student interaction. While technological innovation continues to advance rapidly, theoretical frameworks capable of integrating computational efficiency with the relational and human dimensions of education remain relatively underdeveloped.

Education cannot be reduced to the optimization of measurable learning outcomes. Teaching is fundamentally an interpretative, relational, and ethical activity in which emotions, cognitive vulnerability, dialogue, and contextual judgment play essential roles. Consequently, the increasing reliance on predictive computational systems requires a critical reconsideration of the balance between technological assistance and pedagogical responsibility.

Against this background, this article proposes the concept of Algorithmic Empathy as a theoretical framework for human-centered AI in education. Rather than attributing emotional capacities to computational systems, Algorithmic Empathy refers to the design of AI systems capable of recognizing educational complexity while deliberately preserving the teacher's interpretative authority. Within this framework, AI functions as a decision-support technology that identifies patterns, learning difficulties, and cognitive indicators without replacing the professional, ethical, and relational judgment of educators.

The objective of this paper is to examine the opportunities and limitations of AI integration in contemporary pedagogy through the lens of Algorithmic Empathy. Specifically, the article analyzes adaptive learning, collaborative learning environments, AI-assisted assessment, ethical governance, and teacher professional

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development, arguing that educational innovation should be guided not solely by technological performance but by principles that safeguard human interaction, critical thinking, and pedagogical autonomy.

The originality of this contribution lies in proposing Algorithmic Empathy as an integrative conceptual model that reconciles technological innovation with the humanistic foundations of education. By positioning AI as a relational support rather than a substitute for educational agency, the paper contributes to current debates on responsible AI adoption and offers a theoretical perspective for future educational research and policy development.

2. Literature Review

2.1. Artificial Intelligence and Adaptive Learning

Artificial Intelligence (AI) has become one of the main drivers of innovation in contemporary educational systems. Among its most significant applications is adaptive learning, which aims to personalize instruction by continuously analyzing students' learning progress, cognitive characteristics, preferences, and performance. AI-supported adaptive systems dynamically adjust learning content and instructional strategies according to individual needs, allowing students to progress at their own pace while providing immediate feedback and targeted educational support (Zhang & Xie, 2024; Katiyar et al., 2024).

Recent studies suggest that personalized learning environments can improve learning effectiveness, increase student engagement, and facilitate the achievement of educational objectives. AI-based personalization also enables early identification of learning difficulties, allowing educators to intervene before academic problems become persistent (Shete et al., 2024). These developments have contributed to a growing interest in data-driven educational decision-making, where learning analytics support both instructional planning and individualized educational pathways.

Despite these advantages, several scholars emphasize that adaptive learning should not be understood solely as a process of technological optimization. Educational experiences involve emotional, motivational, and contextual dimensions that cannot be fully captured through computational analysis alone. Consequently, excessive reliance on algorithmic personalization may oversimplify the complexity of human learning and reduce educational processes to measurable performance indicators rather than holistic cognitive development.

2.2 Student Engagement, Motivation and Cognitive Development

Student engagement represents one of the most frequently discussed benefits of AI-supported educational environments. Intelligent tutoring systems, conversational

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agents, and personalized instructional platforms have demonstrated considerable potential to increase motivation by adapting educational content to students' individual characteristics (Karim et al., 2025).

However, empirical findings also reveal important limitations. Although students generally recognize the transformative potential of AI technologies, reported improvements in learning motivation remain considerably lower than expected. This discrepancy suggests that technological efficiency does not automatically translate into meaningful educational engagement. Personalization alone cannot replace the relational dimensions of teaching that contribute to students' intrinsic motivation and sustained participation in learning activities.

Another growing concern relates to the phenomenon of cognitive offloading, whereby learners increasingly delegate cognitive processes to intelligent systems. While AI can reduce routine cognitive demands, excessive dependence on automated support may weaken critical thinking, problem-solving abilities, reflective reasoning, and autonomous learning capacities (Sargsyan, 2025). These findings indicate that educational technologies should complement rather than replace active cognitive engagement.

2.3 Artificial Intelligence and Collaborative Learning

The application of AI extends beyond individualized instruction to collaborative learning environments. Machine learning algorithms are increasingly employed to support group formation by analyzing students' academic profiles, learning styles, previous performance, and interaction patterns (Wang et al., 2024). Such approaches seek to optimize teamwork by creating balanced and complementary learning groups.

Furthermore, AI-powered conversational agents have been introduced into collaborative educational settings through dialogue-based instructional methods such as AI-assisted Socratic questioning (Chukhlomin, 2024). These systems encourage reflection, questioning, and knowledge construction by guiding students through structured conversations.

Although these technologies may improve collaborative learning processes, several authors argue that algorithmically optimized collaboration cannot fully reproduce the complexity of authentic human interaction. Social learning involves negotiation, disagreement, emotional communication, and interpersonal adaptation, all of which remain essential components of educational development (Darby & Tallontire, 2016). Consequently, collaborative learning should preserve opportunities for genuine human interaction rather than relying exclusively on computational mediation.

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2.4 AI-Assisted Assessment

Educational assessment constitutes another area where AI applications have expanded rapidly. Automated assessment systems have demonstrated high levels of consistency when evaluating objective examinations, particularly multiple-choice tests and standardized assessments (Karademir & Alper, 2024). These technologies also facilitate immediate feedback and efficient identification of students' learning difficulties.

Nevertheless, the literature consistently highlights important limitations when AI is applied to subjective assessment tasks. Essays, oral examinations, creative projects, and complex argumentative writing require contextual interpretation, qualitative judgment, and pedagogical sensitivity that remain difficult for computational systems to replicate (González Calatayud et al., 2021).

Research involving pre-service teachers has also revealed unintended educational consequences associated with extensive AI use. Future educators who become overly dependent on automated evaluation systems may gradually lose the ability to independently recognize conceptual errors, diagnose misconceptions, and interpret students' reasoning processes (Kim et al., 2025). These findings reinforce the continuing importance of teachers' professional judgment within educational assessment.

2.5 Ethical Challenges and Teacher Professional Development

The increasing integration of AI into education has generated extensive debate concerning ethics, fairness, transparency, and data governance. One of the principal concerns involves algorithmic bias, since AI systems learn from historical datasets that may reproduce existing educational inequalities and social stereotypes (Boussouf et al., 2024; Degni, 2024). Without appropriate safeguards, predictive educational systems may unintentionally reinforce discriminatory patterns instead of reducing them.

Privacy and data protection constitute additional challenges. AI-supported educational platforms continuously collect and process large amounts of student information, raising important questions regarding informed consent, data security, surveillance, and responsible data governance (Huang, 2023; Irfan et al., 2023). Educational institutions must therefore establish transparent policies that ensure both technological innovation and the protection of students' fundamental rights.

The literature also identifies teacher preparation as a decisive factor influencing successful AI implementation. Although educators generally recognize the potential value of AI-supported instructional tools, many report insufficient training and limited confidence regarding their pedagogical use (Roshan et al., 2024; Hau et al., 2024). Consequently, professional development programs should extend beyond

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technical competencies to include ethical reasoning, critical evaluation of AI-generated recommendations, and informed pedagogical decision-making.

Overall, current research demonstrates that AI offers significant opportunities to improve educational processes through personalization, collaboration, assessment, and administrative support. At the same time, existing studies consistently emphasize the necessity of maintaining human agency, ethical responsibility, and pedagogical judgment as central components of educational practice. These unresolved tensions provide the theoretical foundation for the conceptual framework proposed in the following section.

3. Theoretical Background

3.1 From Adaptive Learning to Human-Centered Artificial Intelligence

The rapid diffusion of Artificial Intelligence in educational environments has shifted pedagogical research from questions of technological feasibility toward broader reflections on educational quality and human-centered learning. Although adaptive learning systems have demonstrated significant potential for personalizing instruction and improving educational efficiency, they remain primarily based on predictive computational models that optimize measurable learning outcomes. Such systems excel at identifying patterns, monitoring academic performance, and recommending individualized learning pathways. However, education involves dimensions that extend beyond computational prediction, including emotional development, interpersonal relationships, contextual interpretation, and ethical judgment.

Teaching is fundamentally an interpretative activity rather than a purely technical process. Educational decisions frequently require the understanding of cognitive uncertainty, emotional vulnerability, and social interaction—dimensions that cannot be completely represented through statistical modelling. Consequently, the increasing use of AI requires theoretical models capable of integrating computational support with the relational nature of educational practice.

Within this perspective, AI should be understood not as a substitute for teachers' professional expertise but as a complementary instrument supporting educational decision-making while preserving human responsibility and pedagogical autonomy.

3.2 Algorithmic Empathy as a Conceptual Framework

The central theoretical contribution of this article is the concept of Algorithmic Empathy, originally developed by Bencivenga (2025) and here extended to the educational domain as a framework for responsible Artificial Intelligence in pedagogy.

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Algorithmic Empathy does not imply that computational systems are capable of experiencing emotions or developing genuine empathic understanding. Rather, it proposes that AI systems should be intentionally designed to recognize educational complexity while avoiding the replacement of human interpretative judgment. In this perspective, empathy is understood as a property of system design rather than an intrinsic characteristic of the algorithm itself.

Instead of functioning exclusively as predictive engines that classify students according to measurable performance indicators, AI systems should facilitate the recognition of cognitive vulnerability, learning uncertainty, and contextual diversity. Their primary function is therefore to assist educators by organizing educational information, identifying potential learning difficulties, and supporting pedagogical reflection without making autonomous educational decisions.

Accordingly, Algorithmic Empathy redefines the relationship between teachers and intelligent educational technologies. Rather than replacing pedagogical expertise, AI becomes a relational support system that enhances teachers' capacity to understand learners while preserving their professional authority.

3.3 Principles of Algorithmic Empathy

The proposed framework is based on four complementary pedagogical principles.

First, AI should preserve human interpretative authority. Algorithms may recognize patterns, detect anomalies, and generate recommendations, but educational interpretation remains the exclusive responsibility of teachers.

Second, AI should recognize cognitive vulnerability instead of reducing students to statistical profiles. Educational performance should always be interpreted within broader developmental, emotional, and social contexts.

Third, AI should promote relational mediation rather than technological substitution. Intelligent systems should strengthen teacher–student interaction instead of replacing interpersonal communication through automated decision-making.

Fourth, educational AI should support critical thinking rather than encourage cognitive dependency. Intelligent systems should stimulate reflection, questioning, and autonomous reasoning while avoiding excessive cognitive offloading.

Together, these principles define Algorithmic Empathy as a human-centered educational framework capable of reconciling technological innovation with the ethical and relational foundations of teaching.

3.4 Proposed Conceptual Model

Based on the previous theoretical considerations, this article proposes a conceptual model positioning Algorithmic Empathy as the mediating element between Artificial Intelligence technologies and educational practice.

Within this model, AI performs functions related to data processing, adaptive recommendations, learning analytics, and assessment support. However, educational interpretation, ethical judgment, and pedagogical decision-making remain under the responsibility of teachers. Human agency therefore constitutes the final interpretative layer through which computational outputs acquire educational meaning.

The proposed framework suggests that educational quality does not depend solely on the computational sophistication of AI systems but on their capacity to preserve the relational, ethical, and interpretative dimensions of teaching. Consequently, responsible AI integration should be evaluated not only according to indicators of efficiency or academic performance but also according to its contribution to meaningful educational relationships and human development.

Conclusions

The increasing integration of Artificial Intelligence into educational systems represents one of the most significant transformations in contemporary pedagogy. While AI offers considerable opportunities to improve adaptive learning, educational assessment, collaborative learning environments, and administrative efficiency, its implementation also raises important pedagogical and ethical challenges. The literature consistently demonstrates that technological innovation alone cannot guarantee meaningful educational improvement if it is not accompanied by appropriate human supervision, ethical governance, and pedagogical reflection.

This article has argued that the relationship between Artificial Intelligence and education should not be interpreted as a process of technological substitution but rather as one of educational augmentation. Although AI systems are capable of processing large volumes of educational data, identifying learning patterns, and supporting instructional decision-making, they remain unable to replace the interpretative, relational, and ethical dimensions that characterize authentic teaching. Educational practice requires contextual judgment, sensitivity to cognitive vulnerability, and the capacity to understand learners as individuals rather than as statistical profiles.

The principal contribution of this paper is the extension of the concept of Algorithmic Empathy to the field of education as a human-centered theoretical framework for responsible AI implementation. Rather than attributing emotional capacities to computational systems, Algorithmic Empathy proposes the design of educational technologies that recognize learning complexity while preserving teachers' professional autonomy and interpretative authority. Within this perspective,

AI functions as an intelligent decision-support system whose primary objective is to enhance—not replace—the educational relationship.

The proposed framework has important practical implications for educational institutions, policymakers, and teacher education programs. The successful integration of AI into pedagogical practice requires not only technological infrastructure but also comprehensive teacher preparation focused on ethical reasoning, critical digital literacy, and responsible educational decision-making. Similarly, educational policies should prioritize transparency, fairness, data protection, and human oversight when implementing AI-supported learning environments.

Finally, this study opens several directions for future research. Empirical investigations are needed to operationalize the concept of Algorithmic Empathy and to examine its potential impact on student engagement, teacher decision-making, educational assessment, and human-AI interaction in different educational contexts. Future interdisciplinary research combining educational sciences, psychology, computer science, and ethics may contribute to validating and refining this conceptual framework. Such efforts may support the development of AI systems that enhance educational quality while preserving the humanistic values that remain fundamental to teaching and learning.

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THE EVOLUTION OF THE SHARING ECONOMY: FROM COLLABORATIVE CONSUMPTION TO PLATFORM CAPITALISM IN DIGITAL MARKETS

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Abstract

The sharing economy was initially described as a more efficient and socially oriented way of using underutilized resources, built around access, trust, reputation and temporary use rather than ownership. However, its evolution in the digital economy shows a more complex transformation. Platforms that once appeared to support peer to peer collaboration have increasingly become market infrastructures that organize visibility, transactions, data, trust mechanisms and user dependence. This paper examines the movement of the sharing economy from collaborative consumption to platform capitalism, focusing on how digital platforms changed the meaning of sharing through commercialization, scaling, algorithmic coordination and market concentration. Based on a literature based conceptual analysis, the study connects foundational contributions on collaborative consumption with recent research on platform capitalism, short term rentals, platform cooperatives, trust systems, sustainability and consumer behaviour. The paper argues that the sharing economy did not disappear, but was absorbed into a platform based logic where collaboration remains visible at the surface, while economic control is increasingly exercised through data,

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rules, reputation systems and network effects. The study contributes by framing sharing economy platforms as both facilitators of access and mechanisms of digital market power.

Keywords: *sharing economy; collaborative consumption; platform capitalism; digital platforms; trust and reputation; market concentration*

JEL Classification: L86; O33; D47; L14; M31

Introduction

The sharing economy was born from a small economic paradox: many things have value precisely when their owners are not using them. A room becomes useful when it is empty, a car becomes productive when it is not parked, and a skill can become marketable when someone else needs it for a limited time. Digital platforms turned this ordinary underuse into an economic model. At the beginning, the attraction of collaborative consumption came from the idea that access could become more important than ownership, and that trust between strangers could be organized through digital tools rather than through traditional institutions [Hamari et al., 2016; Frenken & Schor, 2017].

This article examines what happened after this promise became scalable. The sharing economy did not remain a loose network of people exchanging underused resources. In many sectors, it became a platform based market in which participation depends on rankings, reviews, visibility, search results, payment systems and rules that users do not fully control. The key issue is therefore not simply whether people still share through platforms, but whether the platform has become more important than the act of sharing itself. Once the platform controls who is visible, who is trusted and who receives demand, collaboration becomes only one part of a wider economic structure [Martínez-Polo & Martínez-Sánchez, 2018; Foster, 2024].

The relevance of this transformation can be seen most clearly when the shared resource stops looking like a personal surplus and starts behaving like an investment asset. Airbnb is useful in this sense because it shows how quickly the image of the spare room can be replaced by professional hosting, portfolio management and competition for urban space. What initially appears as hospitality between strangers may gradually become a parallel accommodation market, with effects that reach beyond the guest and the host and enter neighbourhoods, housing availability and local tourism economies [Dogru et al., 2020; Cansoy & Schor,

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2024]. This is why the sharing economy cannot be judged only by the convenience it offers at the moment of booking. It must also be examined through the markets it quietly rearranges.

The article approaches this issue through a literature based conceptual analysis. It does not focus on one company, one country or one empirical dataset, because the movement from collaborative consumption to platform capitalism is broader than a single case. Instead, the paper follows the transformation of the sharing economy through five connected dimensions: access, trust, commercialization, data control and platform power. This allows the analysis to treat the sharing economy not as a failed ideal, but as an idea whose meaning was gradually rewritten by the economic logic of digital platforms.

The article contributes to the existing literature by connecting two discussions that are often treated separately. The first discussion explains why users are attracted to collaborative consumption: lower costs, flexibility, access without ownership and the possibility of using idle resources. The second discussion examines how platforms convert these interactions into scalable markets, where reputation, data and network effects become sources of economic power [Tham et al., 2023; Spier, 2025]. The argument developed here is that the sharing economy has not disappeared. It has changed its centre of gravity. The visible story is still about access and participation, but the deeper economic story is now about the platform that makes participation measurable, governable and profitable.

Literature Review

The literature on the sharing economy starts from a deceptively simple observation: many assets are economically asleep before platforms wake them up. A room without a guest, a car without a passenger, a tool left unused or a skill waiting for demand can all be turned into temporary value. Early studies placed this phenomenon under the logic of collaborative consumption, where access becomes more important than ownership and where digital platforms reduce the distance between strangers [Hamari et al., 2016; Cheng, 2016]. In this first interpretation, the sharing economy appeared less like a new corporate system and more like a smarter circulation of what already existed.

The first difficulty appears when “sharing” becomes too generous as a label. The same word can describe an occasional exchange between individuals, a digitally managed service, or a commercial activity that only borrows the appearance of peer to peer interaction. Frenken and Schor [2017] are useful here because they insist that the concept needs boundaries. This distinction matters for

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the present paper because the road from collaborative consumption to platform capitalism begins exactly in this blurred space. A spare room and a portfolio of rental apartments may be displayed through the same interface, but they do not belong to the same economic story.

Consumer motivation was one of the earliest ways of explaining why the sharing economy became attractive. Users are drawn by convenience, lower costs, enjoyment, sustainability and the possibility of accessing something without owning it [Hamari et al., 2016]. Sun [2024] adds an important correction by showing that collaborative consumption also contains a clear cost benefit logic. This prevents an overly romantic reading of sharing. People do not participate only because they believe in community or ecological responsibility. They also compare effort, price, time and risk. The novelty of the early sharing economy was not the disappearance of self interest, but the way self interest was placed inside a softer vocabulary of access, flexibility and mutual use.

As the field matured, the centre of attention moved from the user to the platform. Tham et al. [2023] show that sharing economy markets depend not only on consumption, but also on the organization of supply and participation. This is a decisive shift. The platform is not just the digital room where users meet. It is the furniture, the lighting, the door, the rules and sometimes even the judge. It decides what appears first, which profile seems trustworthy, how payment is made, how reputation is displayed and how users are encouraged to behave. The exchange may still look personal, but the conditions of the exchange are written into the platform.

Trust is the element that makes this system believable. In traditional markets, trust can be supported by brands, contracts, institutions or repeated personal relations. In the sharing economy, trust has to be created quickly between strangers who may never meet again. Martínez Polo and Martínez Sánchez [2018], in Annals of Spiru Haret University. Economic Series, show that reputation and trust in sharing economy platforms are built through digital identity and reputation mechanisms. Their contribution is useful because it shows that trust is not simply imported into the platform from outside. It is produced, formatted and displayed by the platform itself. A review is no longer only a personal opinion. It becomes a small economic passport.

This is the point where the literature begins to touch platform capitalism. When reputation, visibility and access are controlled digitally, the user no longer participates only in a collaborative exchange. The user must also learn how to be readable by the platform. Hosts, drivers or service providers do not compete only through the service they offer, but through ratings, response speed, profile quality

and algorithmic exposure. The platform does not need to own the apartment, the car or the service in order to organize the market around them. Its strength comes from controlling the corridor through which demand passes [Foster, 2024; Spier, 2025].

Tourism and hospitality make this transformation particularly visible. Airbnb became one of the public symbols of the sharing economy because it translated the idea of access into something concrete: someone else's space could become temporary accommodation. Yet this image is no longer sufficient. The spare room was the friendly beginning of the story, not necessarily its current form. On the same platform, an occasional host, a professional operator and an investor managing several units can appear under similar digital signs. This makes the boundary between hospitality, sharing and lodging business increasingly unstable [Dogru et al., 2020; Hall, 2022; Cansoy & Schor, 2024].

The urban literature pushes the discussion beyond the platform screen. Cocola Gant et al. [2021] describe short term rentals as a new urban frontier in European cities, and the expression is useful because it shows that platform exchange does not remain digital. A booking may look like a private arrangement between guest and host, but when repeated thousands of times it can affect housing availability, neighbourhood life and the relationship between residents and tourists. The platform therefore does not only connect users. It can redirect the use of urban space.

Hospitality research also shows that the sharing economy creates hybrid roles. Paloniemi [2024] discusses emerging hospitality practices in which hosts are not fully private individuals, but not traditional hotel operators either. They occupy a middle position. They must be personal enough to fit the language of sharing, but professional enough to satisfy platform expectations. They answer quickly, protect ratings, manage guest experience and adapt to platform standards. This is how platform capitalism often works in practice: it does not always replace sharing loudly, but it gradually teaches sharing to behave like business.

Sustainability remains one of the strongest promises attached to the sharing economy. The idea is persuasive because it suggests that economic value can be created without producing more goods, simply by using existing assets better. Faraji et al. [2024] and Rathnayake et al. [2024] show that sustainability, technology, participation and governance remain central dimensions of the field. However, this promise becomes more fragile when sharing grows into a large scale platform system. A single reused room may look efficient; an entire urban area reorganized around short term rental demand tells a more complicated story. Sustainability is therefore not guaranteed by the word "sharing". It depends on what happens when sharing is multiplied, commercialized and scaled.

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Recent consumer research confirms that the field has entered a more mature and less innocent phase. Hartl et al. [2024] show that the term "sharing economy" carries symbolic value. It sounds warmer, more human and less corporate than many of the business models it now describes. Khodayari et al. [2025] and Marín Carrillo et al. [2025] also show that research has expanded toward consumer behaviour, platform relations, sustainability, trust and future research agendas. The question is no longer only why people share. The deeper question is what kind of market is created when sharing is measured, ranked and monetized.

A useful counterpoint is offered by platform cooperatives. Atanasova et al. [2025] examine how cooperative platforms challenge dominant sharing economy models from the margins. Their importance lies exactly in this marginal position. They show that digital intermediation could be organized through different forms of ownership and governance. At the same time, their difficulty in challenging dominant platforms reveals how powerful network effects, accumulated data and user dependence can become. The alternative exists, but it must fight platforms that already control scale, habits and visibility.

Finally, Chen et al. [2025] show through Airbnb online reviews that platform data can also support business continuity. Reviews are no longer only traces of satisfaction or dissatisfaction. They can become signals of quality, risk and operational resilience. This confirms a central idea of the present paper: in the sharing economy, ordinary user actions are constantly transformed into data. A comment, a rating, a profile or a response time may look small, but together they build the information system through which the platform governs trust and market participation.

Overall, the literature reveals a movement from access to infrastructure. Early studies emphasized collaborative consumption, idle resources and user motivation. Later studies examined commercialization, tourism, urban effects and hybrid hospitality. Recent research connects the sharing economy with platform capitalism, sustainability, consumer perceptions, cooperative alternatives and governance. This paper builds on these debates by arguing that the sharing economy has not disappeared. It has changed its centre of gravity: from the act of sharing itself to the platform that makes sharing visible, measurable and profitable.

Theoretical Background

The theoretical background of this paper starts from a shift that seems simple, but changes the entire logic of consumption: the move from ownership to access. In traditional consumption, value is usually tied to possession. The consumer buys,

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keeps and controls a good. In collaborative consumption, value can appear without permanent ownership. A room, a car, a tool or a skill becomes economically active when another person receives temporary access to it. This is why the sharing economy was first understood as a flexible way of using underutilized resources through digital coordination [Hamari et al., 2016; Cheng, 2016].

The first concept is access. Access separates use from possession and allows economic value to circulate without transferring ownership. A tourist can stay in a private apartment without owning property, a passenger can move through the city without owning a vehicle, and a consumer can use a good only for the short moment in which it is needed. Yet access is never just an open door. Someone must place the offer in front of the user, make it searchable, attach a price to it, reduce uncertainty and transform the meeting between strangers into a transaction. In the sharing economy, the platform becomes this hidden doorway through which access must pass [Frenken & Schor, 2017; Tham et al., 2023].

The second concept is platform intermediation. A platform does not always produce the service in the classical sense. It often does something more powerful and less visible: it arranges the conditions under which others can produce, rent, host, drive or exchange. This makes the platform appear light, because it may not own the apartment, the car or the tool. However, its role is heavy because it organizes visibility, payment, ranking, trust and participation. The market is not only presented by the platform. It is partly shaped through the platform's architecture [Tham et al., 2023; Spier, 2025].

Trust is the third concept and one of the most fragile elements of the sharing economy. The model asks people to accept transactions with strangers, sometimes in intimate or risky situations: sleeping in another person's home, entering another person's car or buying a service from someone without an institutional brand behind them. For this to work, trust must be created quickly and displayed clearly. Profiles, reviews, ratings, identity checks and reputation scores transform uncertainty into something that looks manageable. Trust becomes not only a relationship between users, but a function designed by the platform [Martínez-Polo & Martínez-Sánchez, 2018].

Reputation is the moment when trust becomes economic. In ordinary social life, reputation grows slowly and remains local. On platforms, it becomes visible, numerical and portable. A rating can influence whether a host receives bookings, whether a provider appears reliable or whether a user is ignored by demand. A delay, a complaint, a fast answer or a positive review does not end with the transaction. It remains stored as part of the user's economic identity and may return

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later as visibility, advantage or exclusion [Martínez-Polo & Martínez-Sánchez, 2018; Chen et al., 2025].

The fifth concept is network effects. A sharing platform becomes more useful as more participants enter it. More hosts attract more guests, more guests attract more hosts, more reviews create more confidence, and more transactions produce more data. This circular growth explains why dominant platforms are difficult to challenge. Their strength does not come only from technology, but from the fact that users, habits, ratings and market memory are already concentrated there. At a certain point, people do not simply use the platform because it is useful. It becomes useful because everyone else is already there [Foster, 2024; Atanasova et al., 2025].

Data control deepens this process. In the early image of the sharing economy, the central figure was the exchange between two users. In the mature platform economy, the hidden resource is the information produced by that exchange. Searches, bookings, cancellations, reviews, locations, prices and response times become material from which the platform learns. The user sees a booking, a ride or a review. The platform sees patterns, risks, preferences and future possibilities. This asymmetry allows platforms to guide markets without necessarily appearing as direct producers of the service being exchanged [Chen et al., 2025; Spier, 2025].

These concepts lead to platform capitalism. Platform capitalism describes an economic logic in which digital platforms extract value from coordination, visibility, data and network effects. The platform does not need to own every resource in order to influence the market around it. It controls the routes through which users meet, the signs through which they trust one another and the conditions through which participation becomes profitable. The sharing economy enters platform capitalism when access is no longer only enabled by the platform, but increasingly disciplined and monetized through it [Foster, 2024; Spier, 2025].

This distinction clarifies the evolution studied in the article. Collaborative consumption begins with the idea that unused resources can be activated more efficiently. Platform capitalism begins when the infrastructure that enables this activation becomes the main source of power. In the first case, the platform serves the exchange. In the second case, the exchange increasingly feeds the platform. Sharing does not disappear, but it changes its position. It remains visible as the friendly surface of the transaction, while rules, data, reputation and scale quietly organize the economic depth behind it [Frenken & Schor, 2017; Khodayari et al., 2025].

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Tourism accommodation illustrates this shift clearly. A spare room offered occasionally represents the collaborative logic of unused capacity. A professionalized short term rental system, supported by rankings, reviews, platform visibility and investment oriented hosting, belongs to a different economic logic. The same interface can contain both realities, which is why the sharing economy is difficult to classify. It can look personal and commercial at the same time, local and global, collaborative and platform governed [Dogru et al., 2020; Hall, 2022; Cansoy & Schor, 2024].

The theoretical background of this paper therefore rests on a central tension: the sharing economy promises access, flexibility and better use of resources, but platform capitalism can transform this promise into control over visibility, reputation and participation. This tension is not a detail of the topic. It is the topic itself. The sharing economy should be read as a movement between collaboration and control, between access and dependence, between the friendly language of sharing and the economic architecture of the platform [Faraji et al., 2024; Rathnayake et al., 2024].

Methodological Approach

This paper uses a literature based conceptual analysis in order to examine the evolution of the sharing economy from collaborative consumption to platform capitalism. The purpose of the study is not to test a statistical model or to measure the performance of one particular platform, but to organize and interpret specialized literature around a broader economic transformation. The analysis focuses on how the original logic of access, trust and temporary use has been reshaped by digital platforms, commercialization, data control, reputation systems and network effects.

The selection of sources was guided by thematic relevance, academic quality and recency. The search process used combinations of keywords such as “sharing economy”, “collaborative consumption”, “platform capitalism”, “digital platforms”, “Airbnb”, “trust and reputation”, “platform cooperatives”, “short term rentals”, “sustainability” and “consumer behaviour”. The literature was identified through academic databases and publisher platforms commonly used for scientific research, including Scopus, Web of Science, ScienceDirect, SpringerLink, Taylor & Francis Online, SAGE Journals, Wiley Online Library and other peer reviewed journal platforms.

The final reference base includes twenty sources. Nineteen sources are external academic articles published in international journals, while one article was selected

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from Annals of Spiru Haret University. Economic Series, in line with the journal's recommendation to cite relevant ASHUES publications. Priority was given to recent articles, especially studies published in the last one to three years, while several older foundational contributions were retained because they define the conceptual basis of collaborative consumption and the sharing economy.

The analysis was conducted in three stages. First, the literature was reviewed in order to identify the main concepts used to explain the sharing economy: access, trust, reputation, digital intermediation, sustainability and platform governance. Second, the selected studies were compared in order to distinguish between the initial collaborative promise and the later commercial platform logic. Third, the findings were organized into an interpretative framework showing how sharing economy platforms evolved from tools of access into infrastructures of digital market power.

Results and Discussion

The evolution of the sharing economy can be understood as a movement from underused resources to organized digital dependency. In the first stage, the main economic problem was simple: many assets were sleeping outside the market. A room was empty, a car was unused, a tool was stored, a skill was available but invisible. Digital platforms solved this problem by making unused capacity searchable and exchangeable. However, once the same platforms became large enough to organize visibility, reputation, payment and demand, the meaning of sharing changed. The platform stopped being only the bridge between users and became part of the market structure itself. This is the central result of the analysis: the sharing economy did not disappear, but its economic centre moved from the shared resource to the platform that governs the exchange [Hamari et al., 2016; Frenken & Schor, 2017; Tham et al., 2023].

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Table no. 1. Main Stages in the Evolution from Collaborative Consumption to Platform Capitalism

Stage	Dominant logic	Role of the platform	Main economic implication
Collaborative consumption	Temporary access to underused resources between users	Connects demand and supply	Value comes from access without ownership
Digital intermediation	Exchange becomes searchable, faster and easier to scale	Structures search, payment and basic trust	The market becomes easier to organize digitally
Reputation based scaling	Trust is transformed into ratings, reviews and visible scores	Measures reliability and reduces uncertainty	Reputation becomes an economic asset
Commercialization	Sharing becomes repeated, professionalized and profit oriented	Supports frequent and business like activity	The boundary between sharing and business becomes unclear
Platform dependency	Participation depends on ranking, visibility and platform traffic	Controls access to demand and market visibility	Users become dependent on platform infrastructure
Platform capitalism	Coordination, data and network effects become dominant	Extracts value from scale, data and governance	Sharing becomes part of digital market power

Source: Authors' own synthesis based on Hamari et al. [2016], Frenken and Schor [2017], Martínez Polo and Martínez Sánchez [2018], Tham et al. [2023], Foster [2024] and Spier [2025].

Table no. 1 shows that the sharing economy did not move in a straight line from idealism to failure. A more accurate interpretation is that each stage kept part of the previous one, but added a stronger layer of platform organization. Collaborative consumption did not vanish when platforms became commercial. Users still access rooms, cars, tools and services without owning them. What changed is the environment in which this access occurs. The transaction is no longer only a direct exchange between two users. It is surrounded by rankings, scores, platform rules, payment systems, visibility mechanisms and data collection. Sharing remains the visible gesture, but the platform increasingly becomes the hidden grammar of the transaction.

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The most important turning point is the transformation of trust into infrastructure. In early collaborative consumption, trust appeared as a social condition: people needed enough confidence to interact with strangers. On mature platforms, trust becomes something more formal and measurable. It is written into profiles, ratings, reviews, verification systems and response indicators. A user does not simply appear trustworthy because another person knows them. They appear trustworthy because the platform has converted previous behaviour into visible signals. This is a major change because reputation is no longer only a consequence of exchange. It becomes a condition for future exchange [Martínez Polo & Martínez Sánchez, 2018; Chen et al., 2025].

This shift gives platforms a powerful position. They do not need to own the assets in order to organize the market around them. They can control the order in which offers appear, the information that users see, the rules that define acceptable behaviour and the mechanisms through which trust is displayed. The platform becomes a market maker without always looking like one. It can present itself as a neutral space of connection, while silently deciding how participants are ranked and how value circulates. This is why the sharing economy becomes difficult to separate from platform capitalism. The language remains close to access and participation, but the economic structure increasingly depends on data, visibility and network effects [Foster, 2024; Spier, 2025].

Airbnb is one of the clearest examples of this transformation. At the beginning, the platform could be easily imagined through the figure of the occasional host offering unused space. That image still exists, but it no longer explains the whole market. The same interface can include a spare room, a family apartment, a professional host and an investor managing several properties. To the user, they may all appear as platform listings. Economically, they are not the same. One reflects occasional sharing, while the others approach professionalized accommodation activity. This explains why Airbnb can be read both as a sharing economy platform and as a competitor within the lodging market [Dogru et al., 2020; Hall, 2022; Cansoy & Schor, 2024].

The urban consequences show why this distinction matters. A single apartment rented occasionally may have a small effect. Thousands of apartments redirected toward short term rental demand can change housing availability, neighbourhood life and the relation between tourists and residents. The platform transaction may look individual, but its repetition creates collective consequences. This is one of the reasons why the sharing economy cannot be judged only by the convenience it

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gives to users. It also has to be judged by the markets and spaces it rearranges when platform coordination becomes large enough [Cocola-Gant et al., 2021].

The same logic applies to hospitality practices. Platform hosts occupy a hybrid position. They are not always traditional firms, but they are also not always casual private individuals. They must manage responsiveness, guest expectations, ratings, cleanliness, complaints and platform standards. The platform therefore creates a new kind of economic actor: personal in presentation, but increasingly professional in behaviour. This hybrid role is central to the evolution of the sharing economy because it shows that platform capitalism often works gradually. It does not always replace sharing with corporate ownership. It teaches sharing to behave more and more like business [Paloniemi, 2024].

Table no. 2. Main Tensions Created by the Platform Based Sharing Economy

Dimension	Collaborative promise	Platform based outcome	Managerial or policy implication
Access	Easier use of underused resources	Access depends on platform ranking and visibility	Participation rules should be more transparent
Trust	Confidence between strangers	Trust is produced through ratings, reviews and digital identity	Reputation systems need fairness and accountability
Sustainability	Better use of existing assets	Scaling may stimulate more consumption and urban pressure	Sustainability should be measured at system level
Hospitality	Personal and flexible service	Hosts become semi professional service providers	Platform standards reshape hospitality practices
Urban space	Income opportunities for residents	Short term rentals may affect housing and neighbourhoods	Regulation should distinguish casual sharing from professional activity
Market competition	More opportunities for small providers	Network effects favour large platforms	Alternative models need support against scale disadvantages
Data	Better matching and risk reduction	Platforms accumulate behavioural and transactional data	Data governance becomes part of economic regulation

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Dimension	Collaborative promise	Platform based outcome	Managerial or policy implication
Cooperative alternatives	More democratic forms of intermediation	Cooperatives remain marginal against dominant platforms	Ownership and governance models should be part of platform policy debates

Source: Authors' own synthesis based on Cocola-Gant et al. [2021], Faraji et al. [2024], Hartl et al. [2024], Rathnayake et al. [2024], Atanasova et al. [2025], Khodayari et al. [2025] and Marín-Carrillo et al. [2025].

Table no. 2 shows that the platform based sharing economy is not built on one contradiction, but on several small fractures inside the same promise. Access is easier, but not free from control. Trust is faster, but more dependent on scores. Sustainability is possible, but not automatic. Hospitality feels personal, but is increasingly standardized. Urban space receives new income opportunities, but also new pressures. These tensions are important because they show that the sharing economy does not simply create a new market. It creates a market that still speaks in the language of personal exchange while operating through systems of ranking, data and platform discipline [Hartl et al., 2024; Khodayari et al., 2025].

The strongest tension is between access and control. The early attraction of the sharing economy was that it opened doors: to rooms, cars, services, tools and opportunities that were previously difficult to find. However, once access passes through a platform, the door is never completely neutral. It has an order, a filter, a ranking and a price. Some users become visible and others disappear into the lower layers of search results. Some hosts receive demand and others remain technically present but economically invisible. This means that access is not only given by the existence of the platform, but also shaped by the way the platform distributes attention [Foster, 2024; Spier, 2025].

Trust also changes its nature. In the original promise of collaborative consumption, trust sounded almost social: strangers could interact because digital systems made them feel safer. In platform capitalism, trust becomes more like a managed resource. It is collected, displayed, compared and converted into future opportunities. A rating is therefore not only a memory of a past transaction. It becomes a small gatekeeper for the next one. The user who is well rated is not only trusted. The user is made more marketable. The user who is poorly rated is not only criticized. The user becomes less visible, less competitive and sometimes less able to participate [Martínez-Polo & Martínez-Sánchez, 2018; Chen et al., 2025].

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The sustainability promise needs the same careful treatment. The sharing economy often suggests that using what already exists is naturally better than producing something new. At a small scale, this argument is persuasive. An empty room used for a few nights or a tool borrowed instead of bought can indeed look like a more intelligent use of resources. The problem begins when the platform does not simply use idle capacity, but creates incentives for more capacity to be produced, purchased or redirected toward platform demand. At that point, the question is no longer whether one transaction is efficient, but whether the whole system still reduces pressure or simply moves it elsewhere [Faraji et al., 2024; Rathnayake et al., 2024].

This is especially visible in urban tourism. A platform listing may look harmless when seen alone. It is just one apartment, one guest, one booking. But platform markets do not act one listing at a time. They accumulate. They repeat. They concentrate. When thousands of individual transactions gather in the same neighbourhoods, the result is no longer only private income or tourist convenience. It can become a change in housing use, resident experience and local economic balance. The platform therefore has a double geography: it exists on a screen, but its consequences are felt in streets, buildings and communities [Cocola-Gant et al., 2021; Hall, 2022].

From a managerial perspective, this creates a difficult responsibility. Platform growth can look like success because it brings more users, more listings, more reviews and more data. Yet growth also makes the platform more accountable for the market it creates. A platform that becomes the main route to demand cannot pretend to be only a technical intermediary. Its design choices decide who receives visibility, how reputation is interpreted, what behaviour is rewarded and how users adapt to survive. In this sense, platform management becomes a form of market governance, even when it is presented as product design [Tham et al., 2023; Spier, 2025].

The analysis also suggests that the sharing economy needs more precise categories. A student occasionally renting a spare room, a family renting an apartment during holidays and an investor managing several short term rental units should not be placed under the same analytical label without distinction. They may all use the same platform, but they do not produce the same economic effect. The same logic applies to sustainability and trust. A platform is not sustainable because it uses the word sharing, and it is not trustworthy only because it displays reviews. The real issue is what kind of behaviour the platform encourages once it becomes

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large enough to shape the market [Frenken & Schor, 2017; Dogru et al., 2020; Cansoy & Schor, 2024].

Platform cooperatives are important because they show that digital intermediation does not have to be organized only through dominant investor led platforms. They suggest another possible route, where ownership, governance and value distribution are closer to the collaborative promise. However, their marginal position also reveals the difficulty of changing the rules after dominant platforms have already accumulated users, data and habits. The alternative exists, but it enters the market late, against actors that already possess scale and visibility. This makes platform cooperatives both a solution and a symptom: they show what could be different, but also how powerful the dominant model has become [Atanasova et al., 2025].

The main contribution of this discussion is that it avoids treating the sharing economy as either a myth or a miracle. It is not only a friendly economy of access, but it is not only exploitation hidden behind a nice word either. It is a changing structure in which real benefits and real dependencies grow together. Users receive access, income opportunities, flexibility and convenience. Platforms receive data, scale, visibility control and market power. The problem is not that sharing became digital. The problem is that the infrastructure of digital sharing became strong enough to define what sharing is allowed to become [Hartl et al., 2024; Marín-Carrillo et al., 2025].

Overall, the results indicate that the future of the sharing economy depends on whether platforms can be governed without destroying the access they created. The challenge is not to return to a pure form of sharing that probably never fully existed. The challenge is to prevent access from becoming dependence, reputation from becoming silent exclusion and convenience from becoming a cover for market concentration. If the sharing economy is to keep part of its original value, it must be understood not only as a consumer practice, but as a digital market system whose power comes from organizing access itself [Khodayari et al., 2025; Rathnayake et al., 2024].

Conclusions

The main conclusion of this paper is that the sharing economy has not disappeared, but it has changed the place from which it produces value. At the beginning, its strength seemed to come from a simple economic intuition: unused resources could be brought back into circulation through temporary access. A spare room, an available car, an unused tool or a personal skill could become valuable

when someone else needed it for a limited time. In this early form, the sharing economy appeared as a lighter alternative to ownership and as a more flexible way of organizing consumption. However, as digital platforms expanded, the decisive resource was no longer only the underused asset. It became the infrastructure that made the asset visible, searchable, trusted and profitable.

The paper therefore shows that the movement from collaborative consumption to platform capitalism should not be read as a clean rupture. The sharing economy did not move from "good" collaboration to "bad" commercialization in a straight line. Its evolution is more complex. Many of its initial promises still remain: access is easier, transactions are faster, strangers can interact with more confidence, and some resources can be used more efficiently. What changed is the architecture around these exchanges. The transaction is no longer only a relation between two users. It is surrounded by rankings, reviews, payment systems, data flows, platform rules and visibility mechanisms. Sharing still exists, but it increasingly takes place inside an infrastructure that decides how sharing is organized.

One important outcome is that trust has become economic infrastructure. In the early language of collaborative consumption, trust sounded like a social bridge between strangers. In mature sharing platforms, trust is also a score, a profile, a review, a verification mark and a ranking signal. This creates both opportunity and pressure. On one hand, reputation systems make exchange possible in contexts where strangers would otherwise hesitate to interact. On the other hand, they transform user behaviour into market information. A good reputation can create future visibility and demand, while a weak or damaged reputation can reduce participation. Trust is therefore no longer only a condition of exchange. It becomes one of the instruments through which platforms organize economic opportunity.

A second outcome is that the sharing economy needs more precise categories. An occasional user who rents a spare room is not the same as a professional operator managing several properties. A cooperative platform is not the same as an investor led platform. A transaction that uses an already idle resource is not the same as a business model that stimulates new investment only for platform activity. Without these distinctions, the concept of sharing economy becomes too elastic and loses explanatory power. The term may continue to sound collaborative, but it can hide very different economic realities. This is one of the main reasons why the sharing economy must be analysed not only through its language, but through the structures that support it.

The article also confirms that the sharing economy should be interpreted as a transformation rather than as a disappearance. Its early logic of access,

collaborative consumption and underused resources remains important, but it now operates inside platform systems shaped by visibility, reputation, data, network effects and governance. This interpretation connects the foundational view of collaborative consumption with recent debates on platform capitalism, reputation mechanisms, commercialization and sustainability [Hamari et al., 2016; Martínez-Polo & Martínez-Sánchez, 2018; Foster, 2024; Spier, 2025; Rathnayake et al., 2024].

The implications are relevant for platform managers. Platform growth should not be confused with platform maturity. A platform may attract more users, more listings, more reviews and more transactions, but this does not automatically mean that it has created a fair or sustainable market. Once the platform becomes the main route through which users obtain demand, it also becomes responsible for the way demand is distributed. Search ranking, reputation rules, visibility criteria and data practices are not neutral technical details. They influence who is seen, who is trusted and who can participate economically. In this sense, platform design becomes a form of market governance.

The implications are also important for policymakers. Regulation should not treat all platform based activity as identical. The same framework cannot fully capture casual sharing, semi professional participation and fully commercial platform use. This is especially visible in short term rentals, where one platform may host both occasional users and professionalized operators. A more useful policy approach would distinguish between these forms of participation and evaluate their different effects on housing, tourism, competition and local communities. The goal should not be to block digital intermediation, but to prevent the vocabulary of sharing from becoming a shield against responsibility.

The sustainability implication is equally delicate. The sharing economy can support a better use of existing resources, but sustainability should not be assumed automatically. A single transaction may look efficient because it uses an asset that already exists. Yet, when repeated and scaled, the same model can stimulate more travel, more investment, more consumption and more pressure on urban spaces. For this reason, sustainability should be evaluated at system level. The relevant question is not only whether one room, one car or one service is used more efficiently, but whether the platform changes behaviour and markets in ways that reduce or increase pressure overall.

Future research should move closer to the moment where users interpret the platform. It would be valuable to study whether consumers still perceive sharing platforms as collaborative spaces or whether they increasingly see them as

commercial infrastructures with a friendlier vocabulary. This distinction matters because the legitimacy of the sharing economy depends not only on what platforms do, but also on what users believe they are entering when they book, host, rate, review or offer a service. If the user imagines collaboration while the platform functions as a market infrastructure, then the gap between perception and reality becomes a central research problem.

Another direction for future research concerns reputation systems. Ratings and reviews should not be examined only as feedback tools. They should be studied as mechanisms that distribute visibility, trust and economic opportunity. Future studies could analyse how reputation affects income, exclusion, stress, competition and the professionalization of participation. This is especially relevant in tourism and hospitality, where the difference between being visible and being invisible on a platform can become an economic difference.

Comparative research between cities, regions and countries would also add value. The same platform can produce different effects depending on regulation, housing pressure, tourism intensity and local economic structure. In one context, short term rentals may create income opportunities for residents. In another, they may intensify housing problems, tourism saturation or conflicts between visitors and local communities. The sharing economy is digital in its interface, but its consequences are often urban, social and spatial.

Platform cooperatives also deserve more attention. They show that digital intermediation can be imagined differently, through alternative ownership and governance models. Their importance is not only practical, but conceptual. They test whether the sharing economy can recover part of its original collaborative meaning without rejecting technology or platform coordination. Future studies could examine why such models remain marginal, what institutional support could strengthen them and whether users are willing to move from dominant platforms toward alternatives that may be fairer but less convenient or less visible.

Overall, the paper concludes that the sharing economy has been translated into another economic language. Its original words are still present: access, trust, flexibility, efficiency and participation. But the grammar has changed. These words now operate inside digital infrastructures that can also create dependency, commercialization, market concentration and control over visibility. The key question is therefore no longer whether the sharing economy is good or bad. The more important question is who designs the conditions under which sharing becomes possible, visible and profitable. The future of the sharing economy will depend on whether platforms can preserve the value of access without turning

access into dependence, whether trust can remain a social bridge without becoming only a score, and whether digital intermediation can connect users without making the platform more powerful than the act of sharing itself.

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THE IMPACT OF ARTIFICIAL INTELLIGENCE ON BUSINESS MANAGEMENT

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Abstract

In recent decades, the development of digital technologies has driven major transformations in the economic and organizational landscape. Artificial intelligence (AI) has become an essential tool for companies, contributing to process automation, improved decision-making, and increased competitiveness. The paper analyzes the impact of artificial intelligence on business management, highlighting both the advantages of implementing these technologies and the challenges posed by their use. The study examines how AI influences key managerial functions, such as the planning, organizing, coordinating, and controlling of organizational activities. At the same time, the economic and social implications of digital transformation are analyzed, as well as the need for organizations to adapt to new technological requirements.

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Keywords: *artificial intelligence; financial management; business management; business economics.*

JEL Classification: G32, M10, M21

Introduction

The importance of this topic stems from the scale of the transformations artificial intelligence has brought to business management. Managers use intelligent systems for strategic decision-making, market trend forecasting, and improving operational efficiency. AI also influences organizational structure and human resource management.

The aim of this paper is to analyze the impact of artificial intelligence on business management, the advantages and challenges arising from its use, as well as the development prospects for organizations in the context of digital transformation.

Contemporary society is characterized by rapid technological advancements and an ongoing process of digitalization that influences all areas of economic activity. In this context, artificial intelligence represents one of the most significant innovations of the 21st century, possessing the capacity to transform the way organizations conduct their operations and formulate their managerial strategies [Russell, S., Norvig, P., 2021].

Artificial intelligence is increasingly being used in the business world for data analysis, process automation, cost optimization, and improving customer relationships. Modern organizations must respond quickly to market changes and adopt innovative technologies to maintain their competitiveness. In this regard, AI offers effective tools that enable enhanced performance and adaptation to the demands of the digital economy [Davenport, Thomas H.,2018].

The concept and evolution of artificial intelligence

Artificial intelligence is the field of computer science that develops systems capable of performing tasks requiring human intelligence, such as learning, analysis, problem-solving, and decision-making [Marr, B.,2019]

The concept was introduced in 1956 by John McCarthy, being defined as "the science and engineering of making intelligent machines."

The evolution of artificial intelligence has been influenced by technological progress and the development of data processing capabilities. Currently, AI encompasses technologies such as:

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- machine learning;
- deep learning;
- natural language processing;
- intelligent robotics;
- robotic process automation;
- predictive analytics.

These technologies enable organizations to analyze large volumes of information and obtain results in a very short time. In the business environment, AI is used to identify business opportunities, optimize production, and improve customer service.

The development of artificial intelligence is closely linked to the emergence of the digital economy and the growing importance of data in managerial processes. Modern organizations collect and process vast amounts of information, and AI facilitates its transformation into useful knowledge for strategic decision-making. [Brynjolfsson, E., McAfee, A, 2016]

The role of artificial intelligence in business management

Artificial Intelligence and the Decision-Making Process

Decision-making is one of the most important managerial functions. Managers must constantly analyze available information and make rapid, effective decisions to achieve organizational objectives.

Artificial intelligence-based systems enable the automated analysis of data and the identification of the best solutions to organizational problems. Intelligent algorithms can generate economic forecasts, analyze consumer behavior, and identify financial risks. [Kaplan, A., Haenlein, M.]

For example, companies use AI for:

- sales forecasting;
- market analysis;
- financial performance assessment;
- risk management;
- marketing strategy optimization.

By using artificial intelligence, managers can make decisions based on real data and reduce the influence of subjective factors on the decision-making process.

Automation of organizational processes

One of the most significant effects of AI implementation is the automation of repetitive and administrative processes. Automation contributes to reducing the time required to carry out tasks and lowering operational costs.

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Examples of automation applications include:

- customer service chatbots;
- automated billing systems;
- document management software;
- industrial robots in production processes;
- automated recruitment platforms.

Through automation, organizations can increase operational efficiency and reduce human error. Furthermore, employees can dedicate more time to creative and strategic activities.

Artificial Intelligence in Human Resource Management

Human resource management has been significantly influenced by the development of artificial intelligence. Organizations use intelligent systems for recruitment, performance evaluation, and the identification of professional skills. [Bostrom, N.,2017]

AI-based platforms can analyze candidates' resumes and select the right individuals for specific roles. Additionally, intelligent algorithms can identify professional training needs and contribute to employee development.

However, the implementation of artificial intelligence can also have negative effects on the workforce. The automation of certain tasks may lead to job losses and the need for professional retraining.

Artificial Intelligence and Customer Relationships

In the modern business environment, customer satisfaction is essential to organizational success. Artificial intelligence helps improve customer relationships by personalizing services and analyzing consumer preferences.

Companies use:

- virtual assistants;
- recommendation systems;
- automated technical support platforms;
- customer sentiment analysis.

These technologies enable organizations to provide fast and personalized services, thereby increasing customer satisfaction and loyalty. [Chaffey, D., 2020]

The advantages of using artificial intelligence in business

Implementing artificial intelligence in business management generates numerous benefits for organizations. Implementing artificial intelligence in business management drives growth by automating routine tasks, optimizing data-driven decisions, and reducing operational costs.

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Increasing organizational efficiency

AI contributes to process optimization and the reduction of time required to carry out activities. Intelligent systems can perform complex tasks in a very short time and with a high degree of precision.

Reducerea costurilor

Automating repetitive tasks reduces operational costs and the need for human resources for administrative activities.

Improving competitiveness

Companies that use smart technologies can react quickly to market changes and develop effective strategies for attracting customers.

Improving service quality

Data analysis and service personalization enable organizations to offer products and services tailored to consumer needs.

The challenges and risks of using artificial intelligence

Despite the advantages offered, the implementation of artificial intelligence also entails numerous challenges.

Ethical and privacy issues

The use of AI involves the collection and processing of large volumes of personal data. In this context, data protection and respect for privacy are essential aspects. [Floridi, L., 2021]

Impact on jobs

Automation can lead to a reduction in certain categories of jobs, particularly in fields involving repetitive and standardized tasks.

Implementation costs

The integration of smart technologies requires significant investments in digital infrastructure, software, and employee training.

Prospects for the development of artificial intelligence in business

In the future, artificial intelligence will play an increasingly important role in the development of organizations and the transformation of the global economy. It is estimated that smart technologies will become indispensable for carrying out managerial activities and maintaining competitiveness.

Future trends include:

- the expansion of automation;
- the use of generative AI;
- the development of predictive analytics;

- the integration of intelligent robots;
- increased investment in cybersecurity.

Organizations will need to adopt flexible strategies and invest in innovation to harness the potential of artificial intelligence.

Conclusions

Artificial intelligence is one of the key drivers of digital transformation and the modernization of business management. The implementation of intelligent technologies contributes to increased organizational efficiency, improved decision-making, and the development of customer relationships.

However, the use of AI also creates challenges related to data security, ethics, and the impact on the workforce. For this reason, organizations must implement intelligent technologies in a responsible and sustainable manner.

To effectively leverage artificial intelligence, the following are recommended:

- developing digital infrastructure;
- continuous employee training;
- developing ethical policies regarding AI use;
- increasing investment in cybersecurity;
- integrating AI into long-term organizational strategies.

In conclusion, artificial intelligence represents a major opportunity for the development of modern businesses and for the creation of competitive and innovative organizations. [Stone, P. et al., 2016]

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THE PARADOX OF GLOBAL FRAGMENTATION: ARTIFICIAL INTELLIGENCE, SERVICIFICATION AND THE RECONFIGURATION OF GLOBAL TRADE TOWARDS REGLOBALIZATION

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Abstract

Global trade is undergoing an apparent paradox. Geopolitical tensions, economic-security concerns and geoeconomic fragmentation are intensifying, while digital technologies, services and knowledge-intensive activities are simultaneously creating new channels of cross-border economic integration. Within this changing environment, artificial intelligence (AI) is emerging as an important accelerator of technological transformation, while the growing servicification of economic activity is progressively reshaping both international trade and global production.

This study examines whether the simultaneous expansion of AI, digital trade and servicification is consistent with a broader reconfiguration of international economic integration. Using a descriptive, comparative and trend-based approach, it combines recent statistical evidence from the OECD, WTO and UNCTAD on firm-level AI adoption, services trade, digitally delivered and digitally deliverable services, services embedded in manufacturing, and global value-chain repositioning. The analysis focuses primarily on developments during 2015–2025, while using the most recent internationally comparable observations for indicators subject to different statistical lags.

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The results identify several interconnected transformations. AI adoption among firms in OECD economies more than doubled between 2023 and 2025 and is particularly concentrated in ICT and knowledge-intensive services. Services increased their share of global exports from approximately 23% in 2015 to 27% in 2025 and accounted for 71% of global intermediate inputs in 2022. Digitally delivered services exports reached approximately USD 4.25 trillion in 2023, while digitally deliverable services represented approximately 56% of world services exports in 2025. At the same time, recent value-chain evidence indicates continued manufacturing servicification but limited evidence of generalized reshoring.

The findings are consistent with a reconfiguration of international integration rather than a uniform reversal. This article applies the established concept of reglobalization to the coexistence of geopolitical fragmentation and growing digital and service-based connections. Its contribution is an integrated descriptive interpretation, not the identification of a causal effect of AI or the measurement of national comparative advantage. The observed transformation remains geographically uneven and subject to substantial technological and development asymmetries.

Keywords: *artificial intelligence; servicification; digital trade; international trade; digitally deliverable services; global value chains; geoeconomic fragmentation; reglobalization.*

JEL Classification: F14; F60; O33; L80

1. Introduction

The contemporary global economy faces geopolitical rivalry, economic-security concerns and increasingly fragmented trade and technology policies. Meanwhile, services and digitally deliverable activities account for a growing share of international exchange (UNCTAD, 2026), and recent experimental estimates suggest limited aggregate changes in global value-chain integration in 2023–2024 (OECD, 2026b). These developments raise a question about the composition and geography of international integration, beyond whether globalization is simply advancing or retreating.

Artificial intelligence (AI) is a potential technological contributor to this transformation through productivity, information processing, innovation and cross-border service delivery (Goldfarb & Trefler, 2018; Jones, 2023; Jakubik et al., 2025; Sun & Trefler, 2026). Recent OECD evidence documents rapid but uneven adoption among firms (OECD, 2026a). Whether this diffusion translates into

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stronger international integration depends on complementary infrastructure, skills, organizational capabilities and regulation.

The expansion of AI is occurring simultaneously with another major structural transformation: the **servicification of international trade and production**. Services increasingly function both as directly traded outputs and as inputs embedded in manufacturing and global production networks. Software, R&D, engineering, logistics, finance, design, professional expertise and data-related activities increasingly contribute to the value and competitiveness of internationally traded products (Lodefalk, 2014; Miroudot & Cadestin, 2017; Reddy et al., 2023; Dai et al., 2024; Sharma et al., 2024). Digital technologies reinforce this process by increasing the tradability of services and facilitating their integration into global value chains (Blázquez et al., 2023; Bian & Fan, 2024; Fan et al., 2024; Wu et al., 2025).

Digital-services trade creates channels of international exchange that rely on computer networks rather than the physical shipment of goods. The WTO reports substantial exports of digitally delivered services, while UNCTAD tracks the broader category of digitally deliverable services (WTO, 2024a; UNCTAD, 2026). Their distinction is retained throughout the study: potential digital deliverability does not establish actual digital delivery.

AI and servicification may also reinforce one another. Recent research indicates that AI can support digital servitization, enable new service offerings and facilitate the transformation of manufacturing firms toward increasingly service-intensive business models (Ayala et al., 2025; Hu et al., 2026; Yan et al., 2026). Firm-level evidence also associates digitalization more broadly with manufacturing servicification and participation in global value chains (Feng et al., 2024; Thangavelu et al., 2026). AI should therefore be understood not as the sole cause of trade transformation, but as a potential **accelerator operating within a broader process of digitalization and servicification**.

These developments are occurring, however, in an international environment increasingly characterized by **geoeconomic fragmentation**. Geopolitical tensions, trade and investment restrictions, industrial policies and supply-chain security concerns are encouraging the reconsideration of established international production relationships (Aiyar et al., 2023; Gopinath et al., 2025). Yet recent research also suggests that fragmentation can redirect rather than eliminate international economic connections. Non-aligned and connector economies may acquire greater importance as trade and investment relationships adjust across geopolitical blocs (Baur et al., 2025; Aiyar et al., 2026).

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The coexistence of these developments creates an important analytical problem. Fragmentation may be increasing in particular geopolitical relationships and physical supply chains while digital services, knowledge-intensive activities and service-embedded production generate new forms of cross-border integration. Traditional interpretations based on a binary distinction between globalization and deglobalization may therefore fail to capture the changing structure of the international economy.

Participation in this transformation is uneven. Developed economies and least developed countries (LDCs) differ markedly in the composition of services exports and in the services incorporated into internationally traded production (UNCTAD, 2026). These differences motivate the development-group comparisons below, without assuming that a cross-sectional gap necessarily widened over time.

Despite the rapid expansion of research on AI, digital trade, servicification and geoeconomic fragmentation, these developments are still frequently examined as separate phenomena. The AI–trade literature focuses primarily on trade costs, productivity, digital services or export performance; the servicification literature examines the increasing services content of manufacturing and global value chains; while the fragmentation literature concentrates on geopolitical realignment and supply-chain restructuring (Miroudot & Cadestin, 2017; Aiyar et al., 2023; Jones, 2023; Bian & Fan, 2024; Bekkers et al., 2025; Gopinath et al., 2025; Jakubik et al., 2025; Sun & Trefler, 2026). Less attention has been given to how these transformations interact as components of a broader restructuring of international economic integration.

Research published in this journal also emphasizes that enterprise globalization involves economic, social, technical and political interconnections and requires appropriate indicators and adaptive management strategies (Yocheva, 2024). This perspective supports examining several dimensions of integration separately, rather than reducing globalization to a single trade measure.

This study addresses this gap by examining recent statistical evidence across four interconnected dimensions: **AI diffusion, trade servicification, digital-services expansion and global value-chain reconfiguration**. Rather than attempting to estimate a causal effect of AI on international trade, it asks whether the simultaneous evolution of these indicators is consistent with a structural transformation of globalization.

The central research question is therefore:

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To what extent do recent developments in AI adoption, digital trade, servicification and global value chains indicate a reconfiguration, rather than a generalized reversal, of international economic integration?

This question is complemented by three analytical questions:

1. **How rapidly and how evenly is AI diffusing across firms and knowledge-intensive economic activities?**
2. **To what extent are services and digitally deliverable activities reshaping the composition of international trade and global production?**
3. **Does recent evidence on global value chains support generalized deglobalization, or does it indicate repositioning and new forms of cross-border interdependence?**

The study contributes an integrated descriptive assessment across AI diffusion, digital-services trade, manufacturing servicification and global value-chain indicators. It distinguishes directly traded services from services embedded in goods, and separates observed statistical patterns from mechanisms discussed in the literature. It then examines how these patterns can be interpreted within a context of geoeconomic fragmentation. Its contribution lies in this synthesis and its explicit evidentiary boundaries, rather than in introducing the concept of reglobalization or estimating causal effects.

Reglobalization is an established concept in trade-policy debate, including the WTO World Trade Report 2023, which advocates broader international integration (WTO, 2023). Here, the term is applied descriptively to changes in the sectoral composition, delivery channels and organization of international interdependence. This application does not demonstrate that global integration is expanding in every dimension or that the transformation is inclusive.

The study employs a **descriptive, comparative and trend-based statistical approach**, drawing primarily on recent internationally harmonized evidence from the OECD, WTO and UNCTAD. The principal analytical period is 2015–2025, complemented by the most recent observations available for indicators subject to different statistical lags. The analysis compares temporal trends, sectors, firm sizes and development groups and combines conventional trade statistics with digital-services and Trade in Value Added indicators. The objective is not to establish causality, but to determine whether the observed statistical patterns collectively support the interpretation of contemporary globalization as a process of structural reconfiguration.

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The remainder of the paper is organized as follows. **Section 2** reviews the literature on AI and international trade, digitalization, servicification, global value chains and geoeconomic fragmentation and develops the conceptual framework. **Section 3** presents the research design, data sources, indicators and comparative methodology. **Section 4** reports and analyzes the statistical evidence on AI adoption, services, digital trade, manufacturing servicification, development asymmetries and GVC repositioning. **Section 5** discusses the findings in relation to the fragmentation–reglobalization paradox. **Section 6** concludes and presents the main policy implications, limitations and directions for future research.

2. Literature Review and Conceptual Framework

2.1. Artificial Intelligence, Digitalization and International Trade

Artificial intelligence (AI) is increasingly transforming productivity, innovation, knowledge creation and the organization of economic activity, while changing the conditions under which firms and economies participate in international markets. Unlike earlier waves of automation, recent AI technologies increasingly extend to cognitive, information-intensive and digitally tradable activities. AI can reduce information and coordination costs, improve forecasting and matching, facilitate translation and communication, and increase the scalability of knowledge-intensive services across borders (Goldfarb & Trefler, 2018; Jones, 2023; Mishra et al., 2023; Jakubik et al., 2025; Sun & Trefler, 2026).

These mechanisms are increasingly visible at firm and sector level. AI capabilities can strengthen export performance by improving firms' adaptability, innovation and ability to exploit international opportunities, while the diffusion of AI may also contribute to new patterns of specialization in AI-intensive industries (Mishra et al., 2023; Bonfiglioli et al., 2025; Kumar et al., 2025). The relationship between AI and international trade is therefore broader than the direct trade of AI products: AI can influence how firms produce, organize services, access foreign markets and participate in international production networks (Jones, 2023; Jakubik et al., 2025; Kumar et al., 2025; Sun & Trefler, 2026).

AI operates within the broader digital transformation of international trade. Digital technologies reduce geographical and informational barriers, expand the range of activities that can be supplied internationally and facilitate participation in global value chains (GVCs). Empirical research associates digitalization with stronger services-export competitiveness, greater export resilience and changing GVC participation and positioning (Li, Han, & Xu, 2023; Feng et al., 2024; Kong et al., 2024; Li, Zhang, & Miao, 2024; Zhu et al., 2025). At the same time, digital-

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trade restrictions and regulatory differences can constrain these effects and influence both services and manufacturing trade (Yang et al., 2024; Yu & Yao, 2024; Sun & Trefler, 2026).

The international specialization implications are also important. The classical concept of revealed comparative advantage emphasizes that countries differ in their relative specialization across internationally traded activities (Balassa, 1965), while subsequent research has refined its measurement and interpretation in changing trade structures (Laursen, 2015). In the digital economy, such specialization may increasingly depend on technological and knowledge capabilities rather than exclusively on conventional factor endowments. Recent studies examining AI specialization, AI-intensive industries and digital trade suggest that technological capabilities can influence countries' positions within emerging patterns of international specialization (Mishra et al., 2023; Bonfiglioli et al., 2025; Wu et al., 2025).

No revealed comparative advantage index is calculated in this study. The discussion of specialization supplies theoretical context for the role of technological capabilities, rather than an empirical ranking of countries or sectors.

Sectoral differences in AI adoption motivate comparison with knowledge-intensive and digitally tradable activities. However, the OECD adoption data measure firms' reported AI use, not exports generated by AI, the intensity of adoption or its productivity effects. The numerical results are presented in Section 4.1 (OECD, 2026a).

AI should nevertheless not be treated as an isolated cause of changes in international trade. It interacts with digital infrastructure, organizational capabilities, human capital, regulation and wider technological transformation. Accordingly, the recent literature increasingly portrays AI as an **accelerator of structural change**, rather than as a substitute for the broader digitalization process (Jones, 2023; Ayala et al., 2025; Bekkers et al., 2025; Hu et al., 2026; Yan et al., 2026).

2.2. Servicification, Digital Trade and Global Value Chains

Servicification refers to the growing role of services in production, exports and value creation. It includes purchased service inputs and service activities performed within manufacturing firms (Lodefalk, 2014; Miroudot & Cadestin, 2017). Servitization is a related but distinct firm-level concept concerning the addition of service offerings to product-based business models. The article uses each term in accordance with the phenomenon examined by the cited study.

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Subsequent studies provide evidence that servicification is closely connected with participation and upgrading in GVCs. Service inputs can strengthen firms' international competitiveness, facilitate participation in fragmented production networks and influence their position within global value chains (Díaz-Mora et al., 2022; Pattnayak & Chadha, 2022; Reddy et al., 2023; Dai et al., 2024; Sharma et al., 2024). Consequently, the distinction between manufacturing and services has become increasingly blurred: modern manufacturing incorporates software, R&D, engineering, logistics, finance, design, marketing, data processing and other knowledge-intensive services.

Digitalization reinforces this transformation. Digital technologies can increase the international tradability of services while simultaneously expanding their role as inputs into manufacturing and GVCs. Research has associated digital services and digital transformation with manufacturing GVC participation, GVC upgrading and changing international production positions (Blázquez et al., 2023; Bian & Fan, 2024; Fan et al., 2024; Feng et al., 2024; Wu et al., 2025). At the firm level, digital transformation has also been linked to stronger export stability and resilience, suggesting that its effects extend beyond export volumes to firms' capacity to maintain international market participation under changing conditions (Li, Zhang, & Miao, 2024; Zhang et al., 2024).

Trade policy and regulation constitute another important dimension. Deep service provisions and digital-trade rules can facilitate cross-border services integration, whereas restrictions on digital services may adversely affect manufacturing exports and GVC participation (Díaz-Mora et al., 2022; Yang et al., 2024; Yu & Yao, 2024; Sharma et al., 2024; Zhu et al., 2025). Servicification is therefore simultaneously a technological, productive and institutional process.

Recent literature provides an increasingly explicit connection between **AI and servitization**. AI can enable firms to identify digital-service opportunities, personalize offerings and combine physical products with increasingly data-intensive services (Ayala et al., 2025). Evidence from manufacturing firms suggests that AI can facilitate servitization transformation, while the effects depend on complementary innovation, organizational and technological capabilities (Hu et al., 2026). Digitalization more generally has also been associated with manufacturing servicification at firm level (Thangavelu et al., 2026). At the same time, the returns to AI-enabled servitization need not be uniform: organizational learning, socio-technical complementarities and the intensity of AI innovation can condition the relationship (Yan et al., 2026). These studies reinforce the interpretation of AI as a technological mechanism capable of accelerating an already established

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servicification process (Ayala et al., 2025; Hu et al., 2026; Thangavelu et al., 2026; Yan et al., 2026).

The statistical evidence reviewed below concerns both direct services exports and the role of services as production inputs (WTO, 2024a; UNCTAD, 2026). These measures have different denominators and should not be interpreted as interchangeable estimates of services' contribution to global trade.

Indicators of services used in production complement gross export statistics by identifying service activities embedded in manufacturing and other sectors (UNCTAD, 2026; OECD, 2026b). A high services share in intermediate inputs is a level indicator; evidence of increasing servicification requires observations over time.

Thus, direct digital-services trade and services embedded in manufacturing should be interpreted as complementary manifestations of the same structural transformation. AI and digital technologies can strengthen both channels: the first by increasing the scalability and international tradability of knowledge-intensive services, and the second by increasing the software, data, R&D and service content incorporated into internationally traded products.

2.3. Geoeconomic Fragmentation and the Emergence of Reglobalization

The technological transformation of trade is occurring simultaneously with growing **geoeconomic fragmentation**. Geopolitical tensions, trade and investment restrictions, industrial policies and concerns over strategic dependence have encouraged firms and governments to reconsider the geographical organization of production and supply chains. The fragmentation literature emphasizes the economic costs that may arise when international trade and investment become increasingly structured around geopolitical alignment (Aiyar et al., 2023; Gopinath et al., 2025).

However, fragmentation does not necessarily imply a uniform reversal of globalization. Recent research identifies substantial heterogeneity in the restructuring of international economic relationships. Non-aligned and "connector" economies can gain importance by maintaining trade and investment relationships across increasingly separated geopolitical blocs, thereby contributing to the redirection rather than disappearance of global economic linkages (Baur et al., 2025; Aiyar et al., 2026). This suggests that the geography of globalization may change even when international economic interdependence remains substantial.

Digitalization adds another layer to this reconfiguration. Digital technologies can reduce certain trade costs and expand international exchange in activities less dependent on physical proximity. WTO modelling indicates that digitalization could

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significantly increase long-run trade and raise the importance of services and digitally deliverable activities in world trade (Bekkers et al., 2025). Research on digital trade similarly shows that it can affect GVC participation and positioning in both manufacturing and services, even as conventional supply chains are being reconsidered (Bian & Fan, 2024; Fan et al., 2024; Wu et al., 2025; Zhu et al., 2025).

AI may intensify this process. WTO analyses emphasize that AI can reduce trade costs, increase productivity and expand trade opportunities, particularly in digitally tradable activities, while also generating risks related to technological concentration, infrastructure gaps and unequal access to AI capabilities (WTO, 2024b, 2025). AI-enabled trade therefore operates simultaneously as a potential source of deeper international integration and as a possible mechanism through which existing technological inequalities are amplified (Jones, 2023; Jakubik et al., 2025; Sun & Trefler, 2026; WTO, 2025).

The distribution of digital trade already demonstrates this asymmetry. In 2025, digitally deliverable services represented approximately **61% of services exports in developed economies but only 16% in least developed countries (LDCs)**, while LDCs accounted for only approximately **0.6% of world services exports** (UNCTAD, 2026). Digital infrastructure, skills, institutional capacity and access to advanced technologies therefore increasingly determine countries' ability to participate in emerging forms of international integration.

In this study, reglobalization is used as an interpretive framework for the changing composition and channels of international integration (WTO, 2023). Fragmentation is documented through the literature and treated as the context of the descriptive assessment. The study does not construct a fragmentation index or directly quantify trade between geopolitical blocs.

In this study, **reglobalization** therefore refers to the **reconfiguration of international economic integration around services, digital technologies, AI, knowledge-intensive activities and reorganized global production networks, occurring alongside rather than instead of geoeconomic fragmentation**. The concept does not imply a return to the globalization model of previous decades. Rather, it captures the emergence of new forms, channels and geographical patterns of international interdependence.

The literature reviewed above suggests a concise conceptual sequence:

AI and digital transformation → direct and embedded servicification → reconfiguration of global production and trade → reglobalization under conditions of geoeconomic fragmentation.

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This sequence constitutes an **analytical framework rather than a causal model**. The empirical analysis therefore does not attempt to estimate a mathematical causal effect of AI on globalization. Instead, it examines whether recent statistical evidence on AI adoption, services, digital trade, GVCs and geographical disparities is consistent with the structural transformation identified in the literature.

3. Data and Methodology

3.1. Research Design

This study adopts a descriptive and comparative design, using published aggregate statistics to examine four dimensions: AI diffusion, services trade, digital-services delivery and global value-chain reconfiguration. It compares changes within individual series and differences within source-defined groups. It does not estimate correlations across harmonized country observations or identify causal relationships.

The empirical strategy combines longitudinal evidence with cross-sectional comparisons. The principal analytical period is **2015–2025**, which captures the acceleration of digital trade, the COVID-19 disruption and recovery, the rapid diffusion of generative AI, and the intensification of geopolitical and supply-chain fragmentation. Earlier observations are retained when they provide a meaningful structural benchmark, particularly for digitally delivered services and long-term trade developments. For indicators published with a statistical lag, the most recent internationally comparable observation is used.

The study deliberately combines indicators with different temporal coverage rather than imposing an artificial common panel. This choice reflects the descriptive purpose of the analysis and avoids discarding recent information merely because some international datasets—particularly Trade in Value Added (TiVA)—are released later than conventional trade statistics.

The analytical design follows five stages:

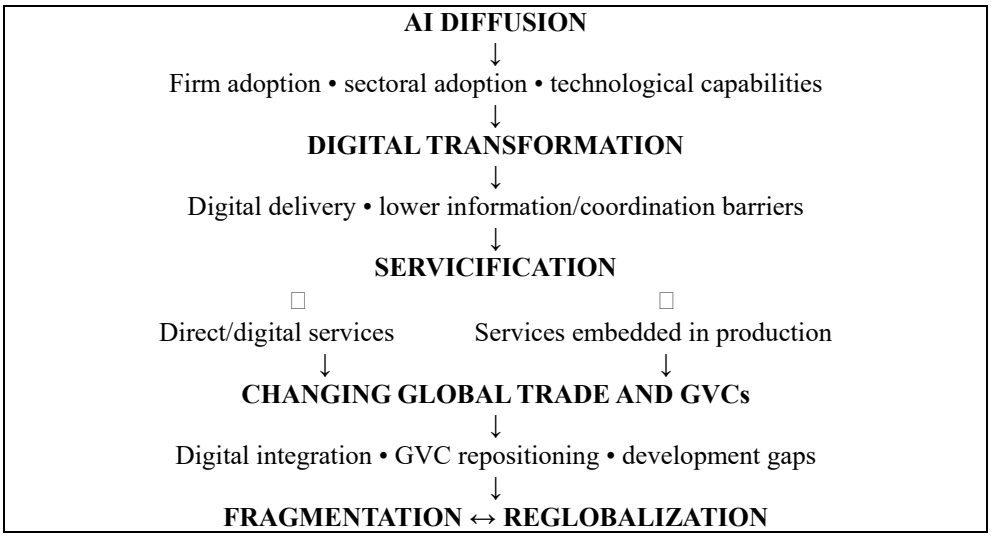
AI diffusion → expansion of services → digitalization of services trade → servicification of production → fragmentation/reglobalization assessment

The first stage documents the recent acceleration and sectoral distribution of AI adoption. The second examines the increasing importance of services in global exports and production. The third focuses specifically on digitally delivered and digitally deliverable services. The fourth evaluates the increasing services content of manufacturing and recent changes in global value chains. Finally, these trends are considered jointly to assess whether contemporary international integration is

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better characterized as generalized deglobalization or as a technologically and geographically uneven process of **reglobalization**.

Figure 1. Analytical framework of the study



Source: Authors' conceptualization based on the literature reviewed in Section 2.

The arrows in Figure 1 represent the analytical sequence used to organize the statistical evidence and **do not imply econometrically identified causal relationships**.

3.2. Data Sources

The numerical evidence is drawn from three principal sources: OECD (2026a) for enterprise AI adoption; OECD (2026b) for experimental TiVA estimates; and WTO (2024a) and UNCTAD (2026) for services and digital-trade benchmarks. IMF and other research publications inform the literature review rather than constituting additional statistical datasets used in the analysis. No Statista series is used in the reported tables.

Preference is given to primary international sources because they provide internationally comparable definitions, transparent methodologies and updated statistical series. The use of several organizations is necessary because no single international database currently integrates comparable indicators for AI adoption, digital trade, services, manufacturing servicification and GVC restructuring.

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Table 1. Data architecture and principal indicators

Analytical dimension	Indicator	Period / benchmark used	Unit	Principal source
AI diffusion	Firms using AI	2023–2025	% of firms	OECD
	AI adoption by firm size	2025	% of firms	OECD
	AI adoption by economic activity	2025	% of firms	OECD
Trade servicification	Services share of global exports	2015; 2025	%	UNCTAD
	Services export growth	past decade; 2025	annual %	UNCTAD
	Services share of global intermediate inputs	2022	%	UNCTAD
Digital trade	Digitally delivered services exports	2023	USD trillion	WTO
	Digitally delivered services share of total services exports	2023	%	WTO
	Digitally delivered services share of goods + services exports	2023	%	WTO
	Digitally deliverable services share of services exports	2025	%	UNCTAD
Development gap	Digitally deliverable services share – developed economies	2025	%	UNCTAD
	Digitally deliverable services share – LDCs	2025	%	UNCTAD
	LDC share of world services exports	2025	%	UNCTAD
Servicification of production	Services share of intermediate inputs	2022	%	UNCTAD

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Analytical dimension	Indicator	Period / benchmark used	Unit	Principal source
	Services inputs embodied in industrial-goods exports	2022	%	UNCTAD
	Domestic services content of manufacturing exports	2022–2024	percentage-point change	OECD TiVA
	Foreign services content of manufacturing exports	2022–2024	percentage-point change	OECD TiVA
GVC reconfiguration	Domestic value added in gross exports	2022–2024	%	OECD TiVA
	Selected country changes in domestic/foreign services content	2022–2024	% / pp	OECD TiVA
Digital governance	Preferential trade agreements containing e-commerce/digital-trade provisions	2000–2025	%	UNCTAD

Sources: WTO (2024a); OECD (2026a, 2026b); UNCTAD (2026).

The resulting evidence base therefore combines **levels, shares, growth rates and changes over time** rather than reducing the analysis to a single composite indicator.

3.3. Statistical Indicators and Observed Benchmarks

Indicators are selected for their relevance to the research question, the availability of explicit definitions and source coverage, and the possibility of comparing observations within the same series. Table 2 consolidates the benchmarks subsequently examined in Section 4. The synthesis is a comparison of published evidence rather than a newly harmonized dataset.

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Table 2. Key statistical benchmarks used in the analysis

Indicator	Statistical benchmark	Year / period
Firms using AI	**8.7% → 14.2% → 20.2%**	2023 → 2024 → 2025
Large firms using AI	**52.0%**	2025
Small firms using AI	**17.4%**	2025
ICT firms using AI	**57.3%**	2025
Professional/scientific services firms using AI	**36.8%**	2025
Services share of global exports	**23% → 27%**	2015 → 2025
Services share of global intermediate inputs	**71%**	2022
Developed economies – services share of intermediate inputs	**78%**	2022
Developing economies – services share of intermediate inputs	**61%**	2022
Digitally delivered services exports	**USD 4.25 trillion**	2023
Annual growth of digitally delivered services	**9.0%**	2023
Digitally delivered services / services exports	**>54%**	2023
Digitally delivered services / goods + services exports	**13.8%**	2023
Digitally deliverable services / global services exports	**56%**	2025
Developed economies – digitally deliverable share	**61%**	2025
LDCs – digitally deliverable share	**16%**	2025
LDC share of global services exports	**0.6%**	2025
Average growth of digitally deliverable services	**7.1% p.a.**	past decade
Domestic services content of manufacturing exports	**+0.3 pp**	2022–2024
Foreign services content of manufacturing exports	**+0.3 pp**	2022–2024
Export-weighted domestic value-added share	**77.0% → 77.7% → 77.6%**	2022 → 2023 → 2024

Sources: OECD (2026a, 2026b); WTO (2024a); UNCTAD (2026).

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AI indicators measure the share of enterprises reporting use of AI, with breakdowns by firm size and economic activity. These measures describe adoption within the OECD countries for which data are available; they do not represent a global enterprise census or a measure of AI-generated exports (OECD, 2026a).

Services indicators distinguish the share of services in gross exports from their share in intermediate production inputs. Comparisons are made within each definition and source-defined economy group. A change in an export share can reflect price and composition effects as well as changes in activity; it is not interpreted here as a volume or productivity measure (UNCTAD, 2026).

The WTO benchmark measures services actually delivered digitally in 2023. UNCTAD's 2025 benchmark covers services that are potentially digitally deliverable. Because the definitions differ, the two observations are not combined into a single growth series (WTO, 2024a; UNCTAD, 2026).

TiVA indicators distinguish the domestic and foreign services content of manufacturing exports from economy-wide domestic value added in gross exports. Their changes are reported in percentage points, with experimental nowcasts for 2023–2024 identified explicitly. These aggregate estimates provide evidence on the persistence and composition of cross-border production, not a direct measure of geopolitical fragmentation (OECD, 2026b).

3.4. Comparative Dimensions

Four forms of comparison are used to organize the statistical evidence.

3.4.1. Temporal comparison

Changes over time are used to identify the direction and speed of structural transformation. Examples include the increase in AI adoption between 2023 and 2025, the change in the services share of global exports between 2015 and 2025, and recent changes in services content and domestic value added within manufacturing exports.

The analysis emphasizes **percentage-point changes where shares are compared** and growth rates where the original international source reports growth. No attempt is made to infer causality from temporal coincidence.

3.4.2. Sectoral comparison

Sectoral comparisons contrast AI adoption in ICT with professional and scientific services, using the categories reported by OECD (2026a). They identify differences in adoption, but do not test whether firms using AI export more or whether sectoral AI adoption explains digital-services growth.

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3.4.3. Firm-size comparison

Firm-size comparisons examine the adoption gap between large and small enterprises within the OECD source. This gap is relevant to unequal technological capabilities, but does not directly measure differences in export participation or the returns to AI investment.

3.4.4. Development comparison

Development comparisons examine the share of digitally deliverable services in services exports for developed economies and LDCs. The LDC share of world services exports is a separate indicator with a different denominator. These measures are retained separately and reported in Section 4.5 (UNCTAD, 2026).

The comparison also considers the services inputs embodied in industrial-goods exports across developed economies, developing economies and LDCs. The source's categories are retained: LDCs form a subgroup of developing economies, rather than an additional mutually exclusive group.

Table 3. Selected structural gaps

Comparison	Higher value	Lower value	Observed gap
AI adoption: large vs. small firms, 2025	52.0%	17.4%	**34.6 pp**
Digitally deliverable services: developed vs. LDCs, 2025	61%	16%	**45 pp**
Services in intermediate inputs: developed vs. developing economies, 2022	78%	61%	**17 pp**
Services inputs in industrial-goods exports: developed vs. LDCs, 2022	33%	13%	**20 pp**

Sources: OECD (2026a, 2026b); UNCTAD (2026).

These comparisons describe observed technological and development disparities. They do not establish that the disparities widened, since comparable repeated group-level observations are not presented for every indicator.

3.5. Global Value Chains and the Fragmentation–Reglobalization Dimension

The analysis considers recent GVC indicators alongside services trade to assess whether the observations are consistent with persistent cross-border production and structural reconfiguration. The resulting interpretation is indicative, rather than a definitive classification of the global economy.

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The economy-wide export-weighted domestic value-added share and the domestic and foreign services content of manufacturing exports are examined separately. The country illustration uses Japan, as reported in OECD (2026b); it is an illustrative example and not a representative estimate for all economies.

The TiVA comparison retains the source's 41-economy coverage for the economy-wide aggregate and its experimental status for recent observations. It does not extrapolate these findings to all countries or infer bilateral geopolitical alignment from aggregate domestic content.

A relatively stable aggregate domestic value-added share is consistent with continued reliance on cross-border production. It can nevertheless coexist with supplier substitution, country-specific reshoring and fragmentation between geopolitical blocs. Consequently, it cannot independently demonstrate the absence of deglobalization.

The presence of e-commerce or digital-trade provisions in preferential trade agreements is used as contextual evidence of institutional attention to digital exchange (UNCTAD, 2026). The presence of provisions alone does not establish regulatory interoperability, implementation or the degree of institutional fragmentation.

3.6. Analytical Matrix

The final interpretation is based on the joint reading of the indicators rather than on any individual statistic.

Table 4. Statistical interpretation matrix

Observed statistical pattern	Structural interpretation
Rapid increase in firm-level AI adoption	Acceleration of technological transformation
Highest AI adoption in ICT and professional/scientific services	Concentration in knowledge-intensive activities
Services share of exports rising	Direct trade servicification
Services = 71% of global intermediate inputs	Substantial services use in production in 2022; this level alone does not establish an increase

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Observed statistical pattern	Structural interpretation
Digitally deliverable services = 56% of services exports	Expansion of digital international integration
Increasing domestic + foreign services content in manufacturing	Continued servicification of GVCs
Domestic value-added share broadly stable in 2023–2024	Limited aggregate reshoring in the covered sample and period; not a direct test of geopolitical fragmentation
61% vs. 16% digital-services share	Strong development asymmetry
Expansion of digital-trade provisions in trade agreements	Greater institutional attention to digital trade; interoperability is not measured

Source: Authors' interpretation of OECD (2026a, 2026b), WTO (2024a) and UNCTAD (2026). The matrix classifies evidence conceptually and is not an estimated causal model.

Taken together, the framework distinguishes three possible interpretations.

Deglobalization would be associated primarily with declining cross-border integration, widespread reshoring and weakening international production linkages.

Continued traditional globalization would imply persistence of the earlier trade structure without major changes in its technological or sectoral composition.

Reglobalization, as defined in this study, is associated with continuing international integration accompanied by a shift toward services, digital delivery, knowledge-intensive activities, AI-enabled capabilities and reorganized rather than disappearing global value chains.

The statistical evidence is evaluated against these three interpretations in Section 4.

3.7. Methodological Boundaries

Several limitations are explicitly incorporated into the research design. First, the indicators originate from different international databases and therefore do not always cover identical country samples or years. They are consequently compared at the level at which the respective organizations report internationally harmonized aggregates rather than merged into an artificial common panel.

Second, **digitally delivered services** and **digitally deliverable services** are not treated as interchangeable concepts. The former refers to services actually

delivered remotely through computer networks, while the latter identifies services that can potentially be delivered in this way. Results therefore retain the terminology used by the original source.

Third, increases in separate aggregate indicators do not establish statistical co-movement in a common sample or a causal relationship. The comparison concerns contemporaneous structural patterns, while the literature supplies possible connecting mechanisms. No claim is made that AI caused the observed expansion of services trade.

Finally, recent TiVA estimates for 2023–2024 are experimental nowcasts and are treated accordingly. Their principal role is to identify the direction and magnitude of recent GVC changes rather than to provide definitive historical estimates.

A further limitation concerns fragmentation: the study does not measure geopolitical-bloc trade, bilateral decoupling or a comprehensive fragmentation index. Its interpretation therefore combines published fragmentation research with separate aggregate indicators of digital and service-based integration. Regulatory provisions and cross-sectional development gaps are not treated as direct measures of fragmentation or widening inequality.

4. Results and Analysis

4.1. The Rapid Expansion and Uneven Diffusion of AI Adoption

AI adoption has accelerated substantially in recent years. Across OECD countries for which comparable data are available, the proportion of firms reporting AI use increased from **8.7% in 2023 to 14.2% in 2024 and 20.2% in 2025**. Thus, firm-level adoption more than doubled within only two years (OECD, 2026a).

Table 5. AI adoption among firms, 2023–2025

Year	Firms using AI (%)	Change from previous observation
2023	8.7	—
2024	14.2	+5.5 pp
2025	20.2	+6.0 pp

Source: OECD (2026a).

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The aggregate trend nevertheless conceals substantial differences across firms and economic activities. In 2025, **52.0% of large firms** reported using AI, compared with only **17.4% of small firms**, producing a gap of **34.6 percentage points**. Sectoral differences were similarly pronounced: AI use reached **57.3% among ICT firms** and **36.8% among professional and scientific services firms**.

Table 6. Selected dimensions of AI adoption, 2025

Category	AI adoption (%)
ICT firms	57.3
Large firms	52.0
Professional and scientific services	36.8
All firms	20.2
Small firms	17.4

Source: OECD (2026a).

Note: Sector categories and firm-size categories are separate dimensions; they overlap and must not be summed or treated as mutually exclusive groups.

Two findings are particularly relevant to the trade transformation examined in this study. First, the speed of diffusion indicates that AI has moved rapidly from an emerging technology toward broader business adoption. Second, adoption is especially pronounced in information- and knowledge-intensive activities. These are also activities in which digital delivery and cross-border provision are increasingly feasible. The statistical evidence therefore establishes an important structural correspondence between the diffusion of AI capabilities and the sectors at the centre of expanding digital-services trade.

4.2. Services Are Reshaping Global Trade and Production

The rapid diffusion of AI coincides with a broader structural shift toward services. The share of services in global exports increased from approximately **23% in 2015 to 27% in 2025**, representing a rise of **4 percentage points** over the decade (UNCTAD, 2026).

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Gross export statistics, however, substantially understate the role of services in contemporary production. In 2022, services represented approximately **71% of global intermediate inputs**, compared with their much smaller share of gross exports. The corresponding share reached **78% in developed economies and 61% in developing economies**, a difference of **17 percentage points**.

Table 4. The growing role of services in global trade and production

Indicator	Value
Services share of global exports, 2015	23%
Services share of global exports, 2025	27%
Change, 2015–2025	+4 pp
Services share of global intermediate inputs, 2022	71%
Developed economies	78%
Developing economies	61%
Developed–developing gap	17 pp

Source: UNCTAD (2026).

The role of services is also visible inside internationally traded industrial products. Services represented approximately **33% of intermediate inputs embodied in industrial-goods exports in developed economies**, compared with **27% in developing economies and 13% in LDCs**.

Table 8. Services inputs embodied in industrial-goods exports

Economy group	Share (%)
Developed economies	33
Developing economies	27
Least developed countries	13

Source: UNCTAD (2026).

The services-input comparisons document differences in the role of services across economy groups. The increase in the services share of gross exports supports a shift in export composition, while the TiVA changes provide a separate temporal indication of manufacturing servicification. The 2022 intermediate-input shares establish levels rather than growth by themselves.

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4.3. Digital Services as a New Engine of International Trade

Digital trade represents one of the clearest manifestations of this structural transformation. Global exports of digitally delivered services reached approximately **USD 4.25 trillion in 2023**, increasing by **9% compared with 2022**. They accounted for more than **54% of global services exports** and approximately **13.8% of combined world exports of goods and services** (WTO, 2024a).

By 2025, digitally deliverable services accounted for approximately **56% of global services exports**. Their average annual growth during the preceding decade was approximately **7.1%**, exceeding the growth of services exports overall (UNCTAD, 2026).

Table 9. Selected indicators of global digital-services expansion

Indicator	Value	Reference period
Digitally delivered services exports	USD 4.25 trillion	2023
Annual growth	9.0%	2022–2023
Share of world services exports	>54%	2023
Share of combined goods and services exports	13.8%	2023
Digitally deliverable share of services exports	56%	2025
Average annual growth of digitally deliverable services	7.1%	preceding decade

Sources: WTO (2024a); UNCTAD (2026).

The figures show that digital services are no longer a peripheral component of international trade. More than half of global services exports now consist of activities that can be delivered digitally, while digitally delivered services already represent a substantial component of combined goods and services trade.

This transformation also changes the role of geographical distance. Software, professional services, financial activities, telecommunications, information services and other digitally deliverable activities can increasingly cross borders without the physical movement traditionally associated with international trade. Consequently, measures focused primarily on merchandise flows capture a decreasing proportion of the mechanisms through which economies are internationally connected.

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4.4. Servicification of Manufacturing and the Persistence of Global Value Chains

The structural shift toward services is also visible within manufacturing. OECD experimental estimates indicate that between 2022 and 2024 the **domestic and foreign services content of manufacturing exports each increased by approximately 0.3 percentage points on average** (OECD, 2026b).

Japan illustrates this transformation particularly clearly. Domestic services content increased from approximately **19.8% to 20.5%**, while foreign services content increased from approximately **9.2% to 9.9%** over the same period.

Table 10. Selected indicators of manufacturing servicification, 2022–2024

Indicator	2022	2024	Change
Average domestic services content	—	—	+0.3 pp
Average foreign services content	—	—	+0.3 pp
Japan – domestic services content	19.8%	20.5%	+0.7 pp
Japan – foreign services content	9.2%	9.9%	+0.7 pp

Note: OECD reports the first two indicators as average changes rather than common levels across the economies examined. Source: OECD (2026b).

Importantly, this increasing services intensity has not coincided with generalized reshoring. Across the **41 economies** examined by the OECD, the export-weighted domestic value-added share changed from approximately **77.0% in 2022 to 77.7% in 2023 and 77.6% in 2024**.

Table 11. Export-weighted domestic value-added share, 2022–2024

Year	Domestic value-added share (%)
2022	77.0
2023	77.7
2024	77.6

Source: OECD *(2026b).*

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The modest aggregate increase is consistent with limited economy-wide reshoring in the covered sample and period (OECD, 2026b). It does not exclude substantial changes in particular countries, sectors or bilateral relationships. Together with rising services content, it supports an interpretation of persistent cross-border production accompanied by compositional change.

Manufacturing therefore remains internationally interconnected while becoming progressively more dependent on services, software, data, logistics, finance and other intangible inputs. This represents a particularly important dimension of reglobalization because international integration is increasingly embedded inside products rather than being visible solely in gross cross-border flows.

4.5. An Uneven Transformation: The Digital Development Gap

The expansion of digital trade is highly asymmetric across development groups. In 2025, digitally deliverable services represented approximately **61% of services exports in developed economies**, compared with **56% globally and only 16% in LDCs** (UNCTAD, 2026).

Table 12. Digitally deliverable services as a share of services exports, 2025

Economy group	Share (%)
Developed economies	61
World	56
Least developed countries	16

Source: UNCTAD (2026).

The difference between developed economies and LDCs is therefore **45 percentage points**. Moreover, LDCs accounted for only **0.6% of global services exports in 2025**.

The same asymmetry appears in productive servicification. Services accounted for approximately **33% of intermediate inputs embodied in industrial-goods exports in developed economies, 27% in developing economies and only 13% in LDCs**. Thus, the gap is visible not only in direct digital-services exports but also in the extent to which economies incorporate services into internationally traded production.

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Table 13. Selected indicators of the digital and services development gap

Indicator	Developed economies	Developing economies	LDCs
Digitally deliverable services / services exports, 2025	61%	—	16%
Services / intermediate inputs, 2022	78%	61%	—
Services inputs embodied in industrial-goods exports	33%	27%	13%
Share of global services exports, 2025	—	—	0.6%

Source: UNCTAD (2026).

The observations describe substantial development disparities in direct digital-services trade and services embedded in goods. Since repeated comparable observations for every group are not presented, these gaps should not be characterized as evidence that inequality has necessarily widened.

The evidence consequently suggests that reglobalization should not be interpreted as an automatically inclusive process. International integration may deepen through digital channels while the ability to participate in those channels remains strongly unequal.

4.6. From Fragmentation to Reglobalization

Taken together, the statistical evidence reveals an apparent paradox. International economic relations are experiencing geopolitical fragmentation and supply-chain repositioning, while cross-border integration is simultaneously expanding or being reinforced through services, digital delivery and technologically intensive activities.

Table 14. Statistical evidence of the fragmentation–reglobalization paradox

Fragmentation context from the literature	Observed integration indicators
Geopolitical tensions and trade restrictions	AI adoption: 8.7% → 20.2% (2023–2025)
Supply-chain repositioning	Services: 23% → 27% of global exports

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Fragmentation context from the literature	Observed integration indicators
Digital and technological disparities	Digital services: >54% of services exports in 2023
Developed–LDC digital gap: 45 pp	Services: 71% of global intermediate inputs
Unequal AI capabilities (an adoption disparity, not a direct fragmentation measure)	Domestic + foreign services content of manufacturing rising
Regulatory heterogeneity discussed in the literature	Domestic value-added share broadly stable around 77% in the covered sample; bilateral fragmentation remains possible

Sources: OECD (2026a, 2026b); WTO (2024a); UNCTAD (2026).

Note: The first column summarizes contextual arguments from the literature; the second reports selected integration indicators. This comparison does not constitute a fragmentation index or demonstrate causality.

Three findings are particularly significant.

First, AI adoption is expanding at exceptional speed and is concentrated particularly in ICT and knowledge-intensive services. The technology is therefore diffusing most rapidly in sectors closely associated with the digital transformation of trade.

Second, services are becoming more important through two channels simultaneously: as directly traded outputs and as inputs embedded in manufacturing and other internationally traded production. The distinction between a "goods economy" and a "services economy" is consequently becoming progressively less informative.

Third, international production networks show evidence of adjustment rather than generalized retreat. The broadly stable domestic value-added share, combined with increasing foreign and domestic services content, suggests that firms are reorganizing global production rather than simply abandoning it.

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The institutional architecture of trade is changing as well. Approximately **55% of preferential trade agreements concluded between 2000 and 2025 contained e-commerce or digital-trade provisions**. Among agreements concluded since 2020, such provisions involved approximately **90% of developed countries, 62% of developing countries and 66% of LDCs** (UNCTAD, 2026). Digital integration is therefore increasingly reflected in trade governance, even though regulatory approaches remain heterogeneous.

Forward-looking WTO analysis reinforces the potential importance of AI in this transformation. Depending on technological diffusion and policy conditions, AI could increase global trade by approximately **34–37% by 2040**, with particularly important effects on digitally deliverable services (WTO, 2025). These estimates are scenarios rather than observed outcomes and should therefore not be interpreted as certain forecasts.

The observed indicators are consistent with a reconfiguration of international integration, but do not by themselves establish a global transition or a causal role for AI. Services and digital delivery have gained importance, while the recent TiVA evidence indicates limited aggregate reshoring in the covered economies. The connection to fragmentation rests on the literature and the interpretation developed in Section 5.

The central empirical result of this study can therefore be summarized as follows:

Fragmentation is changing the geography and governance of globalization, while AI, digital trade and servicification are changing its technological and sectoral composition.

This coexistence provides the empirical basis for interpreting contemporary international economic transformation as **reglobalization**: the emergence of new forms and channels of international integration alongside fragmentation in others.

5. Discussion

The evidence presented in this study suggests that the current transformation of international trade cannot be adequately described through a simple globalization–deglobalization dichotomy. Geoeconomic fragmentation is increasingly visible in trade policy, geopolitical alignment and supply-chain strategies (Aiyar et al., 2023; Gopinath et al., 2025), yet the statistical evidence simultaneously shows expanding digital-services trade, increasing servicification and persistent cross-border production linkages. Recent research on non-aligned and connector economies further suggests that fragmentation can redirect international linkages rather than eliminate them (Baur et al., 2025; Aiyar et al., 2026). The emerging pattern is

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therefore one of **reconfiguration rather than generalized retreat from international economic integration**.

5.1. AI as an Accelerator of Trade Transformation

The rapid diffusion of AI provides an important technological dimension to this reconfiguration. Firm-level AI adoption more than doubled between 2023 and 2025 in the OECD economies for which comparable data are available, while adoption is particularly concentrated in ICT, professional and scientific services and large firms. These patterns are consistent with a growing literature showing that AI can affect international trade through productivity, information processing, innovation, market access and reductions in coordination and transaction costs (Goldfarb & Trefler, 2018; Jones, 2023; Jakubik et al., 2025; Kumar et al., 2025; Sun & Trefler, 2026).

The results should not, however, be interpreted as evidence that AI independently causes the observed expansion of digital-services trade. AI is developing within a much broader process of digitalization involving cloud infrastructure, digital platforms, data flows, telecommunications and regulatory change. The evidence instead supports interpreting AI as an **accelerator of an already established digital transformation of trade**.

This interpretation is particularly relevant because AI adoption is strongest in activities characterized by high information and knowledge intensity. These activities overlap substantially with those that can increasingly be supplied across borders through digital networks. Research linking AI capabilities with export performance, international specialization and digital servitization provides additional support for this mechanism (Mishra et al., 2023; Ayala et al., 2025; Bonfiglioli et al., 2025; Hu et al., 2026; Yan et al., 2026).

The concentration of AI adoption in knowledge-intensive sectors is consistent with a possible technological complementarity with digitally tradable services. However, this study does not test that complementarity statistically. The proposed connection is a literature-informed interpretation that requires firm- or country-level evidence for direct evaluation.

5.2. Servicification Changes the Structure of Globalization

A second major finding concerns the changing role of services. Their increasing share of global exports captures only part of the transformation. The much larger contribution of services to intermediate inputs, together with the continued increase in domestic and foreign services content of manufacturing exports, demonstrates that servicification is occurring **both directly and within internationally traded goods**.

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This finding is consistent with earlier evidence on the importance of services for manufacturing exports and value creation (Lodefalk, 2014; Miroudot & Cadestin, 2017) and with more recent studies connecting services and digitalization with GVC participation and upgrading (Díaz-Mora et al., 2022; Reddy et al., 2023; Bian & Fan, 2024; Dai et al., 2024; Fan et al., 2024; Sharma et al., 2024; Wu et al., 2025).

The implication is significant for how international trade is conceptualized. Goods and services should increasingly be regarded as **complementary components of global production rather than separate or competing categories**. Software, R&D, design, logistics, finance, marketing, professional expertise and data services are incorporated into the production and international competitiveness of manufactured goods. A physical product crossing a border can therefore embody a substantial amount of domestic and foreign service value.

Digital technologies deepen this interdependence by making many service inputs easier to coordinate and supply internationally (Blázquez et al., 2023; Feng et al., 2024; Thangavelu et al., 2026). The traditional distinction between a manufacturing economy and a services economy consequently becomes progressively less informative for understanding contemporary international specialization.

The finding that both domestic and foreign services content of manufacturing exports increased while aggregate domestic value-added shares remained broadly stable is particularly relevant. It provides limited support for the view that the recent period represents generalized reshoring or a systematic dismantling of global value chains. Instead, it is more consistent with **GVC repositioning**, in which the composition, geography and technological organization of international production change without eliminating cross-border interdependence.

5.3. Digital Trade Creates New Integration but Also New Divides

The expansion of digitally delivered and digitally deliverable services represents perhaps the clearest manifestation of the emerging form of international integration. More than half of global services exports are now associated with activities that can be delivered digitally, while digital services have become a significant component of total world trade. These developments support earlier research showing that digitalization can expand services exports, strengthen export resilience and alter participation in global value chains (Li, Han, & Xu, 2023; Kong et al., 2024; Li, Zhang, & Miao, 2024; Zhang et al., 2024; Zhu et al., 2025).

However, the evidence also reveals a substantial **digital development divide**. The 45-percentage-point gap between developed economies and LDCs in the share of digitally deliverable services in services exports is particularly striking. The

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difference is reinforced by the very small contribution of LDCs to world services exports and by their lower services content in industrial-goods exports.

These disparities suggest that the transition toward digital and service-intensive trade does not automatically broaden participation in globalization. Digital infrastructure, connectivity, skills, access to finance, data and technological capabilities increasingly function as conditions for effective participation. AI may strengthen these opportunities but may also reinforce existing asymmetries if access to computing resources, expertise and complementary technologies remains concentrated.

The development implications are therefore more complex than a simple expansion of digital trade. Economies with stronger technological and service capabilities may capture a disproportionate share of new opportunities, whereas countries with weaker digital ecosystems risk becoming relatively less competitive in the fastest-growing segments of international trade. The same technological forces that reduce the relevance of physical distance may therefore increase the importance of **digital capability distance**.

5.4. Fragmentation and Reglobalization Can Coexist

The central contribution of the analysis lies in reconciling two developments that can initially appear contradictory. The first is the intensification of geoeconomic fragmentation. The second is the continuing expansion and transformation of cross-border economic integration.

The evidence indicates that these processes can occur simultaneously. Geopolitical tensions may redirect merchandise trade, investment and particular supply chains, while digital technologies generate new cross-border flows and services become increasingly embedded in internationally traded production. Connector economies may acquire new roles between geopolitical blocs, while digital trade rules and regulatory differences create another layer of integration and fragmentation (Aiyar et al., 2023; Baur et al., 2025; Gopinath et al., 2025; Aiyar et al., 2026).

The expansion of digital-trade provisions in preferential trade agreements reinforces this interpretation. Digital integration increasingly requires institutional frameworks governing data, electronic transactions and digitally supplied services. At the same time, differences between national and regional regulatory approaches may themselves become sources of fragmentation. Consequently, technological integration and institutional fragmentation are not mutually exclusive.

This is where the concept of **reglobalization** becomes analytically useful. It does not imply that globalization has returned to its previous trajectory, nor does it

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deny the significance of geopolitical fragmentation. Instead, it describes a transformation in the **composition, channels and geography of international interdependence**.

The evidence examined in this study suggests that this transformation has at least four characteristics: international exchange is becoming **more service-intensive**, **more digitally deliverable**, **more dependent on technological capabilities**, and **more unevenly distributed across countries and firms**. At the same time, global production networks are being reorganized rather than universally dismantled.

This interpretation is also consistent with forward-looking WTO analysis, which identifies substantial potential for AI to expand international trade, particularly digitally deliverable services, while emphasizing that the magnitude and distribution of these gains depend strongly on technological diffusion and policy conditions (WTO, 2025). AI therefore has the potential to strengthen reglobalization, but not necessarily to produce a more geographically balanced form of globalization.

5.5. The Fragmentation–Reglobalization Paradox

Taken together, the findings reveal the central paradox of contemporary international economic transformation:

global economic integration can become simultaneously more digital and interconnected, yet more technologically unequal, geopolitically contested and institutionally fragmented.

This paradox helps explain why conventional measures of globalization may provide apparently conflicting signals. Merchandise trade and particular bilateral relationships may show fragmentation, while digitally delivered services, service-intensive production and technologically enabled cross-border activities reveal continuing or even expanding international integration.

Accordingly, the relevant question is no longer simply whether globalization is advancing or retreating, but **what kind of globalization is emerging**.

The statistical evidence examined here points toward a form of reglobalization in which AI and digital technologies facilitate new modes of international exchange, services increasingly shape both direct trade and manufacturing, and global value chains adjust to geopolitical pressures without disappearing. At the same time, unequal technological capabilities determine which firms and economies are best positioned to participate in this transformation.

Reglobalization should therefore be understood neither as the opposite of fragmentation nor as a return to the globalization model of previous decades. **It is**

the reorganization of international economic integration within a more digital, service-intensive, technologically asymmetric and geopolitically fragmented world economy.

6. Conclusions and Policy Implications

This article examined the changing configuration of international economic integration through the combined lenses of **artificial intelligence, digital trade, servicification and global value-chain reorganization**. Drawing on recent statistical evidence from major international organizations, the analysis considered whether the coexistence of geopolitical fragmentation and expanding technology-enabled cross-border integration is better understood as straightforward deglobalization or as a broader process of **reglobalization**.

The evidence identifies several interconnected structural transformations. First, AI adoption has accelerated rapidly, particularly in ICT and knowledge-intensive services. Second, services have increased their importance not only as direct exports but also as intermediate inputs embedded in internationally traded production. Third, digitally deliverable services now constitute more than half of global services exports, demonstrating the increasing importance of trade that can occur without the physical movement traditionally associated with international exchange. Finally, recent evidence on global value chains provides limited support for generalized reshoring: international production networks continue to operate while manufacturing becomes progressively more service-intensive.

Taken together, these developments suggest that contemporary globalization is being **reconfigured rather than simply reversed**. Geopolitical tensions, trade restrictions and supply-chain repositioning coexist with expanding digital exchange, service-intensive production and new forms of technology-enabled international interdependence. Reglobalization, in this sense, does not imply a return to the globalization model of previous decades. It describes an emerging configuration in which **services, data, digital technologies, knowledge and AI-enabled capabilities increasingly influence how international economic integration takes place**.

A particularly important finding is that this transformation is highly uneven. Developed economies have substantially stronger positions in digitally deliverable services and generally greater technological capabilities, whereas least developed countries remain weakly represented in the fastest-growing segments of international services trade. The digital transformation of globalization therefore

creates opportunities for broader participation in international markets, but it can simultaneously reinforce existing technological and development gaps.

These findings have several policy implications. Trade policy alone is increasingly insufficient to determine an economy's capacity to participate successfully in international integration. **Digital and AI readiness should become an integral component of trade and development strategies.** This requires investment in reliable and affordable digital infrastructure, broadband connectivity, computing capacity, human capital and advanced digital skills. Particular attention should be given to small firms and developing economies, which face greater constraints in adopting AI and participating in digitally intensive international markets.

A second priority concerns the development of **domestic service capabilities**. As manufacturing becomes increasingly service-intensive, competitiveness in goods exports depends not only on manufacturing capacity but also on access to efficient logistics, finance, software, engineering, R&D, professional services and data-related capabilities. Policies supporting these complementary activities can therefore strengthen both direct services exports and the competitiveness of manufacturing within global value chains.

Third, the growing importance of digitally delivered trade requires greater attention to the **international regulatory environment**. Interoperability in digital-trade rules, data governance, electronic transactions and cross-border service provision can facilitate participation in emerging forms of international exchange. Excessive regulatory fragmentation, by contrast, risks creating new barriers precisely where digital technologies have the potential to reduce traditional trade costs. International cooperation therefore remains important even in an environment characterized by increasing geopolitical competition.

For developing and least developed economies, the central policy challenge is not simply to increase participation in existing trade flows, but to build the capabilities required to participate in the **changing composition of global trade**. Closing gaps in connectivity, skills, digital infrastructure and technological capacity is essential if reglobalization is to become more geographically inclusive rather than reinforcing concentration in technologically advanced economies.

The study's descriptive design identifies changes within published series and disparities within source-defined groups. It does not establish causal effects, a common-sample correlation between AI and trade, or the extent of geopolitical fragmentation. Different definitions, periods and country coverage constrain joint interpretation, while recent TiVA observations remain experimental. Comparative advantage is discussed as theoretical background rather than measured empirically.

Future research could extend this analysis as longer and more internationally comparable AI time series become available. Harmonized country-level panel data could allow the relationships among AI capabilities, digitally delivered services, manufacturing servicification and GVC participation to be tested more directly. Further research could also examine whether the benefits of AI-enabled trade are converging or diverging across developed, emerging and least developed economies and how different digital-trade regulatory regimes influence these outcomes.

The evidence is consistent with an international economy whose sectoral composition and delivery channels are changing. Growing services trade, digital delivery and rising services content in manufacturing can coexist with geopolitical fragmentation documented in the literature. Reglobalization is a useful interpretation of this coexistence, provided it is understood as a qualified synthesis rather than a measured outcome, a universally inclusive transition or a demonstrated effect of AI.

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THE MODERATING ROLE OF INSTITUTIONAL CONDITIONS IN PARTNERSHIP-INNOVATION RELATIONSHIP: EVIDENCE FROM LUBRICANT OIL INDUSTRY

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Abstract

This study investigates the moderating effect of institutional conditions on the relationship between strategic distribution partnerships and value chain innovation in emerging economies. Drawing on Institutional Theory, we examine how regulatory enforcement, infrastructure quality, and market formalization influence the effectiveness of partnerships in promoting innovation outcomes. Utilizing survey data from 562 stakeholders within Conoil Plc.'s distribution network in Nigeria's lubricant oil industry, we apply Structural Equation Modelling (SEM) to test a moderation framework. The results indicate that institutional conditions significantly enhance the partnership-innovation relationship (interaction $\beta = 0.21$, $p = 0.018$). Strategic distribution partnerships have a direct positive effect on value chain innovation ($\beta = 0.62$, $p < 0.001$), while institutional conditions independently

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contribute to innovation (β = 0.29, p = 0.012). Nevertheless, the weak psychometric properties of the institutional construct (Cronbach's α = 0.033, CR = 0.004, AVE = 0.016) indicate that institutional factors are multidimensional and should be analyzed separately. This study advances understanding of institutional voids and their implications for supply chain strategy, showing that partnership effectiveness depends on institutional quality. We provide implications for managers addressing institutional constraints and for policymakers seeking to foster enabling environments for supply chain innovation. The findings underscore that firms cannot rely solely on partnerships to drive innovation; institutional quality is critical to realising the benefits of partnerships.

Keywords: *Institutional theory, institutional voids, strategic partnerships, value chain innovation, emerging markets, Nigeria, moderation, supply chain management*

JEL Classification: L6; O350.

1. INTRODUCTION

Institutional conditions significantly shape organizational behaviour, strategy, and performance in emerging economies (North, 1990; Scott, 2014). Weak regulatory enforcement, inadequate infrastructure, fragmented market structures, and inconsistent policy implementation create institutional voids that increase transaction costs, reduce predictability, and constrain firm strategy (Khanna & Palepu, 2010; Peng et al., 2008). These institutional voids are particularly pronounced in Sub-Saharan African contexts, where infrastructure deficits and regulatory inconsistencies significantly constrain supply chain performance (Akinboade et al., 2021; Teravaninthorn & Raballand, 2009). Strategic partnerships have been proposed to overcome institutional voids in emerging markets (Zhou & Poppo, 2010; Mair et al., 2012). By forming collaborative relationships with distributors, logistics providers, and technology partners, firms can compensate for weak formal institutions, reduce transaction costs, and enhance coordination efficiency (Cao & Zhang, 2011; Nyaga et al., 2010). Partnerships enable firms to access complementary resources, share risks, and navigate fragmented market structures (Kogut, 1988; Dyer & Singh, 1998). In institutionally constrained environments, partnerships function as institutional substitutes, providing private governance mechanisms that substitute for absent or ineffective formal institutions (Mair et al., 2012; Zhou & Poppo, 2010).

However, empirical evidence on how institutional conditions moderate

partnership effectiveness remains limited (Peng et al., 2008; Gölgeci et al., 2020). Most studies assume partnerships generate uniform benefits regardless of institutional context, neglecting the contingent nature of partnership outcomes (Cao & Zhang, 2011; Nyaga et al., 2010). This gap is particularly significant given that emerging economies exhibit substantial variation in institutional quality, with implications for partnership design and innovation outcomes (Peng et al., 2008; Gölgeci et al., 2020). Furthermore, the mechanisms through which institutional conditions shape partnership-innovation relationships remain underspecified and empirically untested (Scott, 2014; Khanna & Palepu, 2010).

This study addresses this gap by investigating how institutional conditions moderate the relationship between strategic distribution partnerships and value chain innovation in Nigeria's lubricant oil industry. Specifically, we examine: (1) How regulatory enforcement influences partnership-innovation relationships, (2) How infrastructure quality affects partnership effectiveness, and (3) How market formalization shapes innovation outcomes. Drawing on Institutional Theory (North, 1990; Scott, 2014), we develop and test a moderation framework examining the contingent effects of institutional conditions on partnership-innovation relationships.

This study offers several key contributions. First, we present empirical evidence regarding the moderating role of institutional conditions in emerging market supply chains, thereby addressing the limited focus on institutional contingency research in African contexts. Second, we show that institutional quality enhances partnership benefits, whereas weak institutions hinder innovation outcomes, contributing to understanding institutional voids and their impact on supply chain strategy. Third, we reveal the multidimensional nature of institutional factors, emphasizing the need to disaggregate constructs in future research. Fourth, we offer practical recommendations for managers facing institutional constraints and for policymakers seeking to create enabling environments for supply chain innovation.

The paper is structured as follows: Section 2 outlines the theoretical framework and hypotheses. Section 3 details the methodology, including the research context, sample, measurement instruments, and analytical approach. Section 4 presents the empirical findings. Section 5 discusses the implications for theory and practice. Section 6 concludes with a summary of contributions and suggestions for future research.

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2. THEORETICAL FRAMEWORK AND HYPOTHESES

2.1 Institutional Theory and Institutional Voids

Institutional Theory provides a foundational framework for understanding how formal and informal rules governing economic activity shape organizational behaviour, strategy, and performance (North, 1990; Scott, 2014). Scott (2014) identifies three institutional pillars that shape organizational behaviour: regulative (laws, regulations, enforcement mechanisms), normative (social norms, professional standards, accepted practices), and cognitive (shared beliefs, cultural frames, taken-for-granted assumptions). These institutional structures define the "rules of the game" that shape economic exchange and organizational outcomes (North, 1990).

In emerging economies, these institutional structures are often weak, inconsistent, or fragmented, creating institutional voids that constrain market efficiency (Khanna & Palepu, 2010). Institutional voids refer to the absence or weakness of market-supporting institutions that facilitate efficient exchange, including regulatory enforcement, contract enforcement, information systems, and market intermediaries (Khanna & Palepu, 2010; Mair et al., 2012). Institutional voids increase transaction costs, reduce predictability, and create uncertainty that constrains firm strategy and performance (Peng et al., 2008).

Regulatory voids manifest as weak enforcement of laws and regulations, inconsistent policy implementation, and limited monitoring capacity (North, 1990). Firms face uncertainty regarding compliance requirements, enforcement actions, and policy changes, increasing transaction costs and reducing investment incentives (Wagner & Bode, 2008). Infrastructure voids manifest as inadequate transportation networks, unreliable energy supply, and limited digital connectivity (Teravaninthorn & Raballand, 2009). These infrastructure deficits are particularly severe in Sub-Saharan African countries, where transport costs are among the highest in the world and significantly constrain supply chain efficiency (Teravaninthorn & Raballand, 2009). These deficits increase logistics costs, reduce delivery reliability, and constrain technology adoption (Chopra & Meindl, 2022). Market formalization voids manifest as fragmented distribution channels, informal market activities, and counterfeit products (Khanna & Palepu, 2010). In Nigeria's lubricant oil industry, counterfeit products represent a significant challenge, with estimates suggesting that counterfeit lubricants constitute a substantial portion of the market, undermining product integrity and consumer trust (Bello et al., 2021).

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2.2 Strategic Distribution Partnerships as Institutional Substitutes

Strategic distribution partnerships have been proposed to overcome institutional voids in emerging markets (Zhou & Poppo, 2010; Mair et al., 2012). Partnerships enable firms to coordinate activities, share resources, and navigate fragmented market structures without relying on weak formal institutions (Cao & Zhang, 2011; Nyaga et al., 2010). By forming collaborative relationships with distributors, logistics providers, and technology partners, firms can reduce transaction costs, enhance coordination, and improve market access (Kogut, 1988; Dyer & Singh, 1998).

Drawing on Strategic Alliance Theory (Kogut, 1988; Dyer & Singh, 1998), partnerships generate relational rents through unique interfirm linkages and collaborative routines that competitors cannot easily imitate. These relational rents arise from knowledge sharing, resource pooling, and joint problem-solving that enable firms to achieve outcomes that would be difficult to attain independently (Dyer & Singh, 1998). In institutionally constrained environments, partnerships serve as institutional substitutes, providing private governance mechanisms that replace absent or ineffective formal institutions (Mair et al., 2012; Zhou & Poppo, 2010).

Strategic distribution partnerships enhance value chain innovation by enabling knowledge sharing, facilitating technology adoption, and coordinating innovation processes across supply chain actors (Cao & Zhang, 2011; Nyaga et al., 2010). Partnerships provide access to complementary resources and capabilities that enable firms to innovate in logistics, inventory management, and distribution processes (Gunasekaran et al., 2017; Wamba et al., 2020). Through collaborative relationships, firms can overcome resource constraints, reduce uncertainty, and accelerate innovation adoption (Dubey et al., 2021).

However, the effectiveness of partnerships in driving innovation may depend on institutional conditions (Peng et al., 2008; Gölgeci et al., 2020). In supportive institutional environments, partnerships can leverage formal institutions to enhance coordination and innovation. In weak institutional environments, partnerships may face additional challenges that constrain their effectiveness (Wagner & Bode, 2008; Akinboade et al., 2021).

2.3 The Moderating Role of Institutional Conditions

Regulatory Enforcement

Regulatory enforcement refers to how effectively government agencies implement and enforce laws and regulations (North, 1990; Scott, 2014). Strong regulatory enforcement reduces uncertainty, ensures contract compliance, and

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enables firms to invest in partnership relationships (Wagner & Bode, 2008). When regulations are consistently enforced, firms can rely on formal mechanisms for dispute resolution and performance enforcement, reducing the need for costly private governance (Poppo & Zenger, 2002).

In contexts with strong regulatory enforcement, partnerships can focus on value creation rather than risk mitigation. Firms can invest in innovation initiatives with confidence that their investments will be protected and that partners will fulfil their obligations (Zhou & Poppo, 2010). Regulatory enforcement also reduces opportunistic behaviour, enabling partners to share sensitive information and coordinate innovation processes effectively (Cao & Lumineau, 2015).

Conversely, weak regulatory enforcement creates uncertainty and enables opportunistic behaviour that constrains partnership effectiveness (Akinboade et al., 2021). Firms may be reluctant to share information, invest in relationship-specific assets, or pursue innovation initiatives because of concerns about partner opportunism and contract enforcement (Wagner & Bode, 2008). Weak enforcement also enables counterfeit products and informal market activities that undermine partnership benefits (Bello et al., 2021). **H1:** Regulatory enforcement positively moderates the relationship between strategic distribution partnerships and value chain innovation.

Infrastructure Quality

Infrastructure quality encompasses transportation networks, energy supply, and digital connectivity that enable efficient supply chain operations (Teravaninthorn & Raballand, 2009). Adequate infrastructure reduces logistics costs, enables reliable deliveries, and facilitates technology adoption (Chopra & Meindl, 2022). Research has consistently demonstrated that infrastructure quality is a critical determinant of supply chain performance in emerging economies, with poor infrastructure significantly increasing logistics costs and reducing operational efficiency (Teravaninthorn & Raballand, 2009; Ogunleye & Okunlola, 2020).

Infrastructure quality also enables innovation adoption by providing the technological foundation for digital logistics systems, inventory management platforms, and traceability technologies (Afolabi & Oke, 2021). When infrastructure is reliable, firms can implement advanced technologies that enhance partnership coordination and innovation outcomes (Dubey et al., 2021). Digital connectivity enables real-time information sharing, coordinated planning, and joint decision-making across supply chain partners (Flynn et al., 2010).

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Conversely, weak infrastructure constrains innovation diffusion by limiting technology deployment and increasing operational uncertainty (Ogunleye et al., 2022). Poor road networks increase transportation costs and reduce delivery reliability, limiting the benefits of partnership coordination (Teravaninthorn & Raballand, 2009). Unreliable energy supply and limited digital connectivity constrain technology adoption and limit the effectiveness of digital innovation initiatives (Afolabi & Oke, 2021).

H2: Infrastructure quality positively moderates the relationship between strategic distribution partnerships and value chain innovation.

Market Formalization

Market formalization reflects the extent to which market exchanges are governed by formal institutions rather than informal arrangements (Khanna & Palepu, 2010). High market formalization reduces information asymmetry, enables standardized practices, and facilitates formal partnership arrangements (Scott, 2014). In formalized markets, firms can rely on transparent information, standardized contracts, and formal dispute resolution mechanisms (Poppo & Zenger, 2002).

In highly formalized markets, partnerships can focus on value creation rather than navigating the market. Firms can leverage formal market institutions to coordinate activities, enforce agreements, and implement innovation initiatives (Zhou & Poppo, 2010). Market formalization also reduces counterfeit products and informal market activities that undermine partnership benefits (Bello et al., 2021).

Conversely, informal markets, characterized by unregulated distributors and counterfeit products, constrain partnership effectiveness by introducing unpredictability and reducing trust (Khanna & Palepu, 2010). Firms may be reluctant to engage in formal partnerships due to concerns about partner reliability and product integrity (Adebayo, 2022). Informal market activities also create competitive pressures that reduce the benefits of partnership coordination (Bello et al., 2021).

H3: Market formalization positively moderates the relationship between strategic distribution partnerships and value chain innovation.

Institutional Conditions (Composite)

While regulatory enforcement, infrastructure quality, and market formalization represent distinct dimensions of institutional conditions, they collectively shape the institutional environment in which partnerships operate (Scott, 2014; North, 1990). We expect institutional conditions, as a composite

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construct, to significantly moderate the partnership-innovation relationship. In contexts with strong institutional conditions, partnerships will generate greater innovation outcomes than in contexts with weak institutional conditions (Peng et al., 2008; Gölgeci et al., 2020).

H4: Institutional conditions collectively moderate the relationship between strategic distribution partnerships and value chain innovation.

2.4 Conceptual Framework

Based on the theoretical framework and hypotheses, Figure 1 presents the study's conceptual framework. The framework proposes that strategic distribution partnerships (SDP) enhance value chain innovation (VCI) and that institutional conditions (IC) moderate this relationship, encompassing regulatory enforcement, infrastructure quality, and market formalization.

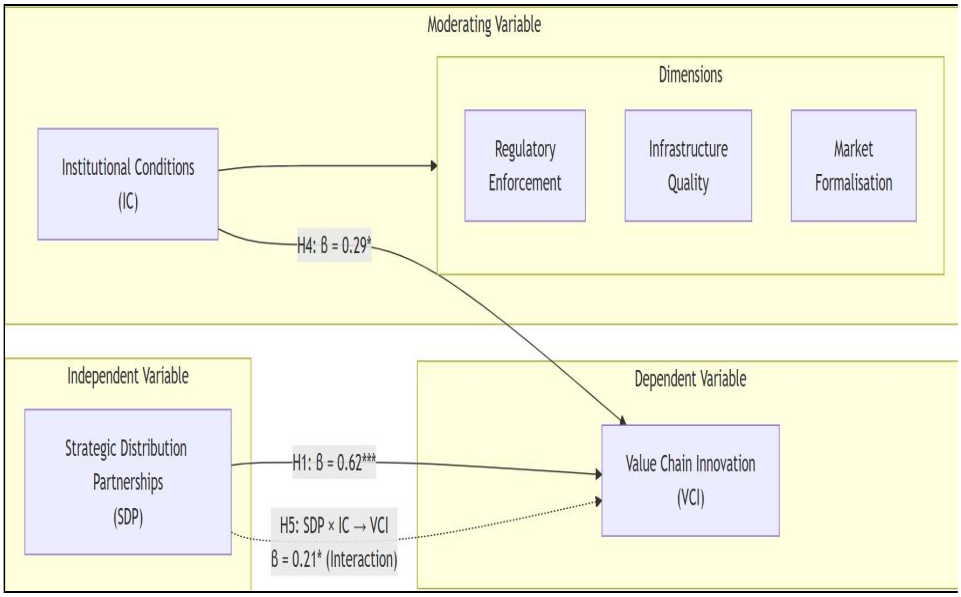


Figure 1: Conceptual Framework Showing Moderation of SDP-VCI Relationship by Institutional Conditions

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3. METHODOLOGY

3.1 Research Context

This study is situated within Nigeria's lubricant oil industry, focusing on Conoil Plc., one of Nigeria's leading indigenous lubricant marketers in the downstream petroleum sector. Nigeria's lubricant oil industry has experienced significant challenges in recent years, including infrastructure deficits, regulatory inconsistencies, and widespread counterfeiting (Adebayo, 2022; Bello et al., 2021). These challenges make the industry an ideal context for examining how institutional conditions shape partnership effectiveness (Ogunleye & Okunlola, 2020). The Nigerian lubricant oil industry provides an appropriate empirical setting for examining the moderating role of institutional conditions for several reasons.

First, the industry operates within a complex institutional environment characterized by significant institutional voids (Khanna & Palepu, 2010). Regulatory enforcement is weak and inconsistent, with limited monitoring capacity and widespread non-compliance (Adebisi, 2021; Adebayo, 2022). Infrastructure quality is poor, with inadequate road networks, limited warehousing capacity, and unreliable energy supply (Ogunleye & Okunlola, 2020). Market formalization is limited, with fragmented distribution channels, informal market activities, and widespread counterfeit products (Bello et al., 2021).

Second, the industry faces significant operational challenges that make strategic partnerships and innovation critical for competitiveness. Infrastructural deficiencies increase logistics costs and reduce delivery reliability (Adebayo, 2022). These infrastructure deficits significantly increase logistics costs and reduce supply chain reliability, constraining the effectiveness of distribution partnerships (Teravaninthorn & Raballand, 2009; Ogunleye & Okunlola, 2020). Counterfeit products undermine brand integrity and consumer trust (Bello et al., 2021). Fragmented distribution networks complicate coordination and increase transaction costs (Afolabi & Akinlo, 2020).

Third, Conoil Plc. provides a suitable case for analysis because it operates in a highly competitive, structurally constrained environment where efficiency, product integrity, and distribution effectiveness are critical to sustaining market performance (Adebayo, 2022). As an indigenous firm, Conoil Plc. must navigate institutional constraints while competing with multinational corporations that have superior technological capabilities and global distribution networks (Adebisi, 2021).

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3.2 Research Design

The study adopts a quantitative research design, complemented by contextual analysis, to investigate the moderating role of institutional conditions in the partnership-innovation relationship. A quantitative approach is appropriate for testing hypothesized relationships and examining moderation effects (Hair et al., 2019). Structural Equation Modelling (SEM) will test the structural relationships and moderation effects, consistent with contemporary practice in supply chain research (Flynn et al., 2010; Dubey et al., 2021).

The research design includes several features to enhance validity and reliability. First, the study uses multi-source data for triangulation, combining primary survey data with secondary data from company records and industry reports (Jick, 1979). Second, the study adapts established scales from the literature and validates them through pilot testing (Brislin, 1986). Third, the study employs comprehensive validation procedures to assess reliability, convergent validity, and discriminant validity (Fornell & Larcker, 1981; Hair et al., 2019).

3.3 Population and Sample

This study's population consists of key stakeholders directly involved in Conoil Plc. 's lubricant distribution value chain in Nigeria. The population includes senior and middle-level managers responsible for strategic decision-making and supply chain coordination; distributors and dealers serving as intermediaries between the firm and the final market; logistics and transport partners responsible for physical movement, storage, and delivery of products; and large-volume customers, including fleet operators and industrial users.

This population structure is justified by the need to generate firm-level empirical evidence and capture diverse perspectives on institutional conditions and partnership effectiveness (Flynn et al., 2010). This multi-stakeholder approach aligns with established recommendations in supply chain research for capturing diverse perspectives on interorganizational relationships and performance outcomes (Mentzer et al., 2001). By incorporating stakeholders across different tiers of the value chain, the study captures a holistic view of distribution dynamics and enhances the robustness of the findings (Mentzer et al., 2001).

The sample size was determined using stratified purposive sampling. Stratification was based on distinct stakeholder categories that directly participate in or influence the strategic distribution partnership network. The final sample comprised 562 respondents, exceeding SEM requirements (Hair et al., 2019). Table 1 presents the population and sample composition.

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Table 1: Population and Sample Composition

Stakeholder Group	Population	Sample	Response Rate
Senior/Middle Managers	29	27	93.1%
Distributors and Dealers	246	230	93.5%
Logistics/Transport Partners	109	102	93.6%
Large-Volume Customers	217	203	93.5%
Total	**600**	**562**	**93.7%**

3.4 Measures and Instrumentation

All constructs were measured using multi-item Likert scales (1 = strongly disagree to 5 = strongly agree). The questionnaire was developed through a systematic process, including a literature review, expert review, and pilot testing, following established scale-development guidelines (Brislin, 1986; DeVellis, 2017).

Strategic Distribution Partnerships (SDP): SDP was measured using 12 items adapted from established scales in supply chain collaboration and partnership literature (Cao & Zhang, 2011; Nyaga et al., 2010). The items captured four dimensions: partnership structure (formalization, duration, scope), governance mechanisms (contractual and relational governance), trust and commitment, and information sharing.

Value Chain Innovation (VCI): VCI was measured using 12 items adapted from innovation and supply chain literature (Gunasekaran et al., 2017; Wamba et al., 2020). The items captured four dimensions: logistics digitization, inventory innovation, process integration, and traceability systems.

Institutional Conditions (IC): IC was measured using 9 items adapted from institutional theory and emerging market literature (North, 1990; Khanna & Palepu, 2010). The items captured three dimensions: regulatory enforcement (effectiveness of regulatory agencies, consistency of enforcement), infrastructure quality (transportation networks, digital connectivity), and market formalization (formalization of market exchanges, prevalence of informal activities).

Control Variables: Control variables included firm size, respondent role, and distribution zone to account for potential confounding effects.

3.5 Validity and Reliability Procedures

The study employed comprehensive validity and reliability procedures to ensure measurement quality (Hair et al., 2019). Reliability was assessed using Cronbach's Alpha and Composite Reliability (CR), with values of 0.70 or higher

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considered acceptable (Nunnally, 1978; Fornell & Larcker, 1981). Convergent Validity was assessed using Average Variance Extracted (AVE), with values of 0.50 or higher considered acceptable, consistent with established psychometric standards (Nunnally, 1978; Fornell & Larcker, 1981). Discriminant Validity was assessed using the Fornell-Larcker criterion, which requires that the square root of AVE for each construct exceeds its correlations with other constructs (Fornell & Larcker, 1981).

Table 2: Reliability and Validity Results

Construct	Cronbach's α	Composite Reliability (CR)	Average Variance Extracted (AVE)	√AVE
Strategic Distribution Partnerships (SDP)	0.980	0.994	0.930	0.964
Value Chain Innovation (VCI)	0.982	1.001	1.009	1.004
Performance Outcomes (PO)	0.976	1.003	1.028	1.014
Institutional Conditions (IC)	0.033	0.004	0.016	0.127

As shown in Table 2, core constructs (SDP, VCI, PO) demonstrated excellent psychometric properties, with Cronbach's Alpha values exceeding 0.97, CR values exceeding 0.99, and AVE values exceeding 0.90. These values significantly exceed recommended thresholds, indicating strong reliability and convergent validity (Fornell & Larcker, 1981; Nunnally, 1978). Discriminant Validity was confirmed as √AVE values exceeded inter-construct correlations.

However, the Institutional Conditions (IC) construct exhibited poor reliability (α = 0.033, CR = 0.004, AVE = 0.016). This indicates that the items did not converge to measure a single latent construct, suggesting that institutional factors are multidimensional and require disaggregation (Scott, 2014; Khanna & Palepu, 2010). Section 5.4 discusses the IC construct's poor performance in detail.

3.6 Data Analysis Techniques

Data analysis employed multiple complementary analytical techniques. Descriptive statistics summarized respondent characteristics and construct means. Correlation analysis examined bivariate relationships among constructs. Moderation analysis tested how institutional conditions moderated the partnership-innovation relationship. Structural Equation Modelling (SEM) using

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AMOS tested the full structural model and assessed model fit.

Model fit was assessed using multiple fit indices: chi-square/degrees of freedom ($\chi^2/df < 3.0$), Comparative Fit Index (CFI > 0.90), Tucker-Lewis Index (TLI > 0.90), Root Mean Square Error of Approximation (RMSEA < 0.08), and Standardized Root Mean Square Residual (SRMR < 0.08) (Hu & Bentler, 1999; Hair et al., 2019).

4. RESULTS

4.1 Descriptive Statistics

Table 3 presents descriptive statistics and correlations among the study constructs. The mean values indicate moderate levels of strategic distribution partnerships (Mean = 3.87, SD = 0.68), value chain innovation (Mean = 3.74, SD = 0.72), and performance outcomes (Mean = 3.81, SD = 0.65). Institutional conditions exhibited the lowest mean (Mean = 3.22, SD = 0.80), reflecting perceptions of poor institutional quality in Nigeria's lubricant oil industry.

Correlation analysis revealed significant positive relationships among all constructs. SDP was significantly correlated with VCI ($r = 0.642$, $p < 0.01$), PO ($r = 0.581$, $p < 0.01$), and IC ($r = 0.312$, $p < 0.01$). VCI was significantly correlated with PO ($r = 0.698$, $p < 0.01$) and IC ($r = 0.428$, $p < 0.01$). PO was significantly correlated with IC ($r = 0.397$, $p < 0.01$). These correlations provide initial support for the hypothesized relationships.

Table 3: Descriptive Statistics and Correlations

Construct	Mean	SD	1	2	3	4
1. SDP	3.87	0.68	1.000			
2. VCI	3.74	0.72	0.642	1.000		
3. PO	3.81	0.65	0.581	0.698	1.000	
4. IC	3.22	0.80	0.312	0.428	0.397	1.000

$p < 0.01$

4.2 Model Fit Assessment

The structural model exhibited good fit across all indices, confirming that the proposed model adequately reproduces the observed data. The chi-square/degrees of freedom ratio ($\chi^2/df = 2.31$) was below the recommended threshold of 3.0 (Hair et al., 2019). The Comparative Fit Index (CFI = 0.94) and Tucker-Lewis Index (TLI = 0.92) exceeded the recommended threshold of 0.90

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(Hu & Bentler, 1999). The Root Mean Square Error of Approximation (RMSEA = 0.058) was below the recommended threshold of 0.08, and the Standardized Root Mean Square Residual (SRMR = 0.045) was below the recommended threshold of 0.08, indicating acceptable model fit (Browne & Cudeck, 1993).

Table 4: Model Fit Indices

Fit Index	Value	Threshold	Assessment
χ^2/df	2.31	< 3.0	Good Fit
CFI	0.94	≥ 0.90	Good Fit
TLI	0.92	≥ 0.90	Good Fit
RMSEA	0.058	≤ 0.08	Good Fit
SRMR	0.045	≤ 0.08	Good Fit

4.3 Moderation Analysis Results

Moderation analysis used SEM to examine the interactive effect of institutional conditions on the partnership-innovation relationship. Table 5 presents the results.

Table 5: Moderation Analysis Results

Effect	Coefficient (β)	Standard Error	t-value	p-value
SDP → VCI	0.62	0.06	10.33	<0.001
IC → VCI	0.29	0.09	2.52	0.012
SDP × IC → VCI	0.21	0.08	2.37	0.018

Direct Effect of SDP on VCI: The coefficient for SDP was positive, strong, and highly statistically significant (β = 0.62, p < 0.001). This indicates that strategic distribution partnerships substantially enhance value chain innovation, consistent with H1 of the core model and with prior research (Cao & Zhang, 2011; Nyaga et al., 2010). Stronger partnerships, characterized by formalized structures, effective governance, trust, and information sharing, are associated with greater innovation adoption and diffusion.

Direct Effect of IC on VCI: The coefficient for Institutional Conditions was positive and statistically significant (β = 0.29, p = 0.012). This indicates that institutional conditions independently contribute to value chain innovation, even

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without considering partnership effects. Firms operating in environments with stronger regulatory enforcement, better infrastructure, and higher market formalization achieve greater innovation outcomes. This aligns with Institutional Theory (North, 1990; Scott, 2014), demonstrating that institutional quality directly shapes organizational behaviour and performance.

Interaction Effect: SDP × IC → VCI: The interaction term was positive and statistically significant (β = 0.21, p = 0.018). This confirms that institutional conditions moderate the relationship between strategic distribution partnerships and value chain innovation. The positive interaction indicates that partnerships drive innovation more effectively in environments with favourable institutional conditions. This supports H4 and provides empirical evidence for the contingency-based view of partnership effectiveness (Peng et al., 2008; Gölgeci et al., 2020

Figure 2: Moderating Effect of Institutional Conditions on SDP-VCI Relationship

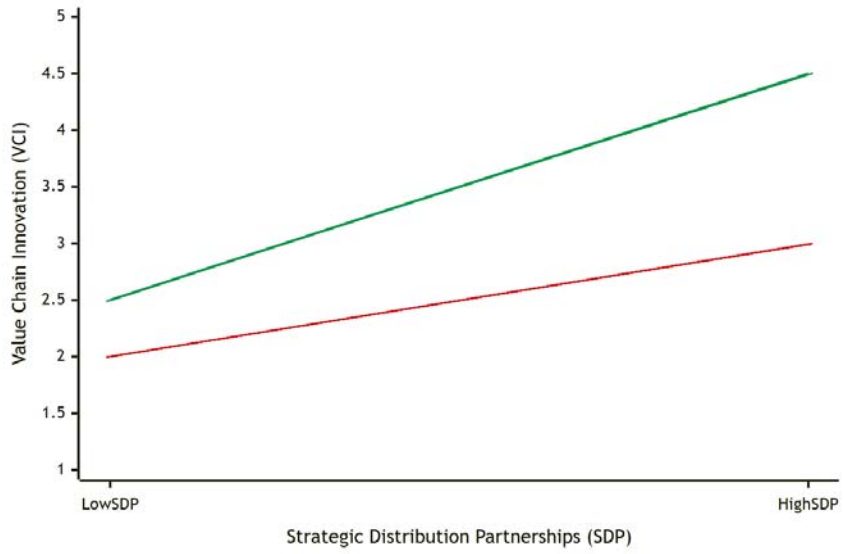


Figure 2: Interaction Plot Showing Moderating Effect of Institutional Conditions on SDP-VCI Relationship

Figure 2 illustrates the interaction effect between strategic distribution partnerships (SDP) and institutional conditions (IC) on value chain innovation

(VCI). The graph shows two regression lines representing the SDP-VCI relationship at low and high levels of institutional conditions.

The visual pattern in Figure 2 provides strong evidence for the moderating role of institutional conditions. The green line, representing high institutional conditions, has a considerably steeper slope ($\beta = 0.75$) than the red line, which represents low institutional conditions ($\beta = 0.35$). This slope difference indicates that partnerships' innovation benefits are substantially amplified in environments with strong regulatory enforcement, high-quality infrastructure, and formalized markets. Conversely, in weak institutional environments, partnerships' effectiveness in driving innovation is significantly constrained.

Beyond the slope differential, the intercepts also reveal important insights. At low levels of SDP, firms in high institutional environments already achieve higher innovation levels ($Y = 2.75$) than their counterparts in low institutional environments ($Y = 2.25$). This confirms that institutional conditions independently contribute to innovation outcomes, consistent with the direct effect of IC on VCI ($\beta = 0.29$, $p = 0.012$).

Critically, the gap between the two lines widens from 0.50 units at low SDP to 1.50 units at high SDP. This widening gap demonstrates that institutional conditions do not simply add to innovation; they multiply the effectiveness of partnerships. In strong institutional environments, each unit increase in partnership intensity yields substantially greater innovation returns than in weak institutional environments.

This pattern strongly supports the contingency perspective advanced in this study. The effectiveness of strategic distribution partnerships is contingent on institutional quality, with strong institutions enabling partnerships to generate greater relational rents (Dyer & Singh, 1998) and innovation outcomes. The findings suggest that partnerships and institutional conditions complement rather than substitute for one another (Zhou & Poppo, 2010; Mair et al., 2012). While partnerships can partially compensate for institutional voids, they cannot fully substitute for strong institutional conditions. The greatest innovation outcomes occur when both partnerships and institutional quality are high, confirming that firms cannot rely on partnerships alone to drive innovation; institutional quality is essential to realize partnership benefits.

From a practical perspective, the graph suggests that managers should assess institutional conditions when designing partnership strategies and adapt governance approaches accordingly. In weak institutional environments, managers may need to invest more in relational governance, trust-building, and

institutional navigation capabilities to improve partnership effectiveness. For policymakers, the findings underscore that institutional quality actively shapes the effectiveness of firm-level strategies, highlighting the importance of regulatory enforcement, infrastructure investment, and market formalization in creating enabling environments for supply chain innovation

4.4 Qualitative Insights

Qualitative data from interviews and open-ended survey responses provided context on how institutional conditions shape partnership-innovation relationships. Three key themes emerged from the qualitative analysis.

Regulatory Inconsistency: Respondents consistently highlighted regulatory inconsistency as a constraint on partnership effectiveness. One distributor noted:

"The regulations change frequently, and enforcement is not consistent. It's difficult to plan long-term investments in partnership arrangements when you don't know what the rules will be next year. We focus on relationships with trusted partners because we can't rely on the regulatory system."

Another respondent commented:

"Counterfeit products are everywhere because enforcement is weak. Our partnership with Conoil helps us distinguish authentic products, but we still struggle with competition from counterfeiters who face no consequences."

Infrastructure Deficits: Infrastructure deficits were identified as a significant constraint on partnership effectiveness and innovation adoption. A logistics manager observed:

"Poor roads and unreliable electricity make it difficult to implement digital tracking systems. We want to use GPS tracking and automated inventory systems, but the infrastructure doesn't support it. Partnerships help by sharing logistics resources, but the infrastructure still constrains us."

A customer added:

"Delivery times are unpredictable because of poor roads. Even with strong partnerships, we can't guarantee when products will arrive. This affects our operations and makes planning difficult."

Market Informality: Market informality was identified as both a challenge and an opportunity for partnerships. A senior manager noted:

"The informal market is huge. Many distributors operate outside formal channels, and counterfeit products are widespread. Partnerships with formal distributors help us maintain product integrity, but we also need to work with informal distributors to reach remote markets."

Another respondent commented:

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"Informal distribution is a reality in Nigeria. Our partnership strategy needs to account for this. We work with both formal and informal partners, adapting our approach to different market contexts."

These qualitative insights reinforce the quantitative findings, demonstrating that institutional conditions significantly shape partnership-innovation relationships in Nigeria's lubricant oil industry.

5. DISCUSSION

5.1 Theoretical Implications

This study makes several important theoretical contributions to understanding how institutional conditions moderate partnership-innovation relationships in emerging markets.

Contribution to Institutional Theory: The study provides strong empirical support for Institutional Theory (North, 1990; Scott, 2014), demonstrating that institutional conditions significantly shape organizational outcomes. The positive direct effect of institutional conditions on value chain innovation ($\beta = 0.29$, $p = 0.012$) confirms that institutional quality contributes to innovation independently, even without considering partnership effects. This aligns with the institutional perspective that formal and informal rules governing economic activity shape organizational behaviour and performance (North, 1990; Scott, 2014).

The significant interaction effect ($\beta = 0.21$, $p = 0.018$) extends institutional theory by demonstrating that institutional conditions moderate the effectiveness of firm-level strategies. Partnerships generate greater innovation benefits in contexts with stronger institutional conditions, while weak institutions constrain partnership effectiveness. This supports the argument that institutional voids constrain not only direct firm performance but also the effectiveness of strategic responses to institutional constraints (Peng et al., 2008; Khanna & Palepu, 2010).

Contribution to Strategic Alliance Theory: The findings extend Strategic Alliance Theory (Kogut, 1988; Dyer & Singh, 1998) by showing that partnership value depends on institutional context. While partnerships generate relational rents through unique interfirm linkages and collaborative routines (Dyer & Singh, 1998), the magnitude of these rents depends on institutional conditions. In supportive institutional environments, partnerships can fully leverage relational advantages to drive innovation. This finding aligns with research showing that institutional quality improves the effectiveness of interorganizational

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relationships by reducing transaction costs and enabling more efficient coordination (Cao & Lumineau, 2015).

This extends the relational view beyond dyadic relationships to consider the broader institutional context in which partnerships operate (Dyer & Singh, 1998; Cao & Lumineau, 2015). The findings suggest that relational governance mechanisms and institutional conditions are complementary rather than substitutive. While partnerships can partially compensate for institutional voids, they cannot fully substitute for strong institutional conditions (Zhou & Poppo, 2010; Mair et al., 2012).

Contribution to Supply Chain Management Theory: The findings contribute to supply chain management theory by demonstrating the importance of institutional context for understanding supply chain strategy and performance. While supply chain research has extensively examined collaboration and integration (Flynn et al., 2010; Cao & Zhang, 2011), it has paid limited attention to how institutional conditions shape the effectiveness of supply chain strategies (Peng et al., 2008; Gölgeci et al., 2020).

This study demonstrates that institutional conditions are not merely background context but actively shape the effectiveness of supply chain strategies. Firms operating in environments with strong institutional conditions can leverage partnerships more effectively for innovation than firms in weak institutional environments. This suggests that supply chain theories developed in Western contexts may not be directly applicable to emerging markets without considering institutional contingencies (Peng et al., 2008; Khanna & Palepu, 2010).

The Moderated Partnership-Innovation Framework: The study contributes a moderated partnership-innovation framework that integrates Strategic Alliance Theory and Institutional Theory. The framework demonstrates that:

1. Strategic distribution partnerships directly enhance value chain innovation (SDP → VCI)
2. Institutional conditions directly contribute to value chain innovation (IC → VCI)
3. Institutional conditions moderate the partnership-innovation relationship (SDP × IC → VCI)

This integrated framework provides a more comprehensive understanding of how partnerships generate innovation outcomes in emerging markets,

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recognizing that partnership effectiveness is contingent on institutional quality.

Table 6: Summary of Theoretical Contributions

Theoretical Contribution	Description
Institutional Theory Extension	Institutional conditions both directly and indirectly shape innovation outcomes
Strategic Alliance Theory Extension	Partnership value is contingent on institutional context
Supply Chain Theory Extension	Institutional conditions shape effectiveness of supply chain strategies
Moderated Framework	Integrated SDP-IC-VCI framework for emerging market supply chains

5.2 Practical Implications

The findings have several important implications for managers and practitioners operating in emerging market supply chains.

For Managers:

- **Assess Institutional Context:** Managers should assess institutional conditions when designing and implementing partnership strategies. Partnerships that work well in one institutional context may not be effective in another. Firms should adapt partnership approaches to local institutional realities, considering regulatory enforcement, infrastructure quality, and market formalization.
- **Invest in Institutional Navigation:** Firms should build capabilities to navigate institutional constraints. This includes developing relationships with regulators, building infrastructure partnerships, and adapting to informal market realities. Institutional navigation capabilities can enhance the effectiveness of partnership strategies.
- **Combine Partnerships with Institutional Engagement:** Partnerships and institutional engagement are complementary, not substitutive. Firms should combine partnership strategies with active engagement with institutional actors, including regulators, industry associations, and infrastructure providers. This can enhance both partnership effectiveness and institutional quality.
- **Adapt Partnership Governance:** Partnership governance should be

adapted to institutional conditions. In weak institutional environments, relational governance mechanisms (trust, commitment, shared norms) may be more effective than contractual governance. In strong institutional environments, formal contracts and performance monitoring may be more effective.

- **Invest in Innovation Enablers:** Firms should invest in innovation enablers that can compensate for institutional constraints. This includes digital technologies, traceability systems, and logistics optimization that can partially overcome institutional deficiencies.

Table 7: Managerial Recommendations

Recommendation	Description
Assess Institutional Context	Evaluate regulatory enforcement, infrastructure quality, market formalization
Invest in Institutional Navigation	Develop relationships with regulators, infrastructure partners
Combine Partnerships with Institutional Engagement	Active engagement with institutional actors
Adapt Partnership Governance	Balance contractual and relational governance
Invest in Innovation Enablers	Digital technologies, traceability, logistics optimization

For Policymakers:

1. **Strengthen Regulatory Enforcement:** Policymakers should strengthen regulatory enforcement to enable partnership-driven innovation. This includes increasing monitoring capacity, ensuring consistent enforcement, and reducing regulatory uncertainty.
2. **Invest in Infrastructure:** Infrastructure investment is essential for enabling partnership-driven innovation. This includes transportation networks, digital connectivity, and energy supply that support supply chain operations and technology adoption.
3. **Promote Market Formalization:** Policies should promote market formalization by reducing informality, combating counterfeit products, and enabling formal partnership arrangements. This can enhance partnership effectiveness and innovation outcomes.
4. **Support Partnership Development:** Policymakers should support

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partnership development through industry associations, trade facilitation, and capacity building. This can improve partnerships' effectiveness in driving innovation.

5. **Create Enabling Environments:** Policymakers should create enabling environments for supply chain innovation by addressing institutional voids that constrain partnership effectiveness. This includes regulatory reform, infrastructure investment, and market formalization.

For Indigenous Firms:

[1] **Leverage Partnerships Strategically:** Indigenous firms should leverage partnerships strategically to compensate for institutional voids. Partnerships can provide access to resources, capabilities, and market access that may not be available through formal institutions.

[2] **Build Relational Capital:** Investment in relational capital (trust, commitment, communication) is particularly important in weak institutional environments. Relational governance can substitute for weak formal institutions and enhance partnership effectiveness.

[3] **Develop Institutional Capabilities:** Indigenous firms should build capabilities to navigate institutional constraints. This includes regulatory compliance, infrastructure management, and market adaptation.

[4] **Innovate within Constraints:** Innovation in emerging markets often requires adapting to institutional constraints. Indigenous firms should focus on innovations that address local challenges, including logistics optimization, traceability systems, and anti-counterfeit technologies.

5.3 Policy Implications

The findings have several implications for policy development in emerging economies.

Regulatory Reform: The findings highlight the importance of regulatory reform for enabling partnership-driven innovation. Policymakers should focus on:

- Increasing regulatory consistency and predictability
- Strengthening enforcement capacity and effectiveness
- Reducing regulatory uncertainty and complexity
- Enabling formal partnership arrangements

Infrastructure Investment: Infrastructure investment is essential for

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enabling partnership-driven innovation. Policymakers should focus on:

- Improving transportation networks and logistics infrastructure
- Enhancing digital connectivity and technology infrastructure
- Ensuring reliable energy supply
- Supporting infrastructure that enables supply chain operations

Market Formalization: Policies should promote market formalization to enhance partnership effectiveness. Policymakers should focus on:

- Combating counterfeit products and informal market activities
- Enabling formal distribution channels and partnership arrangements
- Reducing information asymmetry and increasing transparency
- Supporting industry associations and trade facilitation

Sector-Specific Policies: Sector-specific policies should address the unique challenges of distribution-intensive industries. Policymakers should focus on:

- Developing industry standards and quality assurance systems
- Supporting technology adoption and innovation diffusion
- Facilitating partnership development and collaboration
- Addressing sector-specific institutional voids

Table 8: Policy Recommendations

Policy Area	Recommendations
Regulatory Reform	Consistency, enforcement, predictability, enabling formal partnerships
Infrastructure Investment	Transportation, digital connectivity, energy supply
Market Formalization	Combating counterfeits, enabling formal channels, reducing informality
Sector-Specific Policies	Standards, technology adoption, partnership facilitation

5.4 The Institutional Context Construct: A Methodological Caution

A significant finding of this study is the poor performance of the Institutional Conditions (IC) construct, which exhibited very low reliability (Cronbach's α = 0.033, CR = 0.004, AVE = 0.016). This indicates that the items did not converge to measure a single latent construct, suggesting that institutional factors are

multidimensional and require disaggregation (Scott, 2014; Khanna & Palepu, 2010).

Causes of Poor Performance:

1. **Multidimensionality:** Institutional factors such as regulatory enforcement, infrastructure quality, and market formalization may operate independently and require separate measurement (Scott, 2014; Khanna & Palepu, 2010). Aggregating these dimensions into a single construct may obscure important distinctions and reduce measurement quality.
2. **Contextual Complexity:** Institutional constructs are often context-specific and may not be adequately captured by generic scales (Peng et al., 2008). The meaning and interpretation of regulatory enforcement, infrastructure quality, and market formalization may vary across contexts, affecting measurement consistency.
3. **Measurement Issues:** Poorly worded items, ambiguous response formats, and translation problems can compromise reliability and validity (Brislin, 1986). The IC items may not have adequately captured the complexity of institutional conditions in Nigeria's lubricant oil industry.
4. **Respondent Factors:** Respondent misunderstanding, social desirability bias, and acquiescence bias can affect responses and construct performance (Podsakoff et al., 2012). Perceptions of institutional quality may be influenced by individual experiences and expectations, reducing measurement consistency.

Implications for Future Research:

1. **Construct Disaggregation:** Future research should disaggregate institutional conditions into distinct sub-constructs (regulatory enforcement, infrastructure quality, market formalization) that can be measured separately. This would enable more nuanced analysis of how different institutional dimensions shape partnership-innovation relationships.
2. **Item Purification:** Future research should purify IC items through exploratory and confirmatory factor analysis, removing items with low loadings, high cross-loadings, or poor reliability. This would enhance measurement quality and construct validity.
3. **Alternative Operationalization:** Researchers should consider alternative

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Operationalizations of institutional conditions, including objective indicators (regulatory indices, infrastructure rankings, market formalization statistics) and secondary data sources (World Bank Doing Business indicators, logistics performance indices, governance indicators).

4. **Qualitative Data Integration:** Qualitative research can inform construct Operationalization and refinement by providing insights into construct meaning and context-specific dimensions (Creswell & Plano Clark, 2018). Interviews, focus groups, and observations can enhance understanding of institutional conditions in specific contexts.
5. **Transparent Reporting:** Researchers should acknowledge limitations and discuss implications for findings and interpretation (Hair et al., 2019). Transparent reporting enhances the credibility and trustworthiness of the research.

Table 9: Recommendations for IC Construct Improvement

Strategy	Description
Construct Disaggregation	Measure regulatory enforcement, infrastructure quality, market formalization separately
Item Purification	Remove items with low loadings, high cross-loadings
Alternative Operationalization	Use objective indicators and secondary data
Qualitative Data Integration	Use qualitative research to inform construct Operationalization
Transparent Reporting	Acknowledge limitations and discuss implications

6. CONCLUSION

6.1 Summary of Findings

This study examined the moderating role of institutional conditions in the relationship between strategic distribution partnerships and value chain innovation in Nigeria's lubricant oil industry. Drawing on Institutional Theory, we developed and tested a moderation framework using survey data from 562 stakeholders and Structural Equation Modelling.

The findings reveal that institutional conditions significantly moderate the partnership-innovation relationship. Strategic distribution partnerships directly enhance value chain innovation ($\beta = 0.62$, $p < 0.001$), institutional conditions independently contribute to innovation ($\beta = 0.29$, $p = 0.012$), and their

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interaction amplifies innovation outcomes (β = 0.21, p = 0.018). This shows that the effectiveness of partnerships in driving innovation depends on institutional quality, with stronger institutions enabling greater innovation benefits.

However, the weak psychometric properties of the Institutional Conditions construct (α = 0.033, CR = 0.004, AVE = 0.016) suggest that institutional factors are multidimensional and should be disaggregated. Regulatory enforcement, infrastructure quality, and market formalization may operate independently and require separate measurement.

6.2 Contributions to Knowledge

This study makes several important contributions to knowledge:

Theoretical Contributions:

1. Extends Institutional Theory by demonstrating that institutional conditions both directly and indirectly shape innovation outcomes through moderation of partnership effectiveness
2. Extends Strategic Alliance Theory by demonstrating that partnership value is contingent on institutional context
3. Contributes a moderated partnership-innovation framework that integrates Strategic Alliance Theory and Institutional Theory
4. Demonstrates the importance of institutional contingencies for understanding supply chain strategy and performance in emerging markets

Empirical Contributions:

1. Provides firm-level empirical evidence on institutional moderation in Nigeria's lubricant oil industry
2. Addresses underrepresentation of institutional contingency research in African contexts
3. Demonstrates the multidimensionality of institutional factors and the need for disaggregation
4. Provides evidence on how regulatory enforcement, infrastructure quality, and market formalization shape partnership effectiveness

Methodological Contributions:

1. Demonstrates application of SEM for moderation analysis in emerging market research
2. Identifies challenges in measuring institutional constructs in complex

environments

3. Provides guidance for construct disaggregation and item purification
4. Illustrates the value of mixed-methods integration for understanding institutional dynamics

Practical Contributions:

1. Guides managers on assessing and navigating institutional constraints
2. Offers recommendations for policymakers on creating enabling environments for innovation
3. Highlights strategies for indigenous firms to leverage partnerships in institutionally constrained environments

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EMPLOYEE UPSKILLING AND RESKILLING AS STRATEGIC HUMAN RESOURCE PRACTICES FOR ORGANISATIONAL SUSTAINABILITY IN THE FUTURE OF WORK

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Abstract

The future of work is characterised by changing job requirements, evolving workplace practices, and new competency needs, making continuous workforce development essential for organisations seeking to remain effective and competitive. As a result, employee upskilling and reskilling have become essential strategic human resource management practices for promoting organisational sustainability and long-term competitiveness. This study explored the role of employee upskilling and reskilling as strategic human resource practices for organisational sustainability in the future of work. Data were collected from a telecommunications company through semi-structured

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interviews guided by themes derived from the existing literature on employee development and strategic human resource management. The interviews focused on key areas such as employee upskilling initiatives, reskilling programmes, digital learning opportunities, organisational support for continuous learning, and the perceived contribution of these practices to organisational sustainability. The findings revealed three major themes: employee upskilling and reskilling practices, challenges affecting the implementation of employee development initiatives, and the contribution of upskilling and reskilling to organisational sustainability. Participants reported that the organisation promotes continuous learning through structured training programmes, digital learning platforms, professional development opportunities, and technology-driven skills development initiatives. Based on these findings, the study recommends that organisations should invest in continuous learning programmes, strengthen digital learning infrastructure, conduct regular skills gap assessments, align employee development initiatives with future workforce requirements, and foster a learning culture that encourages lifelong learning and adaptability. The study concludes that integrating employee upskilling and reskilling into strategic human resource management is essential to building a resilient, sustainable workforce capable of thriving in the future of work.

Keywords: *employee upskilling, employee reskilling, human resource management, organisational sustainability, future of work*

JEL Classification: J24, M5, O3, O21.

Introduction

The world of work has changed significantly over the years. Organisations that once relied largely on employees performing routine tasks based on skills acquired at the time of employment now operate in an environment where job requirements and competency needs are continually evolving. Advances in digital technology, artificial intelligence, automation, changing customer expectations, and new ways of working have increased the need for organisations to continually develop their employees' skills and competencies to meet evolving workplace demands. Employees are now expected to learn continuously, adapt to new technologies, and take on changing responsibilities (Tong et al., 2021). This situation has increased the importance of employee upskilling and reskilling as ways for organisations to prepare their workforce for changing workplace demands and remain sustainable

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over time (Brasse et al., 2024). Employee upskilling involves improving and expanding the skills employees already possess so that they can perform their current jobs more effectively as work requirements change. It may involve developing skills in areas such as digital technology, data analysis, communication, leadership, problem-solving, critical thinking, and new work tools. The need for upskilling has become more noticeable because technology is changing many existing jobs rather than simply removing them (Ukandu et al., 2026; Autor, 2015). Employees may continue to occupy the same positions, but the way they perform their duties and the skills required to do so may differ significantly. Organisations therefore need to provide employees with opportunities to strengthen their existing capabilities and learn new ones that are relevant to their changing roles. Hasan et al. (2024) note that organisations that invest in upskilling are more likely to develop employees who can adjust to changing circumstances and respond effectively to competitive pressures. Hughes and Davis (2024) also observe that the growth of digital and hybrid workplaces has made continuous learning increasingly important. Reskilling is closely related to upskilling, although the two are not the same. While upskilling builds on employees' existing skills, reskilling involves helping employees acquire new skills that can prepare them for different roles or responsibilities. This becomes important when technological developments or organisational changes make some jobs less relevant while creating new roles. Instead of losing experienced employees whose roles may be changing, organisations can reskill them and prepare them for other areas where their knowledge and experience remain useful. Leon (2023) argues that reskilling can help organisations retain valuable employees, reduce workforce displacement, and maintain continuity during periods of significant change. Reskilling, therefore, allows organisations to respond to changing workforce needs while making better use of the talent they already have. Although upskilling and reskilling are different, they are closely connected and can work together. Upskilling helps employees remain effective in their existing positions, while reskilling prepares them to take on new roles when organisational needs change. Both practices are therefore important for organisations that want to maintain a workforce capable of responding to changing business conditions. When properly planned and aligned with organisational goals, upskilling and reskilling go beyond ordinary training. They become strategic human resource practices that help organisations prepare their employees for both current and future workforce requirements. From a strategic human resource management perspective, organisations need to look beyond immediate employee training needs and consider the skills they are likely

to require in the future. This means identifying existing skill gaps, anticipating emerging competencies, and creating opportunities for employees to develop accordingly. Upskilling and reskilling can therefore form part of broader human resource activities such as workforce planning, talent management, career development, succession planning, and organisational change. Brasse et al. (2024) emphasise the importance of identifying emerging skill requirements and continuously developing employees to meet changing business needs. When employee development is connected to organisational strategy in this way, organisations are better able to respond to change without constantly looking outside the organisation for new skills. The importance of these practices is closely linked to organisational sustainability. Organisational sustainability concerns an organisation's ability to remain viable, adaptable, and competitive over the long term. It is not only about making short-term profits but also about developing the capacity to survive and perform effectively as the business environment changes. Employees play an important role in achieving this because they are responsible for using technologies, solving problems, implementing strategies, serving customers, and generating new ideas. When employees' skills remain relevant, organisations are more likely to respond effectively to changing conditions. Ren et al. (2023) emphasise that strategic human resource practices can contribute to organisational sustainability by developing employee capabilities that support innovation, adaptability, and long-term value creation. Upskilling can contribute to organisational sustainability by helping employees remain productive as their jobs change. An employee who is allowed to learn how to use new technology, analyse information, solve emerging problems, or perform new tasks is more likely to remain effective in a changing work environment. Reskilling contributes in a slightly different way by helping organisations move employees into new roles when their existing jobs are affected by technological or organisational changes. This can reduce the loss of experienced employees and the cost of continually recruiting new workers. In this sense, both practices can help organisations make better use of their existing human resources while preparing for future workforce requirements. The need for upskilling and reskilling has become even more important with the emergence of what is commonly described as the future of work. The future of work refers to the changes taking place in jobs, workplaces, and workforce requirements resulting from technological advancement, digitalisation, artificial intelligence, automation, demographic changes, and new forms of employment. Organisations are increasingly using digital systems, automated processes, remote and hybrid work arrangements, and technologies that

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allow employees to work alongside machines. These changes are affecting not only the nature of jobs but also the skills employees need to perform them effectively. Brasse et al. (2024) argue that organisations will increasingly need to identify emerging skills and continuously develop their employees to remain effective in a changing workplace. Artificial intelligence and automation have made this issue even more important. As some routine tasks become automated, employees are increasingly expected to perform tasks that require judgment, creativity, critical thinking, communication, collaboration, and technological understanding. At the same time, new roles are emerging that require skills that may not have been necessary in the past. Organisations that can upskill employees to meet changing responsibilities and reskill them for emerging roles may therefore be better prepared for these developments. Pillans (2024) notes that continuous capability development is increasingly important for organisations seeking to build an adaptable workforce and sustain performance in uncertain environments. Despite the growing recognition of upskilling and reskilling, many organisations still struggle to ensure that their employees possess the skills required for changing work environments. In some organisations, training programmes are still treated as occasional activities rather than as part of a long-term workforce strategy. This can create a gap between the skills employees currently possess and the competencies the organisation will need in the future. The problem is particularly relevant in areas such as digital technology, data analytics, artificial intelligence, automation, and other emerging fields. Kraus et al. (2023) note that the implementation of reskilling initiatives remains uneven, while Brasse et al. (2023) highlight the difficulty organisations face in preparing employees for rapidly changing workplace requirements. Where these gaps are not addressed, organisations may experience several challenges. Employees whose skills are no longer relevant may find it difficult to adjust to new technologies and responsibilities. This can result in reduced productivity, resistance to change, lower innovation, and increased dependence on external recruitment. Organisations may also lose experienced employees because they are unable to provide opportunities for development or advancement into new roles. Over time, these challenges can weaken organisational resilience and make it more difficult for organisations to remain competitive. Ren et al. (2023), Griep et al. (2024), and Maley (2024) all highlight the importance of developing employees' capabilities as organisations respond to changing business environments. It is therefore important for organisations to treat employee upskilling and reskilling as strategic human resource practices rather than as isolated training activities. Upskilling enables employees to strengthen the

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skills they already have and remain effective in changing roles, while reskilling allows them to acquire new skills and move into emerging areas of work. When both practices are properly linked to organisational goals, they can help organisations address skill gaps, retain valuable employees, improve adaptability, encourage innovation, and respond more effectively to technological change. These benefits are particularly important for the future of work, where organisations must continuously adapt to new technologies and evolving workforce expectations. Against this background, employee upskilling and reskilling have become important to organisations seeking to remain relevant and sustainable in a rapidly changing business environment. The ability to continuously develop existing skills and acquire new ones can help organisations prepare their workforce for emerging demands rather than simply reacting when skills become outdated. Thus, examining employee upskilling and reskilling as strategic human resource practices for organisational sustainability in the future of work provides an important basis for understanding how organisations can develop a workforce that is adaptable, capable, and prepared to contribute to long-term organisational survival and success.

Review of Related Literature

Human Capital Theory

Human Capital Theory, associated with Becker (1964), provides a useful foundation for understanding the importance of employee upskilling and reskilling in organisations. The theory views employees' knowledge, skills, abilities, and competencies as valuable forms of human capital that can be developed through education, training, learning, and continuous skill development. Becker argues that investment in human capital improves individuals' productive capacity and, in turn, generates benefits for the organisations that employ them. In this sense, organisations that deliberately invest in developing their employees' capabilities are more likely to improve productivity, strengthen performance, and create value over time. The theory is particularly relevant to employee upskilling and reskilling as strategic human resource practices, as both represent deliberate investments in employees' capabilities. Upskilling allows employees to improve and extend the skills they already possess, enabling them to perform their existing responsibilities more effectively as job requirements evolve. Reskilling, on the other hand, provides employees with new competencies that can prepare them for different roles and responsibilities within the organisation**.** From the perspective of Human Capital Theory, Arachie et al. (2025) claim that these activities increase the value

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of employees' knowledge and capabilities and can therefore contribute to improved organisational outcomes. The relevance of Human Capital Theory becomes stronger when employee skills are considered in relation to the changing requirements of the workplace. Organisations increasingly need employees who can learn, adapt, solve problems, work with new technologies, and respond to changing business requirements. Brasse et al. (2024) emphasise the importance of developing future-oriented skills to enable organisations to respond effectively to changing work environments. Achoki (2023) argues that continuous upskilling and reskilling are increasingly necessary for organisations seeking to remain competitive in a volatile, uncertain, complex, and ambiguous business environment. These arguments support the central assumption of Human Capital Theory that investment in employees' capabilities can strengthen an organisation's ability to respond to changing circumstances. The theory also provides a basis for understanding the strategic nature of upskilling and reskilling. Rather than viewing skill development as an isolated training activity, Human Capital Theory suggests that organisations can treat employee capabilities as resources that require continuous investment. Leon (2023) found that upskilling and reskilling initiatives can improve workforce adaptability and support organisational transformation under changing industrial conditions. Hasan et al. (2024) similarly report that structured upskilling and reskilling programmes can improve workforce agility, productivity, and innovation. These findings reinforce the view that investing in employees' capabilities can generate benefits that extend beyond individual employees to the organisation as a whole. Human Capital Theory is also relevant to organisational sustainability because the long-term success of an organisation depends partly on its ability to maintain a workforce with relevant and valuable capabilities. When employees are continuously developed, organisations are better positioned to respond to changing demands, retain useful knowledge, support innovation, and reduce the risk of skill gaps. Ren et al. (2023) highlight the contribution of strategic human resource practices to organisational resilience and sustainability by developing human capital capabilities. Similarly, Griep et al. (2024) explain that sustainable human resource practices seek to support organisational performance while also considering employee well-being and long-term value creation. Within the future of work, this perspective becomes particularly important because the skills required to perform many jobs continue to change. Employees may need to strengthen their existing capabilities while also acquiring entirely new skills to remain effective in emerging roles. Brasse et al. (2024) note that changing work structures are increasing the demand for advanced

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cognitive and digital capabilities. Pillans (2024) further argues that organisations that do not invest sufficiently in workforce development may face skill obsolescence, reduced competitiveness, and difficulties maintaining long-term performance. Upskilling and reskilling can therefore be understood as ways to maintain and renew the organisation's human capital in response to changing workplace requirements. Therefore, Human Capital Theory provides a strong theoretical explanation of the relationships among employee upskilling and reskilling, strategic human resource practices, and organisational sustainability. The theory suggests that employees' knowledge and skills are valuable resources that require continuous investment. To strategically upskill employees in their existing roles and reskill them for emerging roles, organisations can strengthen workforce capability, improve adaptability, support innovation, and prepare employees for changing workplace requirements. These outcomes can contribute to organisational resilience and long-term sustainability, particularly as organisations navigate the evolving demands of the future of work (Gurgu & Pistol, 2021). Therefore, Human Capital Theory provides an appropriate theoretical lens for examining employee upskilling and reskilling as strategic human resource practices for organisational sustainability in the future of work.

Employee Upskilling

Employee upskilling has become increasingly important as organisations seek to strengthen employees' capabilities and respond effectively to changing job requirements. Noe (2020) defines upskilling as the process of improving employees' existing knowledge, skills, and competencies to enhance their performance and prepare them for new responsibilities. Moreover, Ufomba et al. (2025) emphasise the importance of continuous learning in helping employees remain adaptable and enabling organisations to maintain their competitiveness as work requirements change. Leon (2023) also describes upskilling as an ongoing learning process through which employees acquire additional capabilities that enable them to remain relevant and productive in their roles. Unlike learning that prepares employees for entirely different occupations, upskilling builds on what employees already know and helps them improve or extend their existing capabilities. This may involve training in digital literacy, technical skills, leadership, problem-solving, communication, and other competencies relevant to particular roles. Through such opportunities, employees can strengthen their current performance while becoming better prepared to take on new responsibilities. Brasse et al. (2024) therefore highlight upskilling as an important approach to strengthening organisational readiness and competitiveness. The

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benefits of this approach extend beyond individual employees. Organisations that consistently invest in developing existing capabilities can improve workforce agility, adaptability, and innovation. Hasan et al. (2024) found that continuous learning contributes to organisational resilience by helping organisations respond more effectively to changes in their operating environment. In addition, sustained investment in employee capabilities can strengthen human capital, reduce skill gaps, and support the organisation's long-term sustainability (Ren et al., 2023; Griep et al., 2024). Upskilling can therefore be viewed not simply as a training activity, but as a strategic approach to maintaining capable employees and supporting organisational performance over time.

Employee Reskilling

Employee reskilling has become increasingly important as organisations prepare employees to take on new roles and responsibilities created by changing business requirements. Van Laar et al. (2020) define reskilling as the process of providing employees with new knowledge, skills, and competencies that enable them to perform roles different from those they previously held. It is therefore a strategic approach to employee development that helps organisations respond when existing positions are substantially altered or no longer required. Unlike upskilling, which builds on employees' existing capabilities, reskilling involves learning a different set of skills to support movement into another role. This may include training in areas such as digital technologies, artificial intelligence applications, data analytics, cybersecurity, project management, and other competencies that are becoming relevant across different occupations. Such opportunities can help employees make successful transitions while allowing organisations to retain valuable staff whose existing roles may be affected by changes in how work is performed. Cillo et al. (2019) and Davenport and Kirby (2016) therefore identify reskilling as an important means of maintaining employee relevance and reducing the negative consequences associated with job displacement. The benefits of reskilling are also reflected at the organisational level. Organisations that provide opportunities for employees to acquire new capabilities can respond more effectively to skill shortages, redeploy existing talent, and maintain greater flexibility in allocating human resources. Brougham and Haar (2024) found that reskilling helps employees cope with changes in their work environment while contributing to organisational resilience and performance. Also, Vrontis et al. (2022) reported that reskilling supports workforce sustainability by helping employees move into emerging roles and meet changing business requirements. Reskilling can therefore

serve as a practical means of retaining experienced employees while developing the capabilities needed to support organisational continuity and long-term growth.

Upskilling and Reskilling as Drivers of Organisational Sustainability and Competitiveness

Upskilling and reskilling employees play significant roles in promoting future organisational sustainability in modern workplaces (Sri Sowmiya & Swetha, 2025). Organisations that continuously invest in employee development are more likely to remain competitive, innovative, and adaptable in changing business environments (World Economic Forum, 2025). Such workforce development initiatives prepare employees to meet evolving organisational demands. Upskilling and reskilling not only improve workplace sustainability but also significantly impact competitiveness, productivity, staff competencies, technical knowledge, and operational efficiency. Employees with updated skills perform tasks more effectively and contribute positively to organisational competitiveness. According to Noe (2020), employee training and development programmes improve workforce efficiency, job performance, and organisational effectiveness. Similarly, Garavan, Carbery, and Rock (2012) observed that organisations investing in workforce learning experience improved productivity and operational performance. In other words, continuous workforce development contributes significantly to organisational sustainability and growth. Continuous employee learning also enhances innovation and creativity within organisations. Employees exposed to learning opportunities are more capable of generating innovative ideas and solving organisational problems. Davenport and Kirby (2016) argued that organisations operating in technology-driven environments require employees capable of combining technical competencies with innovation and creativity. Additionally, the World Economic Forum (2025) identified creativity, analytical thinking, and problem-solving as among the most important workforce competencies required in the future workplace. Therefore, organisations that prioritise upskilling and reskilling are more likely to improve innovation and organisational competitiveness. Another significant role of upskilling and reskilling is improving workforce adaptability. Ukandu et al. (2026) and Schwab (2016) emphasised that organisations operating in the Fourth Industrial Revolution require adaptable employees who can respond effectively to changing workplace demands. Continuous workforce development equips employees with the competencies needed to support organisational change and long-term sustainability. Adaptable employees contribute significantly to organisational resilience and long-term sustainability. Upskilling and reskilling initiatives also improve employee

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engagement, commitment, and retention. Employees are more likely to remain loyal to organisations that invest in their professional development and career growth opportunities. Bersin (2018) maintained that organisations with strong continuous learning cultures experience higher employee engagement and lower turnover rates. Employees often perceive upskilling and reskilling opportunities as evidence of organisational support and a long-term commitment to their careers. Becker (1993), through the Human Capital Theory, argued that organisations that invest in upskilling and reskilling help to improve workforce quality and long-term competitiveness. Similarly, the Resource-Based View Theory suggests that employee competencies constitute valuable organisational resources that competitors may find difficult to imitate.

Human Resource Management's Implementation Strategies in Workforce Upskilling and Reskilling

Effective upskilling and reskilling require careful organisational planning and a sustained commitment to employee development. Human Resource Management plays an important role in this process by designing upskilling and reskilling initiatives that align employees' capabilities with organisational objectives and evolving job requirements (Arachie et al., 2025). One practical approach is to provide regular training and development opportunities through workshops, seminars, leadership programmes, technical training, and professional certification. These activities can help employees strengthen existing skills while acquiring new ones that are relevant to their roles. Noe (2020) notes that effective training and development can contribute to employee productivity, operational efficiency, and overall organisational sustainability. Garavan, Carbery, and Rock (2012) similarly found that continuous development helps employees respond more effectively to changing work demands and strengthens organisational competitiveness. Flexible approaches to upskilling and reskilling can further support employee development. Organisations can use online courses, e-learning platforms, and other accessible learning resources to help employees develop their skills without leaving their regular duties for extended periods. This is particularly useful where employees have different schedules or work across different locations. The World Economic Forum (2025) emphasises the growing importance of digital competence and employees' ability to work effectively with new technologies. Providing accessible learning opportunities can therefore help employees build the confidence and capabilities needed to perform effectively as job requirements change. Regular assessment of employee skills is another important part of implementation. Human Resource professionals need to understand what employees can currently do and

where additional development is required. Skill gap assessments provide useful information for identifying areas where employees may need further training and allow organisations to direct their resources towards the most important competency needs. Rather than providing the same training to everyone, organisations can use these assessments to develop upskilling and reskilling activities that are more closely related to employees' roles and identified areas for improvement. Career development and succession planning should also form part of the overall approach. Employees are more likely to value development opportunities when they can see how learning connects with their professional growth and future responsibilities (Gurgu & Pistol, 2021). Career development programmes can provide opportunities for employees to prepare for higher-level positions while also strengthening their motivation, engagement, and commitment to the organisation. Bersin (2018) notes that organisations with strong learning and career development cultures tend to experience higher employee engagement and lower turnover. This suggests that investment in employee development can benefit both the individual and the organisation. Mentoring and coaching can provide another practical way of supporting upskilling and reskilling. Experienced employees and managers can share their knowledge, provide guidance, and help less experienced colleagues develop the skills required for their roles. Beyond formal training, these relationships provide employees with opportunities to learn from real-world workplace experiences, ask questions, receive feedback, and build confidence. Mentoring can also support knowledge sharing and help organisations retain important skills and experience within the workplace. Finally, successful implementation depends on creating an organisational environment where learning is valued and encouraged. Employees are more likely to participate in development activities when managers support learning, opportunities are readily available, and employees are encouraged to share knowledge with colleagues. A supportive learning culture can therefore make employee development part of everyday organisational practice rather than an occasional activity. Combining regular training, flexible learning opportunities, skill assessment, career development, mentoring, and a supportive learning environment, organisations can strengthen employee capabilities and improve their ability to respond to changing organisational needs.

Overcoming the Challenges of Upskilling and Reskilling

Despite the growing importance of upskilling and reskilling, organisations still face several barriers that limit the effectiveness of employee development initiatives. These include financial constraints, resistance to change, big data

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analyses, inadequate infrastructure, workload pressures, and weak learning cultures (Gurgu & Pistol, 2021). Finding solutions to these barriers requires organisations to adopt practical strategies that make employee development a realistic and continuous part of organisational practice. Financial limitations are one of the major challenges. Upskilling and reskilling programmes may require considerable resources for learning platforms, training facilities, instructional materials, and resource persons/experts. Organisations with limited financial capacity may therefore find it difficult to maintain regular upskilling and reskilling programmes. Noe (2020) explains that employee upskilling and reskilling entail various costs associated with learning technologies, employee participation, and instructional delivery. Rather than viewing such expenditure solely as a cost, organisations need to recognise employee upskilling and reskilling as a long-term investment that can strengthen employee capability, productivity, and competitiveness. This can also be supported by prioritising critical skill areas and making effective use of available internal and external learning resources. Resistance to change can also limit participation in upskilling and reskilling initiatives. Some employees may feel uncomfortable with new technologies, unfamiliar work processes, or changing job expectations, particularly when they are uncertain about how these changes may affect their roles. Schwab (2016) notes that changing workplace requirements can increase concerns about job security and employees' ability to meet new skill demands. Organisations can reduce such concerns by involving employees in development activities, providing adequate support during periods of change, and clearly explaining how acquiring new skills can benefit both employees and the organisation. Creating an environment where employees feel supported rather than threatened can encourage greater willingness to upskill. Another challenge is inadequate infrastructure. Limited access to reliable internet services, appropriate digital tools, and suitable learning platforms can restrict employees' ability to participate in upskilling and reskilling programmes, particularly in developing economies. The World Economic Forum (2025) has also identified unequal access to digital resources as a crucial barrier to employees' preparedness for evolving skill requirements. Organisations can respond by improving access to relevant technologies, strengthening internet connectivity where necessary, and providing learning resources that are suitable for the conditions in which employees work. Time is another practical constraint. Employees may find it difficult to participate in upskilling and reskilling when they are already dealing with demanding workloads and competing responsibilities. Garavan et al. (2012) observed that inadequate time allocation can reduce participation in upskilling and reskilling

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activities and limit their effectiveness. Organisations can address this problem by offering flexible learning arrangements, including online programmes, short learning sessions, and self-paced training. Such approaches allow employees to develop their skills without significantly disrupting their regular responsibilities. A weak knowledge culture can further undermine employee development efforts. When continuous upskilling and reskilling are not encouraged or valued, employees may have little motivation to acquire new knowledge or share what they have learned with others. Bersin (2018) highlights the importance of strong learning cultures in supporting innovation, employee engagement, and organisational sustainability. Organisations therefore need to create an environment where upskilling and reskilling are encouraged, knowledge is shared, and employees are supported in developing their capabilities. Recognising learning efforts, encouraging collaboration, and providing opportunities to apply newly acquired skills can help make development a normal part of organisational life. In this way, organisations can strengthen employee adaptability and build the capabilities needed to respond effectively to fluctuating work demands.

The Concept and Adaptability of the Future of Work

The changing nature of work has gained significant attention as organisations respond to evolving economic, technological, and workforce conditions. It refers to anticipated changes in workplace structures, employment patterns, employee expectations, and organisational systems arising from technological, economic, social, and environmental transformations (World Economic Forum, 2023). These changes reflect how organisations and employees are adapting to emerging technologies, new approaches to work, and evolving skill requirements within an increasingly dynamic business environment (Cooke et al., 2024). Cascio and Montealegre (2016) note that these developments require organisations to build agile workforces capable of responding effectively to continuous technological and organisational change. Consequently, employee adaptability, lifelong learning, and flexibility have become essential for maintaining competitiveness in contemporary workplaces. Brasse et al. (2024) and Minbaeva (2024) argue that organisational success in this changing environment depends largely on strengthening employees' digital, cognitive, and adaptive capabilities through continuous upskilling and reskilling. At the same time, technological advancement presents both opportunities and challenges for organisations (Mäkelä & Stephany, 2025). Although innovations can enhance productivity, efficiency, and organisational performance, they may also contribute to skill obsolescence, workforce displacement, and shortages of employees with relevant competencies. In response,

organisations are increasingly investing in continuous learning and workforce development strategies to equip employees with the capabilities required for emerging roles and changing job demands. These developments highlight the importance of strategic human resource practices that strengthen workforce readiness, organisational resilience, and long-term sustainability in a rapidly changing global economy. It is worthy of note that as workplace requirements continue to evolve, organisations must adapt their workforce development strategies to address emerging competency needs. Several practices are increasingly influencing how employees upskill and reskill within contemporary organisations. One significant development is the growing use of artificial intelligence (Imteyaz et al., 2026). AI technologies can personalise upskilling and reskilling experiences, assess employee competencies, identify skill gaps, recommend suitable training programmes, and track individual development more efficiently. The World Economic Forum (2025) notes that AI and related changes in the way work is organised will continue to influence job requirements and organisational operations globally. Remote and hybrid work arrangements are also influencing how organisations approach employee development. Schwab (2016) explains that employees operating in digitally connected work environments require the ability to collaborate, communicate, and perform effectively across different work settings. As a result, upskilling and reskilling initiatives increasingly emphasise digital literacy, virtual collaboration, communication skills, and the ability to adapt to flexible working arrangements. Microlearning has also gained attention because it allows employees to acquire knowledge in short and manageable sessions that can be integrated into their regular work responsibilities. This approach can increase participation in upskilling and reskilling activities while reducing disruption to daily operations. The development of lifelong learning cultures is another important aspect of employee upskilling and reskilling. Organisations increasingly recognise that upskilling and reskilling should not be treated as a one-time activity but as an ongoing process through which employees acquire new knowledge and strengthen existing capabilities. Arachie et al. (2025) and Bersin (2018) further observed that organisations that promote continuous upskilling and reskilling are better positioned to support innovation, employee engagement, and organisational sustainability. Such an approach encourages employees to remain responsive to changing job requirements and organisational needs. In addition, organisations are making greater use of workforce data and HR analytics to strengthen learning and workforce planning. These tools enable organisations to assess employee competencies, monitor progress in development,

identify emerging skill requirements, and support evidence-based decisions about training and employee development. Combining personalised learning, flexible delivery methods, continuous development, and data-informed decision-making, organisations can strengthen employee adaptability, improve workforce capability, and support long-term organisational sustainability.

Empirical Insights

Empirical literature consistently demonstrates that employee upskilling and reskilling are critical drivers of workforce adaptability, innovation, and organisational competitiveness. Studies have shown that continuous workforce development enhances organisational agility, flexibility, productivity, and responsiveness to changing business environments (Leon, 2023; Jamal et al., 2024; Hasan et al., 2024). Further empirical findings reveal that organisational learning and human capital development are strongly linked to competitiveness and innovation outcomes. Rožman et al. (2023) found that strategic talent development and agile human resource systems significantly enhance organisational competitiveness in volatile business environments. In addition, Wang et al. (2024) emphasised that employee adaptability is strengthened when organisations combine proactive employee learning behaviours with strong organisational support systems, thereby improving occupational resilience. Studies indicate that job redesign, reskilling, and upskilling collectively contribute to organisational agility by improving workforce responsiveness to change (Jamal et al., 2024; Sherehiy & Karwowski, 2014). Ren et al. (2023) argue that sustainable HR practices, including continuous employee development, are essential for long-term organisational resilience and value creation. Similarly, Griep et al. (2024) found that sustainable HRM practices balance organisational performance with employee well-being, thereby strengthening long-term sustainability outcomes. Despite these insights, several challenges persist. Empirical evidence shows that organisations face barriers such as limited financial resources, resistance to change, weak organisational learning cultures, and inadequate digital infrastructure, all of which hinder effective implementation of upskilling and reskilling programmes (Hasan et al., 2024; Achoki, 2023). Additionally, inequality in access to digital technologies continues to limit workforce development opportunities, particularly in developing economies. Although existing empirical studies have established the importance of upskilling and reskilling in improving workforce adaptability, innovation, and organisational competitiveness, most research has focused on developed economies or on general human resource development frameworks. There is still limited empirical evidence on how upskilling and reskilling function specifically as

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strategic human resource practices for organisational sustainability within the context of the future of work, particularly in developing country contexts. Furthermore, few to no studies have integrated these variables into a unified framework that directly links workforce upskilling and reskilling to organisational sustainability, creating a clear gap that this study seeks to bridge.

Materials and Method

This study adopted a qualitative research approach to explore employee upskilling and reskilling as strategic human resource practices for organisational sustainability in the future of work. The qualitative approach was considered appropriate because it provides an opportunity to gain an in-depth understanding of participants' experiences, perceptions, and opinions regarding workforce development practices within organisations. The study was conducted at a Telecommunications Company in Lagos State, Nigeria. The Telecommunications Company was selected because it operates in a highly dynamic industry characterised by changing business demands, evolving work practices, continuous innovation, and shifting employee competency requirements. The organisation continuously invests in employee development, digital capability enhancement, and workforce transformation initiatives to maintain competitiveness in an evolving business environment. These characteristics make the organisation a suitable setting for investigating employee upskilling and reskilling as strategic human resource practices for organisational sustainability. The participants for the study consisted of five departmental heads purposively selected from key functional areas of the organisation. These participants were selected because they hold strategic positions that give them direct responsibility and in-depth knowledge of employee upskilling and reskilling, workforce planning, strategy development and adoption, organisational operations, and policy implementation. Furthermore, the achievement of data saturation, which showed that the interviews produced enough information to satisfy the study's aims and that more interviews did not yield significantly new themes, further reinforced the adequacy of the sample. Their departments included: Human Resources, Information Technology, Customer Experience, Operations, and Corporate Services. To ensure confidentiality and anonymity, the participants were assigned identification codes ranging from P1 to P5. The study was guided by four emerging themes developed from the interview data: (1) upskilling and reskilling concept, (2) adaptability and future readiness, (3) organisational sustainability and competitiveness, and (4) implementation, challenges, and future trends. These themes were used to organise and interpret participants' responses in line with the study objective.

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Table 1: Participants' Departments and Codes

Participant Code	Department	Position
P1	Human Resources	Head of Department
P2	Information Technology	Head of Department
P3	Customer Experience	Head of Department
P4	Operations	Head of Department
P5	Corporate Services	Head of Department

Source: *Field Interview, 2026.*

Data for the study were collected through semi-structured interviews. An interview guide containing open-ended questions was developed to facilitate discussions with the participants. The questions focused on employee upskilling and reskilling practices, their contributions to adaptability and future readiness, organisational performance and competitiveness, and implementation strategies, challenges, and future trends in workforce development. To ensure the trustworthiness of the qualitative findings, attention was given to credibility, dependability, confirmability, and transferability. Credibility was strengthened through the purposive selection of participants with direct knowledge and responsibility for employee development and organisational workforce practices. The use of semi-structured interviews also allowed participants to explain their experiences and perspectives in depth. Dependability was supported by applying a consistent interview procedure across all participants and systematically analysing the interview responses. Confirmability was enhanced by ensuring that the themes were derived from the participants' responses rather than being imposed by the researcher. Transferability was supported by providing a sufficient description of the organisational setting, participants, and study context, enabling readers to assess the relevance of the findings to similar organisational settings. Three (3) human resource and research experts reviewed the interview questions to determine their clarity, relevance, and adequacy in addressing the study's objective. Their observations and recommendations were incorporated before the interviews were conducted. Furthermore, the use of semi-structured interviews enabled participants to elaborate on their responses and clarify issues where necessary, thereby enhancing the credibility of the data collected. The interviews were conducted face-to-face at mutually agreed times and locations within the organisation. With participants' consent, the interviews were audio-recorded and supplemented with field notes to ensure comprehensive documentation of responses. The data generated from the interviews were transcribed verbatim and analysed using

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thematic analysis. The analyses involved careful reading of the interview transcripts, identifying recurring ideas, coding relevant statements, and grouping broader themes aligned with the four key themes guiding the study. The findings were subsequently presented narratively using participant codes (P1–P5) to ensure clarity, confidentiality, and traceability of responses. To enhance the credibility and trustworthiness of the findings, member checking was conducted by allowing participants to review and confirm the accuracy of the interview transcripts and interpretations. In addition, an audit trail comprising detailed records of the data collection and analysis procedures was maintained throughout the study to ensure dependability. Ethical considerations were strictly observed throughout the research process. Before data collection, participants were informed about the study's purpose and objectives, and informed consent was obtained from each participant. Participation was entirely voluntary, and participants were informed of their right to withdraw from the study at any stage without any negative consequences. Confidentiality and anonymity were maintained by using participant codes instead of names, and all information obtained during the interviews was treated with strict confidentiality and used solely for academic purposes.

Findings

The main themes that emerged from participant interviews on employee upskilling and reskilling as strategic human resource practices for organisational sustainability in the future of work were: the concept of upskilling and reskilling; adaptability and future readiness; organisational sustainability and competitiveness; and implementation, challenges, and future trends. Below is the analysis of these themes.

Theme 1: Upskilling and Reskilling Concept

This theme emerged when participants were asked about their understanding of employee upskilling and reskilling within the organisation. All participants (P1–P5) described upskilling as enhancing employees' existing skills and reskilling as acquiring new skills required for emerging or different job roles. P1 and P3 specifically noted that upskilling helps employees remain effective in their current positions, while reskilling prepares them for transitions into new roles as job requirements evolve. Across the interviews, participants agreed that these practices are continuous rather than one-time activities. Participants (P2, P4, and P5) further explained that continuous training and development are necessary because technological changes are rapidly reshaping job functions, making it difficult for employees to rely only on their initial qualifications. Therefore, upskilling and

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reskilling were described as essential mechanisms for maintaining workforce relevance and closing skill gaps within the organisation.

Theme 2: Adaptability and Future Readiness

This theme emerged when participants were asked how upskilling and reskilling influence employees' ability to adapt to technological changes and future workplace demands. All participants (P1–P5) agreed that these practices significantly improve adaptability. P2 and P4 emphasised that employees who are frequently exposed to training are more confident in using new technologies and adapting to changing work systems. Similarly, P1 noted that adaptability is now a critical requirement in modern organisations due to increasing automation and digital transformation. Participants also highlighted that continuous learning prepares employees for future workplace uncertainties. P3 explained that employees become more flexible and open to role changes when trained consistently. In summary, adaptability was described as a capability strengthened through continuous exposure to learning and development opportunities.

Theme 3: Organisational Sustainability and Competitiveness

This theme emerged when participants discussed the impact of upskilling and reskilling on organisational sustainability. All participants (P1–P5) agreed that these practices improve productivity, efficiency, and overall organisational success. P1 and P5 noted that well-trained employees perform tasks more accurately and contribute more effectively to organisational goals. P3 added that sustained employee competence also enhances service delivery and customer satisfaction. Participants further emphasised that upskilling and reskilling strengthen organisational competitiveness, especially in highly dynamic industries. P2 explained that organisations that fail to invest in employee upskilling or reskilling risk becoming less relevant in fast-changing business environments. Therefore, participants linked workforce development directly to improved organisational sustainability and long-term competitiveness.

Theme 4: Implementation, Challenges and Future Trends

The fourth theme emerged when participants were asked about how upskilling and reskilling programmes are implemented, as well as the challenges and future trends. All participants (P1–P5) indicated that implementation is primarily carried out through structured training programmes, workshops, digital learning platforms, and continuous professional development initiatives. P2 and P3 highlighted that digital learning platforms are increasingly used to support flexible, self-paced learning. However, participants also identified several challenges. P1 and P4

pointed out that the high cost of upskilling and reskilling, or the time constraints due to workload, often restrict staff participation. P5 added that some employees resist change, especially when new technologies are introduced. Despite these challenges, participants agreed that the future of workforce development is digital. They highlighted increasing use of artificial intelligence in training, online learning systems, and more personalised upskilling and reskilling approaches that align with employee needs and organisational goals.

Discussion of Findings

Empirical evidence has revealed that employee upskilling and reskilling play a major role in improving workforce adaptability, innovation, and organisational competitiveness. The findings of this study strongly support this position, as participants generally described upskilling and reskilling as ongoing processes that help employees remain relevant in a constantly changing work environment driven by technology and digital transformation.

Theme 1: Upskilling and Reskilling Concept

The first theme showed a clear agreement among participants (P1–P5) that upskilling refers to improving employees' existing skills, while reskilling involves equipping them with entirely new skills for different or emerging job roles. This understanding aligns with Leon (2023) and Jamal et al. (2024), who emphasise that continuous learning helps organisations stay flexible and responsive in changing environments. What stood out in P1's and P3's responses was the idea that these practices are not occasional or optional but rather something organisations must continuously invest in. This reflects Hasan et al. (2024), who argue that structured employee development improves productivity and workforce responsiveness. In other words, the participants' views suggest that organisations are beginning to see employee development as a core strategy rather than just routine training.

Theme 2: Adaptability and Future Readiness

The second theme showed that all participants (P1–P5) agreed that upskilling and reskilling help employees adapt more easily to new technologies and changing job demands. P2 and P4 explained that employees who are regularly trained tend to feel more confident when faced with new systems or work processes. This aligns with Wang et al. (2024), who found that employee adaptability is heightened when organisations actively support continuous learning. It also supports Sherehiy and Karwowski (2014), who argue that workplace flexibility and skill development are key to surviving in fast-changing environments. To put it simply, participants

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viewed adaptability as something that develops through regular learning and exposure to new skills rather than as something employees naturally possess.

Theme 3: Organisational Sustainability and Competitiveness

Under this theme, all participants (P1–P5) agreed that upskilling and reskilling directly impact organisational sustainability. They explained that when employees are better trained, they work more efficiently, make fewer mistakes, and contribute more effectively to organisational goals. P3 also linked this to better service delivery and improved customer satisfaction. These views align with Rožman et al. (2023), who found that organisations that invest in employee development tend to perform better and remain competitive in challenging business environments. Similarly, Jamal et al. (2024) highlight that workforce development improves organisational responsiveness and efficiency. The findings also support Ren et al. (2023), who argue that continuous employee upskilling and reskilling strengthen long-term organisational sustainability. Overall, participants clearly connected employee development to both performance improvement and competitive advantage.

Theme 4: Implementation, Challenges and Future Trends

The fourth theme showed that participants (P1–P5) believe organisations mainly implement upskilling and reskilling through training programmes, workshops, and digital learning platforms. They also noted that continuous professional development is becoming more important in modern workplaces. However, participants also pointed out real challenges. P1 and P4 mentioned that training costs can be high, while heavy workloads often make it difficult for employees to fully participate in learning programmes. Some also noted resistance to change, especially when new systems are introduced. These challenges are also reflected in the literature by Hasan et al. (2024) and Achoki (2023), who highlight cost, resistance to change, and a weak organisational learning culture as common barriers to upskilling and reskilling within the workforce. Despite these issues, participants agreed that the future of employee upskilling and reskilling is becoming more digital and flexible. They pointed to increased use of online learning tools, artificial intelligence, and personalised training systems. Therefore, the findings suggest a shift toward more technology-driven and accessible learning approaches that support both employees and organisational growth.

Limitations of the Study

The population strength - despite the small number of participants, the five departmental heads were selected from key departments because of their direct

involvement and knowledge of employee development and organisational practices.

Data saturation - the interviews reached thematic saturation, as no major new themes emerged from the responses. This helped to ensure that the data were sufficient and robust for the study. The reliance on participants' personal experiences and perceptions – that may have introduced some degree of subjectivity. This was reduced through the use of semi-structured interviews, audio recording, and verbatim transcription.

Finally, the qualitative nature of the study means that the findings provide an in-depth understanding rather than statistical generalisation. To strengthen the credibility of the findings, the study employed thematic analysis, an expert review of the interview guide, an audit trail, and procedures to address credibility, dependability, and transferability. These measures helped to strengthen the trustworthiness of the findings despite the identified limitations. Hence, the study provides useful insights into how employee upskilling and reskilling can support organisational sustainability and offers a good foundation for further research in other sectors and organisational settings.

Conclusion

The workplace is changing rapidly as organisations respond to evolving job requirements, changing work practices, and new expectations regarding employee skills and capabilities. In this study, employee upskilling and reskilling have become critical strategic human resource practices for ensuring that organisations remain competitive, adaptive, and sustainable in the future of work. Findings from the study indicate that continuous employee upskilling and reskilling enhance workforce capability by strengthening existing competencies and enabling employees to transition into new and emerging roles. These practices contribute to improved productivity, innovation, employee engagement, and organisational resilience, thereby supporting long-term organisational sustainability in increasingly dynamic business environments. The effectiveness of upskilling and reskilling initiatives is strongly influenced by organisational support systems, including access to continuous learning opportunities, digital learning infrastructure, supportive leadership, and a culture that encourages lifelong learning. Where these structures are weak or absent, the impact of workforce development is significantly constrained. Although organisations face challenges such as financial constraints, resistance to change, inadequate technological infrastructure, and weak learning cultures, the overall evidence indicates that strategic investment in employee development is essential to maintaining relevance

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and competitiveness. Ultimately, upskilling and reskilling represent indispensable requirements for building a future-ready workforce capable of sustaining organisational performance in a rapidly evolving global environment.

Recommendation

Based on the findings of this study, the organisation under investigation should recognise employee upskilling and reskilling as pivotal strategic human resource practices essential to the sustainability of the future of work. In view of the rapid advances in technology, artificial intelligence, and the digital transformation shaping the Telecoms industry, the firm should begin embedding employee upskilling and reskilling into its long-term strategic human resource management practices. Continuous workforce upskilling and reskilling should be prioritised to ensure employees possess the prerequisite competencies required to respond effectively to changing job demands and organisational objectives. Management should invest significantly in structured learning and development programmes that target both current operational needs and emerging technological skills. Also, emphasis should be placed on digital literacy, technological competence, data analytics, problem-solving, creativity, and other future-oriented skills that enhance employee effectiveness. Such investments will improve employee performance while strengthening organisational adaptability, innovation capacity, and overall competitiveness. Additionally, the organisation should foster a strong culture of upskilling and reskilling that encourages continuous knowledge sharing, innovation, and employee development. Employees should be supported through training opportunities, professional certifications, mentoring, coaching, and career development programmes that enhance their growth and engagement. This will create a motivated workforce that is better prepared to respond to future workplace challenges. It is worth noting that to enhance the effectiveness of workforce upskilling and reskilling initiatives, the organisation under study should leverage modern digital learning platforms, including e-learning systems, virtual training tools, microlearning approaches, and artificial intelligence-supported learning solutions. These tools will improve accessibility, reduce training costs, and enable employees to learn flexibly while continuously updating their skills to meet organisational needs. The organisation should also strengthen its workforce planning processes by regularly identifying current and future skill gaps and aligning training initiatives with strategic objectives. These will ensure that employees are adequately prepared for emerging roles and help reduce the risk of skill obsolescence caused by technological disruption. In addition, management should proactively address barriers to the effective implementation of upskilling

and reskilling programmes by promoting clear communication, employee involvement, and supportive change-management practices. Adequate financial and technological resources should also be allocated to ensure the sustainability of workforce development initiatives. Therefore, by prioritising continuous employee upskilling and reskilling, strengthening learning systems, and embracing digital transformation, the organisation will be better positioned to achieve long-term sustainability, resilience, and competitiveness in an increasingly dynamic and technology-driven business environment.

Suggestions for Further Studies

Future research should expand the scope of this study by investigating employee upskilling and reskilling in sectors beyond the telecommunications industry to enhance the generalisability of the findings. Comparative studies across industries such as banking, manufacturing, education, and public service could provide deeper insights into how sectoral differences influence workforce upskilling and reskilling, organisational sustainability and the future of work.

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LEADERSHIP DEVELOPMENT AS A CATALYST FOR ORGANISATIONAL BEHAVIOUR AND EFFECTIVENESS: A COMPARATIVE STUDY OF SELECTED COUNTRIES

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Abstract

Leadership development has become increasingly important to organisational effectiveness as organisations navigate technological disruption, institutional complexity, workforce diversity, governance pressures and evolving employee expectations. These challenges are particularly significant within Southern Africa, where leadership is exercised across diverse economic, institutional and socio-cultural environments. Despite growing scholarship on leadership within the region, existing research remains fragmented across countries, sectors and leadership constructs, with limited comparative understanding of how leadership development translates into leadership competencies, organisational behaviour and organisational effectiveness. This study comparatively examines leadership development and its organisational implications across eight selected Southern African countries: South Africa, Botswana, Namibia, Zimbabwe, Zambia, Mozambique, Lesotho and Eswatini. The study adopts a comparative qualitative research design using secondary data and document analysis, drawing primarily on contemporary peer-reviewed literature and relevant institutional sources. A common analytical framework is applied across the eight countries to examine leadership-development approaches, leadership competencies, leadership behaviours, organisational-behaviour outcomes,

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organisational-effectiveness outcomes and contextual influences. The study conceptualises leadership development as an organisational capability-building process through which competencies are developed and translated into leadership behaviours that influence employee and collective organisational behaviour and, ultimately, organisational effectiveness. The comparative analysis further recognises that these relationships are shaped by national, institutional, cultural and organisational contexts. By identifying areas of convergence and divergence across the selected countries, the study contributes towards a contextually responsive Southern African leadership-development framework that integrates leadership development, competencies, behaviours and organisational outcomes...

Keywords: *leadership development; leadership competencies; organisational behaviour; organisational effectiveness; leadership competencies; Southern Africa*

JEL Classifications: M12; M14; M53; O15

Introduction

Leadership development has become an increasingly important strategic priority for contemporary organisations operating in environments characterised by technological disruption, economic uncertainty, institutional complexity, changing workforce expectations and heightened demands for ethical, inclusive and sustainable organisational performance (Douglas et al., 2021; van der Westhuizen & Hewitt, 2021; Haricharan, 2023; Bangura & Lourens, 2025). Leadership is therefore no longer adequately understood solely as a function of hierarchical authority, managerial position or individual leadership style. Contemporary scholarship increasingly conceptualises effective leadership as a combination of competencies, behaviours, relationships and contextual capabilities that can be intentionally developed to enhance individual, employee and organisational outcomes (Da Fonseca et al., 2022; Mbokota & Reid, 2022; Muringa & Shava, 2024; Galperin et al., 2024).

Leadership development broadly refers to the systematic strengthening of the knowledge, skills, competencies and behaviours required for effective leadership practice. Such development may occur through formal leadership programmes, coaching, mentoring, experiential learning, developmental assignments, succession planning and structured feedback mechanisms (Douglas et al., 2021; Mbokota & Reid, 2022). However, the organisational value of leadership development extends beyond participation in developmental activities. Its significance ultimately

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depends on whether development produces relevant leadership competencies, whether these competencies translate into observable leadership behaviours and whether those behaviours contribute to positive employee and organisational outcomes (Douglas et al., 2021; van der Westhuizen & Hewitt, 2021; Bangura & Lourens, 2025).

The relationship between leadership development and organisational effectiveness is consequently multidimensional. Leadership competencies such as strategic thinking, self-awareness, communication, emotional intelligence, ethical judgement, inclusivity, adaptability and people management can influence how leaders interact with employees, manage organisational change, establish accountability and shape workplace environments (Da Fonseca et al., 2022; Haricharan, 2023; Muringa & Shava, 2024). Leadership behaviours may subsequently influence organisational behaviour outcomes, including employee engagement, organisational commitment, trust, psychological safety, job satisfaction, collaboration, and employee voice (Barkhuizen & Masale, 2022; Haricharan, 2023; Atiku et al., 2024; Fatoki, 2024). These employee and collective behavioural outcomes may, in turn, contribute to broader dimensions of organisational effectiveness, including performance, service delivery, employee retention, adaptability, innovation and sustainability (Douglas et al., 2021; Atiku et al., 2023; Atiku et al., 2024).

Organisational behaviour therefore provides an important explanatory mechanism through which leadership capability may translate into organisational effectiveness. Leaders influence not only organisational strategy and decision-making but also how employees perceive and experience trust, inclusion, fairness, organisational support and psychological safety (Da Fonseca et al., 2022; Haricharan, 2023; Fatoki, 2024). Positive leadership behaviours can facilitate employee engagement, commitment, collaboration and discretionary contribution, whereas destructive, authoritarian or self-serving leadership behaviours may undermine employee relationships and organisational outcomes (Da Fonseca et al., 2022; Olabiyi et al., 2024). Understanding organisational effectiveness consequently requires consideration of the relationship between what leaders develop, the competencies they possess, how they behave, and how employees and organisations respond.

These relationships are particularly relevant within African organisational contexts. Leadership theories and development frameworks have historically been influenced substantially by scholarship generated within Western organisational environments, raising questions regarding their direct transferability to African

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settings (van der Westhuizen & Hewitt, 2021; Vilakati & Schurink, 2021; Galperin et al., 2024). Leadership is embedded within social, cultural, institutional and organisational environments, and leadership behaviours regarded as effective within one context may not necessarily produce equivalent outcomes within another. Contemporary African leadership scholarship therefore increasingly emphasises contextualising leadership theory and practice within African organisational realities while simultaneously cautioning against conceptualising Africa as a single homogeneous leadership environment (Vilakati & Schurink, 2021; Galperin et al., 2024).

Southern Africa provides a particularly relevant setting within which to investigate these relationships. Countries within the region share geographical, historical and institutional connections while simultaneously differing in economic structures, governance arrangements, institutional capacities, labour-market characteristics and socio-cultural environments. Such variation provides an opportunity to examine whether common leadership competencies and behaviours are associated with organisational effectiveness across different Southern African environments and, importantly, whether particular leadership requirements are shaped by national and organisational context (van der Westhuizen & Hewitt, 2021; Galperin et al., 2024).

This study specifically focuses on South Africa, Botswana, Namibia, Zimbabwe, Zambia, Mozambique, Lesotho and Eswatini. These eight countries are purposively selected to facilitate comparison across diverse institutional, economic and socio-cultural environments while maintaining a coherent Southern African geographical focus. The study does not assume that the selected countries constitute a homogeneous leadership environment. Rather, their contextual differences provide the basis for examining convergence and divergence in leadership-development practices, competencies, behaviours and organisational outcomes. The comparative approach therefore seeks to establish both the leadership capabilities that demonstrate broader relevance across the selected countries and those whose significance appears to be context-dependent.

Contemporary scholarship already demonstrates growing interest in leadership and organisational outcomes within these Southern African settings. Studies have examined leadership self-awareness and effectiveness (Da Fonseca et al., 2022), leadership talent mindset and employee retention (Barkhuizen & Masale, 2022), leadership and service delivery (Atiku et al., 2023), inclusive leadership and employee engagement (Atiku et al., 2024), municipal leadership competencies (Muringa & Shava, 2024), inclusive leadership and employee voice (Fatoki, 2024), and leadership within gendered

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institutional environments (Nkambule & Perumal, 2024). Although these studies provide important insights, the evidence remains dispersed across different countries, organisational contexts and leadership constructs.

Consequently, an important gap exists in understanding these relationships comparatively. Existing studies frequently examine individual leadership styles, competencies or behaviours within particular national or organisational contexts, providing limited understanding of which leadership capabilities demonstrate cross-country relevance and which are shaped by particular institutional and socio-cultural environments (van der Westhuizen & Hewitt, 2021; Da Fonseca et al., 2022; Galperin et al., 2024). Leadership development, leadership competencies and leadership behaviours are frequently examined separately, while organisational behaviour and organisational effectiveness are often treated as independent outcomes. This fragmentation limits understanding of the mechanisms through which leadership development ultimately contributes to organisational effectiveness. Against this background, the present study adopts a comparative qualitative approach to examine leadership development, leadership competencies, leadership behaviours, organisational behaviour and organisational effectiveness across the eight selected Southern African countries. Drawing on contemporary secondary evidence, the study applies a common comparative framework to identify patterns of similarity and difference and to examine how institutional, economic, organisational, and socio-cultural conditions may shape leadership requirements and outcomes.

Literature Review

Leadership development has become increasingly important as organisations seek to strengthen the capabilities required to navigate institutional complexity, technological disruption, workforce diversity, shifting employee expectations and heightened demands for accountability and sustainable performance. Contemporary leadership scholarship consequently extends beyond the traditional emphasis on leadership style and positional authority towards a broader consideration of competencies, behaviours, developmental mechanisms and organisational context (Douglas et al., 2021; van der Westhuizen & Hewitt, 2021; Da Fonseca et al., 2022; Galperin et al., 2024; Huseynzada, 2024). Within this perspective, leadership effectiveness is not viewed solely as an individual attribute but as an organisational capability that is developed, enacted and reinforced through interactions between leaders, employees, organisational systems and the wider institutional environment (Mbokota & Reid, 2022; Haricharan, 2023; Toendepi & Cele, 2024; Bangura & Lourens, 2025).

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Within African and particularly Southern African contexts, these relationships require consideration of the institutional, cultural and organisational environments within which leadership is practised. Emerging scholarship highlights both the relevance of contextually grounded African leadership perspectives and variation in perceptions and practices of effective leadership across African settings (van der Westhuizen & Hewitt, 2021; Vilakati & Schurink, 2021; Galperin et al., 2024). Accordingly, this literature review examines four interconnected areas: leadership development; leadership competencies and behaviours; the relationship between leadership and organisational behaviour; and the contribution of leadership to organisational effectiveness. It subsequently considers these dimensions within the Southern African context to establish the conceptual foundation for comparing South Africa, Botswana, Namibia, Zimbabwe, Zambia, Mozambique, Lesotho, and Eswatini.

Leadership development

Leadership development refers to intentional processes through which organisations strengthen the knowledge, capabilities, behaviours and relational competencies required for effective leadership. These processes extend beyond formal management training and include coaching, mentoring, succession development, developmental assignments, experiential learning, structured feedback, and workplace-based learning (Douglas et al., 2021; Mbokota & Reid, 2022; Bangura & Lourens, 2025). Increasingly, leadership development is conceptualised as a continuous organisational process rather than a once-off intervention because leadership capability must evolve alongside organisational strategy, technological change, workforce expectations and institutional demands (Valizada, 2022; Gurgu et al., 2022; Huseynzada, 2024).

The effectiveness of leadership development depends substantially on its integration with broader organisational systems. Developmental initiatives are more likely to contribute to organisational effectiveness when linked to performance management, talent management, organisational learning and succession planning rather than functioning independently from strategic organisational priorities (Douglas et al., 2021; Barkhuizen & Masale, 2022; Bangura & Lourens, 2025). Leadership development has both individual and institutional dimensions: it strengthens the capabilities of particular leaders while also contributing to the longer-term leadership capacity.

Within African and Southern African organisational environments, leadership development also requires contextual sensitivity. Leadership-development models originating in Western organisational contexts may offer useful principles but

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cannot necessarily be transferred without adaptation to organisational environments shaped by different cultural norms, institutional arrangements and relational expectations (van der Westhuizen & Hewitt, 2021; Galperin et al., 2024). Contemporary Afrocentric scholarship increasingly emphasises collective responsibility, relational leadership, stakeholder orientation and human-centred leadership as important dimensions of effective leadership practice (Toendepi & Cele, 2024). This does not imply the existence of a single African leadership model; rather, it highlights the importance of aligning leadership development with contextual realities and organisational expectations.

Leadership development is also increasingly shaped by digital and organisational transformation. Rapid technological change requires leaders to combine interpersonal and strategic capabilities with digital awareness, organisational learning and adaptability. Digital leadership has consequently been linked to learning-oriented organisational environments and individual performance, while agile and transformational leadership have become increasingly important in contexts characterised by uncertainty and organisational change (Valizada, 2022; Gurgu et al., 2022). Leadership development must therefore prepare leaders not only to manage existing organisational systems but also to lead transformation, innovation and adaptation.

The measurement of leadership-development effectiveness remains an important concern. Traditional indicators such as program attendance and completion provide limited evidence of organisational impact. A more meaningful assessment requires examining whether developmental interventions strengthen relevant competencies, whether those competencies translate into changes in leadership behaviour and whether behavioural changes contribute to employee and organisational outcomes (Douglas et al., 2021; Mbokota & Reid, 2022; Bangura & Lourens, 2025). Leadership development can be understood as a progression from developmental intervention to competency acquisition, behavioural transfer and organisational impact.

Leadership competencies and leadership behaviours

Contemporary organisations require leadership capabilities that extend well beyond technical and functional expertise. Strategic thinking, self-awareness, emotional intelligence, communication, ethical judgement, inclusivity, stakeholder management, adaptability, people development and change leadership have become increasingly important in complex organisational environments (Da Fonseca et al., 2022; Muringa & Shava, 2024; Orekoya, 2024; Huseynzada, 2024).

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These competencies provide leaders with the capacity to interpret organisational challenges, influence others and translate strategic intent into organisational action. Self-awareness is particularly important because leadership behaviour is influenced by leaders' understanding of their own strengths, limitations and interpersonal impact. Effective self-awareness supports behavioural regulation, reflective leadership and more constructive relationships with employees, whereas limited self-awareness may contribute to ineffective or destructive leadership practices (Da Fonseca et al., 2022; Olabiyi et al., 2024). Emotional and relational competence are therefore increasingly regarded as central rather than peripheral to leadership effectiveness.

Strategic competence is similarly important, particularly where leaders are required to respond to uncertainty, align resources, and translate organisational strategy into operational outcomes. Strategic leadership has been associated with improved organisational performance across public, educational and commercial environments, while leadership agility is increasingly relevant in volatile or innovation-intensive sectors (Muringa & Shava, 2024; Boane et al., 2024; Choongo et al., 2023; Adesanya et al., 2025). Leadership capability therefore encompasses both a long-term strategic orientation and the ability to adapt behaviour as organisational conditions change. Leadership competency must nevertheless be distinguished from leadership behaviour. Competencies represent the underlying capacities of leaders, while behaviours represent the observable enactment of those capacities within organisational settings. This distinction is critical because possession of leadership knowledge does not necessarily guarantee effective leadership practice. Leadership behaviour determines how employees experience competencies through communication, decision-making, inclusion, accountability, conflict management, and the distribution of authority.

Recent organisational research increasingly highlights inclusive, transformational, strategic and participative leadership behaviours because of their potential contribution to team climate, employee engagement and organisational performance (Orekoya, 2024; Atiku et al., 2024; Mwambela & Zulu, 2024; Thelma et al., 2025). Inclusive leadership is particularly significant in diverse organisational environments because it encourages employee participation, voice and recognition, while transformational leadership remains relevant in environments requiring organisational change and mobilisation around shared objectives (Shava, 2021; Bush et al., 2022; Gurgu et al., 2022).

Leadership effectiveness should, however, also account for destructive behaviours. Authoritarianism, favouritism, cronyism, self-serving behaviour and

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poor accountability can undermine trust, morale and institutional credibility (Olabiyi et al., 2024; Vollan et al., 2020). Leadership development systems need to establish both positive behavioural expectations and mechanisms for identifying behaviours that pose organisational risk. This reinforces the value of competency frameworks that specify not only what leaders should know, but how effective leadership should be demonstrated in practice.

The literature indicates that effective leadership is multidimensional and cannot be adequately represented by a single leadership style or competency. Instead, leadership effectiveness appears to emerge from an interconnected set of strategic, intrapersonal, relational, ethical, people-management, contextual, and adaptive capabilities (Da Fonseca et al., 2022; Gurgu et al., 2022; Choongo et al., 2023; Orekoya, 2024; Muringa & Shava, 2024; Huseynzada, 2024; Adesanya et al., 2025). These capabilities are reflected in observable leadership behaviours and have implications for employee and organisational outcomes. Importantly, the literature also identifies destructive behaviours, including authoritarianism, exclusion, cronyism and self-serving conduct, which may undermine leadership effectiveness and organisational trust (Olabiyi et al., 2024). Table 1 analyses the principal leadership competency and behavioural dimensions that emerge from the reviewed literature and demonstrates their relevance to organisational behaviour and effectiveness.

Table 1: Analysis of leadership competencies, behaviours and organisational relevance

Leadership dimension	Key competencies	Associated leadership behaviours	Organisational relevance
Strategic capability	Strategic thinking, decision-making, environmental awareness, and change management	Establishes direction, aligns resources, anticipates change, and translates strategy into action	Organisational performance, transformation, adaptability and strategic alignment
Intrapersonal capability	Self-awareness, emotional intelligence, self-regulation, reflective capacity	Demonstrates emotional control, reflects on personal impact, and adapts behaviour	Leadership effectiveness, employee relationships, and decision quality
Relational capability	Communication, interpersonal competence,	Listens, communicates openly, builds relationships, and	Employee engagement, trust, collaboration, and

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Leadership dimension	Key competencies	Associated leadership behaviours	Organisational relevance
	collaboration, trust-building	encourages participation	psychological safety
Ethical capability	Integrity, fairness, accountability, and ethical judgement	Acts consistently, makes transparent decisions, and accepts accountability	Organisational trust, governance, legitimacy and institutional credibility
Inclusive leadership capability	Diversity awareness, openness, empathy, and participative decision-making	Encourages employee voice, recognises contributions, and involves diverse stakeholders	Inclusion, engagement, commitment, and employee participation
People-development capability	Coaching, mentoring, talent development, motivation, empowerment	Develops employees, delegates responsibility, provides feedback and recognises performance	Employee performance, talent retention, succession and workforce capability
Contextual capability	Cultural intelligence, stakeholder awareness, and institutional sensitivity	Adapts leadership to cultural, institutional and stakeholder expectations	Leadership legitimacy, stakeholder relationships and contextual effectiveness
Adaptive and digital capability	Agility, innovation orientation, digital awareness, learning orientation	Responds to disruption, supports innovation and facilitates organisational learning	Resilience, innovation, digital transformation and organisational adaptability
Destructive leadership behaviours	Deficiencies in ethical, relational and self-regulatory capability	Authoritarianism, cronyism, exclusion, favouritism and self-serving conduct	Reduced trust, disengagement, poor morale and diminished organisational effectiveness

Source: Authors' analysis based on Da Fonseca et al. (2022), Valizada (2022), Gurgu et al. (2022), Choongo et al. (2023), Orekoya (2024), Atiku et al. (2024), Muringa and Shava (2024), Olabiyi et al. (2024)

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Analysis presented in Table 1 demonstrates that leadership effectiveness extends beyond the possession of individual competencies. Rather, competencies acquire organisational significance when they are translated into observable behaviours that influence employees, teams and organisational systems. Strategic and adaptive capabilities enable leaders to respond to environmental and organisational change, while intrapersonal and relational capabilities influence how leaders engage with employees and manage workplace relationships (Da Fonseca et al., 2022; Gurgu et al., 2022; Huseynzada, 2024). Ethical and inclusive capabilities further contribute to trust, participation and leadership legitimacy, whereas people-development capabilities support employee performance, talent development and organisational continuity (Orekoya, 2024; Atiku et al., 2024; Muringa & Shava, 2024).

Importantly, these dimensions should not be interpreted as independent competencies. Effective leadership requires their integration. Strategic capability without relational competence may produce organisational direction without employee commitment, while strong interpersonal capability without strategic competence may create positive relationships without sufficient organisational direction. Similarly, technical or strategic competence cannot compensate for persistent unethical or destructive leadership behaviour. Leadership effectiveness reflects the combined application of strategic, intrapersonal, relational, ethical, inclusive, developmental, contextual, and adaptive capabilities.

This analysis provides an important conceptual bridge between leadership competencies and organisational behaviour. Once competencies are translated into leadership behaviours, employees experience those behaviours through communication, decision-making, participation, support, fairness and accountability. These experiences can subsequently influence employee motivation, engagement, trust, commitment, psychological safety and performance. The relationship between leadership and these organisational-behaviour outcomes is considered in the following section.

Leadership and organisational behaviour

Leadership is closely connected to organisational behaviour because leaders shape the psychological, relational and cultural environment in which employees perform their work. Employee engagement, trust, motivation, organisational commitment, psychological safety, employee voice, job satisfaction and retention are consequently influenced by leadership behaviour and the quality of leader–

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employee relationships (Haricharan, 2023; Atiku et al., 2024; Chirwa, 2025; Orekoya, 2024).

Employee motivation represents one of the most direct behavioural outcomes of leadership. Leadership styles influence the extent to which employees experience recognition, autonomy, support and connection to organisational objectives, while organisational culture can strengthen or weaken the relationship between leadership and motivation (Chirwa, 2025). Leadership influences employee behaviour not only through direct interaction but also through the cultural norms and expectations that leaders reinforce within the organisation.

Employee engagement similarly provides an important pathway between leadership and organisational outcomes. Inclusive leadership can strengthen employee involvement, sense of belonging and willingness to contribute, while trust in leadership influences how employees interpret organisational decisions and leadership intentions (Atiku et al., 2024; Orekoya, 2024). The quality of leadership affects whether employees view themselves as active organisational contributors or passive recipients of managerial decisions.

Leadership also has consequences for employee performance. Organisational evidence from Zambia demonstrates relationships between leadership style and employee performance, and leadership has also been associated with educational quality, organisational growth, and service-delivery outcomes across sectors (Mwambela & Zulu, 2024; Thelma et al., 2025; Choongo et al., 2023; John et al., 2023). These findings reinforce the proposition that leadership effectiveness is partly reflected in employees' behavioural responses.

Talent retention is another important organisational behaviour mechanism. Leaders influence how employees are identified, developed, recognised and retained, and leadership orientations towards talent can shape employees' willingness to remain within organisations (Barkhuizen & Masale, 2022). This relationship is particularly important in organisations dependent on scarce professional, technical or managerial skills because ineffective leadership may contribute to the loss of institutional knowledge and organisational capability.

Employee well-being is equally connected to leadership. Leadership and management practices influence employee stress, perceived support and the quality of the working environment, with implications for both employee health and organisational performance (Haricharan, 2023; Pistol et al., 2023). Contemporary leadership requires sensitivity to employee well-being alongside traditional performance expectations, particularly in organisational contexts characterised by sustained pressure and change.

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The relationship between leadership and organisational behaviour can also be adversely affected by perceptions of unfairness, nepotism or exclusion. Procedural fairness influences the legitimacy attributed to leadership decisions, while toxic and self-serving behaviours can undermine employee trust and commitment (Vollan et al., 2020; Olabiyi et al., 2024). Organisational behaviour therefore provides an important explanatory mechanism through which leadership capability is translated into broader organisational outcomes.

Leadership and organisational effectiveness

Organisational effectiveness is multidimensional and reflects an organisation's ability to achieve its objectives, utilise resources productively, sustain employee capability and adapt to changes in its operating environment. Depending on sector and organisational mandate, effectiveness may be reflected through performance, service delivery, innovation, employee retention, organisational growth, institutional legitimacy, governance, adaptability or sustainability (Douglas et al., 2021; John et al., 2023; Atiku et al., 2023; Huseynzada, 2024).

Leadership contributes to organisational effectiveness through strategic direction, resource allocation, employee mobilisation and the creation of organisational cultures supportive of performance. In public-sector contexts, leadership effectiveness is frequently reflected through service delivery, governance and institutional transformation rather than financial outcomes alone (John et al., 2023; Muringa & Shava, 2024; Matsiliza, 2024). This distinction is particularly important in Southern Africa, where public institutions constitute a substantial part of the organisational landscape.

Educational institutions similarly demonstrate the multidimensional nature of effectiveness. Leadership practices influence educational quality, teacher participation, professional learning and institutional performance, while instructional and transformational leadership approaches are increasingly combined to strengthen educational outcomes (Shava, 2021; Bush et al., 2022; Sesoane et al., 2025; Thelma et al., 2025). Leadership effectiveness in education encompasses both administrative performance and the ability to support professional and learning environments.

Within private-sector and entrepreneurial settings, leadership contributes to growth, innovation and competitive adaptation. Leadership style has been linked to FinTech start-up growth in Zambia, while strategic leadership has been associated with hospitality-company performance in Mozambique (Choongo et al., 2023; Boane et al., 2024). Leadership agility has also become increasingly important

among small and medium-sized enterprises where resilience depends on rapid adaptation to changing economic and competitive conditions (Adesanya et al., 2025).

Digital transformation further broadens the determinants of leadership effectiveness. Digital leadership contributes to organisational learning and individual performance, while agile and transformational change leadership support organisational adaptability under rapidly changing conditions (Valizada, 2022; Gurgu et al., 2022). Organisational effectiveness should be understood as dynamic rather than static; effective organisations must be capable not only of achieving current objectives but also of developing the capacity required to remain effective under changing conditions. Organisational reputation and identity may also reinforce effectiveness. Employer branding can influence organisational performance by affecting attractiveness, employee commitment and stakeholder perceptions (Gurgu & Kuleto, 2023). Leadership contributes to these outcomes by shaping organisational values, culture and the way the organisation presents itself to employees and external stakeholders.

Leadership in African and Southern African contexts

The contextual character of leadership is particularly significant within Africa. Organisational leadership occurs within diverse cultural, historical and institutional environments, limiting the applicability of assumptions that leadership practices can be transferred unchanged across contexts. Comparative African evidence demonstrates both common patterns and substantial variations in perceptions of effective leadership, suggesting that leadership effectiveness is influenced by national cultural and institutional conditions (Galperin et al., 2024).

Southern African leadership environments reflect this complexity. Institutional arrangements frequently combine formal organisational systems with historically embedded governance traditions and social structures. Mixed governance systems, traditional leadership arrangements and differences in institutional legitimacy can shape expectations of authority, accountability and participation (Chlouba, 2021; Matsiliza, 2024). Leadership effectiveness needs to be interpreted within the institutional environments in which leaders operate.

Gender represents another important contextual dimension. Leadership participation and progression remain influenced by structural and socio-cultural expectations, particularly in environments where patriarchal traditions continue to shape access to leadership positions (Nkambule & Perumal, 2024; Mooketsane & Monyeki, 2024; Makamure, 2026). Leadership development includes not only

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strengthening the competencies of existing leaders but also creating equitable pathways through which diverse employees can access leadership opportunities.

The relationship between leadership and followership is also important. Organisational outcomes are produced through interactions between leaders and those they influence, rather than through leader action alone. Leadership legitimacy, trust and collective responsibility become particularly significant in environments characterised by institutional uncertainty or social transformation (Chikohomero, 2023; Tagwirei, 2024). This supports a more relational understanding of leadership in which effectiveness depends on the quality of interaction between leaders, employees, stakeholders and institutions.

Institutional and socio-economic instability can further alter leadership requirements. Leadership within environments characterised by governance challenges, conflict or economic uncertainty requires heightened adaptability, stakeholder engagement and institutional awareness (Harawa, 2024; Nkabane & Wantchami, 2024). Collaborative approaches to development and partnership may consequently become particularly important where organisational objectives depend on multiple stakeholders and limited resources (Makhetha & Ngozwana, 2026).

Comparative Southern African leadership evidence

Across South Africa, Botswana, Namibia, Zimbabwe, Zambia, Mozambique, Lesotho and Eswatini, the literature reveals both recurring leadership requirements and important contextual differences. South African scholarship places considerable emphasis on self-awareness, leadership competencies, municipal performance, educational leadership and the risks associated with toxic leadership (Da Fonseca et al., 2022; John et al., 2023; Muringa & Shava, 2024; Olabiyi et al., 2024). This suggests that leadership effectiveness within the South African context increasingly requires a balance between strategic capability, interpersonal competence and ethical accountability.

Botswana's leadership literature highlights talent orientation, retention, governance and gender equality, suggesting that effective leadership is closely connected to the development and preservation of organisational human capital as well as broader institutional inclusion (Barkhuizen & Masale, 2022; Mooketsane & Monyeki, 2024). Namibia similarly demonstrates the importance of inclusive leadership, employee engagement, service delivery and institutional legitimacy, indicating that relational capability and stakeholder confidence are important leadership dimensions (Atiku et al., 2023; Atiku et al., 2024; Chlouba, 2021).

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Zambian research increasingly demonstrates the organisational consequences of leadership across several sectors. Leadership style has been associated with employee performance, employee motivation, educational quality and organisational growth, while organisational culture has been identified as an important mechanism shaping leadership outcomes (Choongo et al., 2023; Mwambela & Zulu, 2024; Chirwa, 2025; Thelma et al., 2025). This evidence suggests that leadership within Zambia is strongly connected to employee-level behavioural outcomes as well as broader organisational and institutional performance.

Zimbabwean scholarship places greater emphasis on leader–follower relationships, legitimacy and institutional rebuilding, reflecting an environment in which trust and collective responsibility assume particular significance (Chikohomero, 2023; Tagwirei, 2024). Mozambique combines evidence of strategic organisational leadership with broader governance and institutional challenges, suggesting that leadership effectiveness involves both strategic organisational capability and the capacity to operate within complex external environments (Boane et al., 2024; Harawa, 2024).

Leadership research in Lesotho highlights governance, collaborative development and social sustainability, reinforcing the importance of stakeholder engagement, legitimacy and partnership-oriented leadership (Nkabane & Wantchami, 2024; Paul & Mosisili, 2025; Makhetha & Ngozwana, 2026). Eswatini demonstrates particularly strong interaction between leadership, gender and institutional structures, with leadership opportunities shaped by societal expectations and patterns of access to positions of authority (Nkambule & Perumal, 2024; Makamure, 2026).

Taken together, the comparative evidence suggests that no single leadership style adequately captures effective leadership across the selected Southern African countries. Instead, a cluster of recurring capabilities emerges, including strategic thinking, adaptability, self-awareness, ethical conduct, relational competence, employee development, inclusivity, stakeholder engagement and change leadership (Da Fonseca et al., 2022; Barkhuizen & Masale, 2022; Choongo et al., 2023; Atiku et al., 2024; Muringa & Shava, 2024; Huseynzada, 2024; Chirwa, 2025). Their relative importance, however, appears to be influenced by organisational sector, institutional maturity, governance conditions, gender relations and national socio-cultural context.

The country-level literature demonstrates that leadership across the selected Southern African countries is characterised by both convergence and contextual

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variation. Common themes relating to strategic capability, employee relationships, adaptability, ethical conduct and people management are evident across several national contexts; however, the organisational expression and relative importance of these capabilities differ according to institutional, socio-cultural and sectoral conditions (Barkhuizen & Masale, 2022; Chikohomero, 2023; Choongo et al., 2023; Atiku et al., 2024; Boane et al., 2024; Muringa & Shava, 2024; Nkambule & Perumal, 2024; Chirwa, 2025). The evidence suggests that leadership effectiveness within Southern Africa cannot be explained adequately through either a completely universal leadership model or isolated country-specific approaches.

The comparative patterns can instead be considered across four interconnected dimensions: the dominant leadership capabilities and behaviours identified within each national literature; the organisational-behaviour outcomes associated with leadership; the organisational-effectiveness outcomes emphasised within that context; and the institutional or socio-cultural conditions that potentially shape leadership practice. Table 2 provides a comparative analysis across the eight selected countries.

Table 2: Comparative analysis of leadership evidence across selected Southern African countries

Country	Leadership competencies and behavioural emphasis	Organisational-behaviour emphasis	Organisational-effectiveness emphasis	Contextual considerations
South Africa	Self-awareness, strategic capability, transformational and instructional leadership, municipal leadership competence, ethical and inclusive behaviour	Employee well-being, engagement, trust, participation and leadership–employee relationships	Service delivery, institutional transformation, educational and organisational performance	Institutional complexity, diverse workforce environments and risks associated with toxic or self-serving leadership
Botswana	Talent-oriented leadership, people development, governance capability and inclusive leadership	Talent development, employee retention and participation	Human-capital sustainability, institutional capability and governance effectiveness	Talent-management requirements, governance structures and gender inclusion

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Country	Leadership competencies and behavioural emphasis	Organisational-behaviour emphasis	Organisational-effectiveness emphasis	Contextual considerations
Namibia	Inclusive leadership, change leadership, fairness, stakeholder orientation and relational capability	Employee engagement, trust, participation and perceptions of fairness	Service delivery, sustainability and institutional legitimacy	Interaction between formal and traditional authority, governance arrangements and stakeholder legitimacy
Zimbabwe	Relational leadership, followership, legitimacy, collective responsibility and adaptive leadership	Trust, followership, commitment and collective participation	Institutional rebuilding, resilience and organisational continuity	Institutional uncertainty and importance of leadership legitimacy
Zambia	Strategic, transformational, participative and performance-oriented leadership	Employee motivation, organisational culture, employee performance and participation	Organisational growth, educational quality, innovation and organisational performance	Sectoral diversity and leadership requirements across public, educational, energy and entrepreneurial environments
Mozambique	Strategic leadership, adaptability, stakeholder management and institutional awareness	Employee alignment, stakeholder relationships and organisational participation	Organisational performance, adaptability and institutional resilience	Institutional complexity, economic pressures and broader governance environment
Lesotho	Collaborative, relational, inclusive and stakeholder-oriented leadership	Participation, inclusion, collaboration and stakeholder engagement	Governance, institutional development and sustainable-development outcomes	Governance challenges, partnership requirements and social-development priorities
Eswatini	Inclusive	Participation,	Institutional	Gender norms,

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Country	Leadership competencies and behavioural emphasis	Organisational-behaviour emphasis	Organisational-effectiveness emphasis	Contextual considerations
	leadership, gender-responsive leadership, institutional leadership and relational capability	inclusion, leadership access and representation	transformation, leadership diversity and organisational inclusion	patriarchal structures and institutional traditions

Source: Authors' analysis based on Barkhuizen and Masale (2022), Bush et al. (2022), Da Fonseca et al. (2022), Chikohomero (2023), Choongo et al. (2023), John et al. (2023), Atiku et al. (2023), Dlamini (2023), Boane et al. (2024), Harawa (2024), Mooketsane and Monyeki (2024), Muringa and Shava (2024), Nkambule and Perumal (2024), Nkabane and Wantchami (2024), Atiku et al. (2024), Chirwa (2025), Paul and Mosisili (2025), Thelma et al. (2025), Makamure (2026), and Makhetha and Ngozwana (2026).

As illustrated in Table 2, the comparative evidence reveals important areas of leadership convergence across the selected Southern African countries. Strategic capability, relational competence, adaptability, employee development, ethical conduct and stakeholder engagement recur across different national and organisational contexts (Choongo et al., 2023; Atiku et al., 2023; Boane et al., 2024; Muringa & Shava, 2024; Huseynzada, 2024). These commonalities suggest the existence of a potential core set of leadership capabilities that may have relevance across Southern African organisational environments. Such convergence is important for the development of a regional leadership framework because it indicates that leadership standards do not necessarily need to be constructed independently for every national context.

At the same time, the comparison demonstrates important areas of divergence. Leadership scholarship within South Africa places considerable emphasis on individual leadership capability, institutional performance and the consequences of destructive leadership (Da Fonseca et al., 2022; John et al., 2023; Olabiyi et al., 2024; Muringa & Shava, 2024). Botswana's literature gives greater prominence to talent orientation and human-capital sustainability (Barkhuizen & Masale, 2022), while Namibian evidence foregrounds inclusion, employee engagement, fairness and leadership legitimacy (Atiku et al., 2023; Atiku et al., 2024). Zambian evidence demonstrates particularly strong relationships between leadership, organisational culture, employee motivation, performance, innovation and

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institutional quality across different sectors (Choongo et al., 2023; Mwambela & Zulu, 2024; Chirwa, 2025; Thelma et al., 2025).

The literature from Zimbabwe, Mozambique, Lesotho and Eswatini further demonstrates why contextual conditions cannot be separated from leadership effectiveness. Leadership legitimacy and leader–follower relationships are particularly evident within Zimbabwean scholarship (Chikohomero, 2023; Tagwirei, 2024), while strategic leadership and the ability to operate within complex institutional conditions emerge within Mozambique (Harawa, 2024; Boane et al., 2024). Governance, collaboration and stakeholder relationships feature prominently within the Lesotho evidence (Nkabane & Wantchami, 2024; Paul & Mosisili, 2025; Makhetha & Ngozwana, 2026), whereas gender, inclusion and institutional structures represent significant dimensions of the Eswatini leadership environment (Nkambule & Perumal, 2024; Makamure, 2026).

Importantly, these differences should not be interpreted as evidence that a competency identified strongly in one country is irrelevant elsewhere. Rather, the comparative evidence indicates differences in emphasis and contextual salience. For example, inclusive leadership may be relevant across all eight countries even where the existing literature has examined it more extensively in Namibia. Similarly, self-awareness is unlikely to be uniquely relevant to South African leaders simply because the construct has received stronger empirical attention within South African research. The comparison reflects the patterns within the available evidence rather than suggesting rigid national leadership profiles.

Three broader comparative observations consequently emerge. First, there appears to be a common leadership core consisting of strategic, relational, ethical, people-development and adaptive capabilities. Second, the way these capabilities are expressed is influenced by institutional, cultural, organisational and sectoral conditions. Third, organisational behaviour provides an important pathway through which leadership capability is translated into organisational effectiveness, particularly through employee motivation, engagement, trust, participation, retention and performance (Barkhuizen & Masale, 2022; Haricharan, 2023; Atiku et al., 2024; Mwambela & Zulu, 2024; Chirwa, 2025).

The comparative analysis supports a core-plus-context understanding of leadership development. Under this approach, a common set of leadership competencies and behavioural expectations may provide the foundation for leadership development across Southern Africa, while contextual dimensions allow leadership practices and developmental priorities to be adapted to national, institutional, sectoral and organisational requirements. This provides an important

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conceptual foundation for the leadership-development framework proposed in this study.

Literature analysis and research gap

The literature demonstrates that leadership development, leadership competencies, leadership behaviours, organisational behaviour and organisational effectiveness are interconnected but distinct dimensions of leadership effectiveness. Developmental mechanisms strengthen leadership capability; competencies provide leaders with the capacity to act; behaviours represent the application of those competencies; and employee responses influence whether leadership translates into sustainable organisational outcomes (Douglas et al., 2021; Barkhuizen & Masale, 2022; Haricharan, 2023; Atiku et al., 2024; Bangura & Lourens, 2025).

Despite increasing research activity, the Southern African evidence remains fragmented across countries, sectors and leadership constructs. Some studies emphasise strategic leadership and organisational growth (Choongo et al., 2023; Boane et al., 2024), while others focus on employee performance and motivation (Mwambela & Zulu, 2024; Chirwa, 2025), talent and retention (Barkhuizen & Masale, 2022), inclusive leadership and employee engagement (Atiku et al., 2024), service delivery (John et al., 2023; Atiku et al., 2023), educational leadership (Bush et al., 2022; Thelma et al., 2025), leadership competencies (Muringa & Shava, 2024), leadership toxicity (Olabiyi et al., 2024) or gendered leadership structures (Nkambule & Perumal, 2024; Makamure, 2026). These streams are rarely integrated into a common comparative framework.

A further gap lies in the limited distinction between leadership development, leadership competencies and leadership behaviours. Treating these constructs interchangeably makes it difficult to determine whether organisational outcomes result from developmental processes, underlying leader capability or the actual behaviours experienced by employees. Similarly, organisational behaviour outcomes such as engagement, motivation, trust and retention are frequently examined separately from broader indicators of organisational effectiveness, despite their likely intermediary role. The comparative evidence supports an integrated relationship in which:

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Leadership development → Leadership competencies → Leadership behaviours → Organisational behaviour → Organisational effectiveness

This relationship is conditioned by national, institutional, cultural, sectoral and organisational context. The present study builds on this integrated perspective by comparing how these dimensions manifest across South Africa, Botswana, Namibia, Zimbabwe, Zambia, Mozambique, Lesotho and Eswatini, to identify leadership capabilities that demonstrate broader regional relevance while distinguishing those that require contextual adaptation. The literature collectively suggests that leadership development contributes to organisational effectiveness through a series of interconnected processes rather than through a simple direct relationship. Developmental interventions strengthen leadership competencies, which shape the behaviours demonstrated by leaders in organisational settings. These behaviours subsequently influence employee attitudes, relationships and collective organisational behaviour, which can contribute to broader organisational outcomes such as performance, service delivery, innovation, sustainability and adaptability (Douglas et al., 2021; Barkhuizen & Masale, 2022; Choongo et al., 2023; Atiku et al., 2024; Muringa & Shava, 2024; Chirwa, 2025). The literature further indicates that these relationships are context-dependent. Leadership practices are influenced by institutional arrangements, organisational culture, sector characteristics, socio-cultural expectations and national conditions (Chlouba, 2021; Galperin et al., 2024; Nkambule & Perumal, 2024; Nkabane & Wantchami, 2024). Consequently, the conceptual framework developed from the literature incorporates context as a cross-cutting influence rather than treating it as a separate leadership outcome. Figure 1 presents the resulting conceptual relationship.

Figure 1 positions leadership development as the starting point of an organisational capability-building process rather than as an organisational outcome in itself. Developmental interventions are expected to strengthen leadership competencies, including strategic, interpersonal, ethical, adaptive and people-management capabilities. These competencies become organisationally meaningful when translated into observable leadership behaviours such as communication, empowerment, accountability, collaboration and ethical decision-making.

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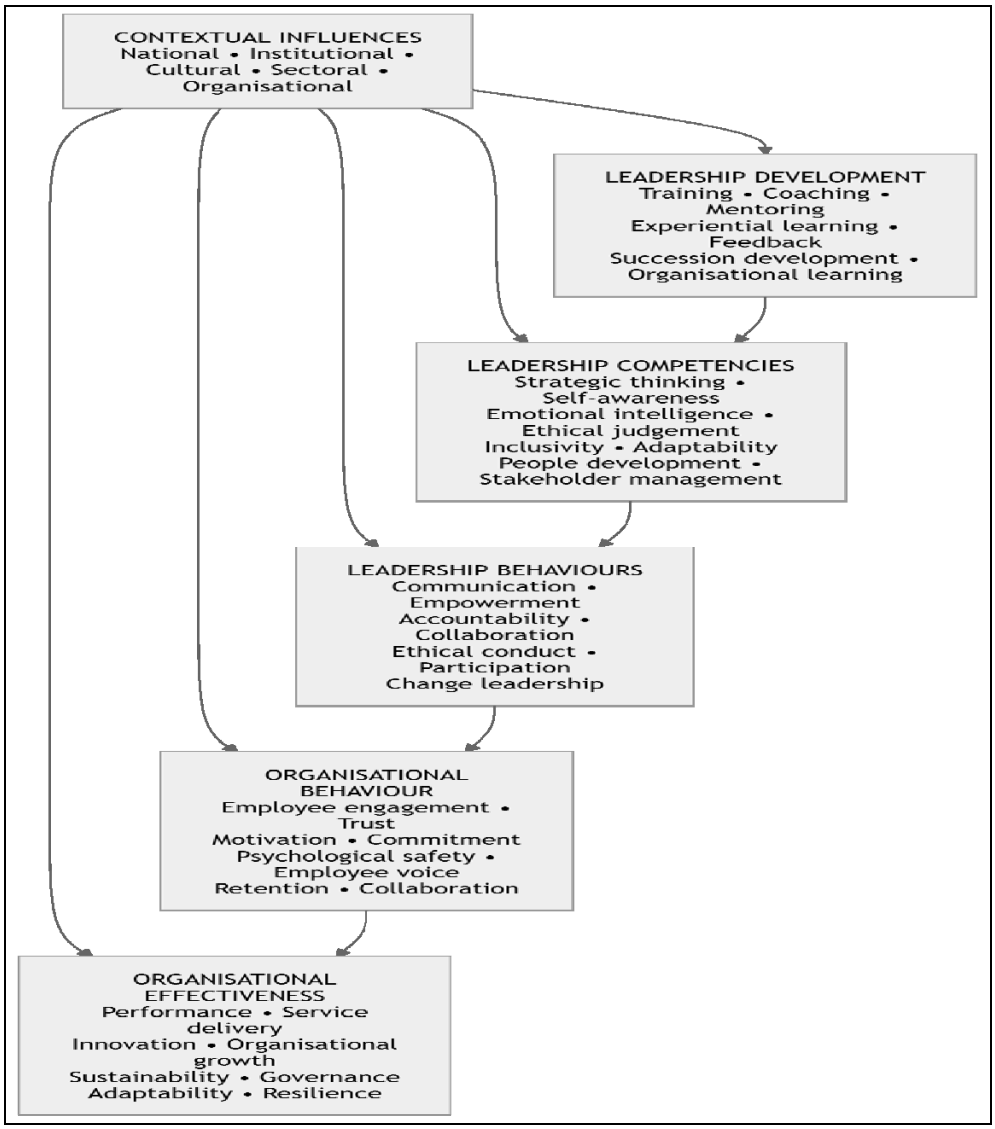


Figure nr.1. Conceptual framework linking leadership development to organisational effectiveness

Source: Authors' conceptualisation based on Douglas et al. (2021), Da Fonseca et al. (2022), Barkhuizen and Masale (2022), Choongo et al. (2023), Haricharan (2023), Atiku et al. (2024), Muringa and Shava (2024), Mwambela and Zulu (2024), Chirwa (2025), and Bangura and Lourens (2025).

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The framework further positions organisational behaviour as an intermediary mechanism between leadership behaviour and organisational effectiveness. Employee engagement, trust, motivation, commitment, psychological safety, participation and retention are not treated merely as secondary employee outcomes. Instead, they represent behavioural pathways through which leadership may contribute to improved organisational performance, service delivery, innovation, sustainability and resilience (Haricharan, 2023; Atiku et al., 2024; Mwambela & Zulu, 2024; Chirwa, 2025).

Importantly, the framework does not assume that these relationships operate uniformly across all eight countries. National, institutional, cultural, sectoral and organisational conditions surround and influence the entire leadership-development process. The same leadership competency may be important across multiple Southern African settings but may require different behavioural expressions depending on organisational and national context (Galperin et al., 2024; Nkambule & Perumal, 2024).

The framework consequently reflects the core-plus-context perspective emerging from the comparative literature. A common core of strategic, relational, ethical, adaptive and people-development capabilities may provide a regional foundation for leadership development, while contextual considerations determine how those capabilities should be developed and enacted within South Africa, Botswana, Namibia, Zimbabwe, Zambia, Mozambique, Lesotho and Eswatini.

This provides a strong transition into the Methodology section, because the methodology can now explain how we will compare the eight countries against these five dimensions: leadership development, competencies, behaviours, organisational behaviour and organisational effectiveness.

Research Methodology

Research approach and design

This study adopts a qualitative comparative research design to examine leadership development and its relationship with organisational behaviour and organisational effectiveness across selected Southern African countries. Comparative research is particularly appropriate where the objective is to identify patterns of similarity and difference across cases while simultaneously examining how contextual conditions may explain variation in the phenomenon under investigation (Goodrick, 2014; Bartlett & Vavrus, 2017). In leadership research, comparative approaches are especially valuable because leadership practices and perceptions of leadership effectiveness are embedded within national, cultural and

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institutional contexts and cannot necessarily be assumed to operate uniformly across countries (van der Westhuizen & Hewitt, 2021; Galperin et al., 2024).

The study is positioned within an interpretivist research paradigm, recognising that leadership and organisational behaviour are socially and contextually constructed phenomena whose meaning may vary across institutional and cultural settings. Interpretivism is appropriate where research seeks to understand meanings, patterns and contextual differences rather than establish universal relationships exclusively through statistical measurement (Creswell & Poth, 2018; Saunders et al., 2023). This orientation is particularly relevant to the present study because African leadership research demonstrates both commonality and considerable contextual variation in perceptions of effective leadership (Galperin et al., 2024; Toendepi & Cele, 2024).

The study relies on secondary qualitative evidence, principally contemporary peer-reviewed scholarship concerning leadership and organisational outcomes. Secondary qualitative research enables existing empirical and conceptual evidence to be re-examined from a new analytical perspective, particularly where the objective is to integrate findings that were originally generated within different settings (Johnston, 2017; Saunders et al., 2023). In the present study, existing country-level research is not merely summarised; rather, it is comparatively analysed to identify patterns of leadership convergence, divergence and contextual variation across the selected Southern African countries.

The comparative design is guided by the conceptual framework developed from the literature, comprising five interconnected dimensions: leadership development, leadership competencies, leadership behaviours, organisational behaviour and organisational effectiveness. National, institutional, cultural, sectoral and organisational contexts are treated as cross-cutting influences because contemporary leadership research demonstrates that leadership practices and outcomes are shaped by the environments within which leadership occurs (van der Westhuizen & Hewitt, 2021; Galperin et al., 2024; Nkambule & Perumal, 2024).

Selection of countries

The comparative analysis focuses on South Africa, Botswana, Namibia, Zimbabwe, Zambia, Mozambique, Lesotho and Eswatini. The countries were purposively selected to provide a coherent Southern African geographical focus while enabling comparison across different institutional, economic, organisational and socio-cultural environments. Purposive selection is appropriate within qualitative comparative research where cases are chosen according to their

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relevance to the research problem and their potential contribution to understanding the phenomenon rather than statistical representativeness (Campbell et al., 2020).

The selection recognises that Southern African countries share important regional, historical and institutional connections while simultaneously exhibiting considerable variation in governance structures, organisational environments, economic conditions and socio-cultural characteristics. Such variation is analytically valuable because contextual differences can influence leadership expectations, legitimacy and organisational outcomes (Chlouba, 2021; Chikohomero, 2023; Galperin et al., 2024; Nkabane & Wantchami, 2024).

The selected countries also provide evidence of leadership across diverse organisational environments. Contemporary studies have examined leadership competencies and organisational outcomes in South Africa (Da Fonseca et al., 2022; Muringa & Shava, 2024), talent-oriented leadership in Botswana (Barkhuizen & Masale, 2022), inclusive leadership and employee engagement in Namibia (Atiku et al., 2024), leadership and followership in Zimbabwe (Chikohomero, 2023; Tagwirei, 2024), leadership and employee or organisational performance in Zambia (Choongo et al., 2023; Mwambela & Zulu, 2024; Chirwa, 2025), strategic leadership in Mozambique (Boane et al., 2024), governance and collaborative leadership issues in Lesotho (Nkabane & Wantchami, 2024; Makhetha & Ngozwana, 2026), and gender and institutional leadership in Eswatini (Nkambule & Perumal, 2024; Makamure, 2026). The purpose of country selection is not statistical generalisation to the whole African continent or even to every Southern African country. Rather, the design seeks analytical generalisation by identifying patterns that recur across different national cases while retaining sensitivity to context.

Data sources and evidence selection

The study uses secondary documentary data, with peer-reviewed journal articles constituting the principal evidence base. Document analysis provides a systematic means of examining and interpreting existing textual material and is particularly appropriate when documentary sources constitute the primary data from which patterns and meanings are generated (Bowen, 2009; Morgan, 2022).

To ensure contemporary relevance, the study primarily considers literature published between 2021 and 2026. Earlier publications are incorporated selectively where they provide foundational theoretical or contextual contributions that remain necessary for understanding the development of leadership scholarship within particular national environments. This approach balances contemporary relevance

with the need to avoid excluding important contextual evidence solely based on publication date.

Evidence is selected according to its relevance to one or more of the five analytical dimensions identified in the conceptual framework: leadership development, leadership competencies, leadership behaviours, organisational behaviour and organisational effectiveness. Studies addressing employee engagement, motivation, trust, retention, organisational culture, service delivery, performance, innovation, governance, resilience and sustainability are included where these outcomes are explicitly connected to leadership (Barkhuizen & Masale, 2022; Choongo et al., 2023; Haricharan, 2023; Atiku et al., 2024; Mwambela & Zulu, 2024; Chirwa, 2025).

Country-specific organisational literature is prioritised because the central purpose of the study is comparative. Broader African research is incorporated where it contributes to understanding regional leadership patterns or provides a basis for interpreting differences across countries (Bush et al., 2022; Galperin et al., 2024). International literature is used principally to establish conceptual and methodological foundations rather than substitute for Southern African evidence.

Comparative analytical framework

A common analytical framework is applied to all eight countries to enhance comparability and analytical consistency. Comparative qualitative research requires sufficient conceptual equivalence between cases to enable meaningful comparison while retaining sensitivity to contextual variation (Bartlett & Vavrus, 2017). Accordingly, the framework developed from the literature is used to organise evidence consistently across the national cases.

The five principal analytical dimensions reflect relationships repeatedly identified within contemporary leadership and organisational research. Leadership-development interventions may strengthen individual and organisational leadership capacity (Douglas et al., 2021; Mbokota & Reid, 2022; Bangura & Lourens, 2025); leadership competencies provide the capabilities necessary for effective leadership practice (Da Fonseca et al., 2022; Muringa & Shava, 2024); leadership behaviours represent the observable enactment of those capabilities (Orekoya, 2024; Atiku et al., 2024); organisational behaviour captures employee and collective responses to leadership (Haricharan, 2023; Chirwa, 2025); and organisational effectiveness represents the broader performance consequences associated with these processes (Choongo et al., 2023; Boane et al., 2024; Huseynzada, 2024).

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Table 3: Comparative analytical framework

Analytical dimension	Focus of analysis	Illustrative indicators
Leadership development	Processes through which leadership capability is developed	Training, coaching, mentoring, experiential learning, feedback, succession development
Leadership competencies	Capabilities associated with effective leadership	Strategic thinking, self-awareness, emotional intelligence, ethics, adaptability, inclusivity
Leadership behaviours	Observable application of leadership capabilities	Communication, empowerment, accountability, collaboration, participation, change leadership
Organisational behaviour	Individual and collective employee responses	Engagement, motivation, trust, commitment, psychological safety, employee voice, retention
Organisational effectiveness	Organisational and institutional outcomes	Performance, service delivery, innovation, growth, sustainability, governance and resilience
Contextual influences	Conditions affecting relationships across dimensions	National, cultural, institutional, sectoral and organisational context

Source: Authors' conceptualisation based on Douglas et al. (2021), Da Fonseca et al. (2022), Mbokota and Reid (2022), Choongo et al. (2023), Haricharan (2023), Atiku et al. (2024), Muringa and Shava (2024), Chirwa (2025), and Bangura and Lourens (2025).

Data analysis

The documentary evidence is analysed through a combination of thematic analysis and cross-case comparative analysis. Thematic analysis provides a flexible approach for identifying, organising and interpreting patterns of meaning within qualitative material and can be applied to documentary and secondary textual data (Braun & Clarke, 2021, 2022). The approach is appropriate to the present study because the objective is to identify recurring leadership-development, competency, behavioural and organisational-outcome themes across heterogeneous national evidence.

The first stage involves familiarisation with the evidence and classification of relevant material according to the five dimensions of the conceptual framework. The second stage involves initial coding of leadership-development practices, competencies, leadership behaviours, organisational-behaviour outcomes and organisational-effectiveness outcomes. Coding is informed by the conceptual

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framework while remaining sufficiently flexible to accommodate themes emerging from particular national contexts, reflecting a theoretically informed but interpretive analytical approach (Braun & Clarke, 2021).

The third stage involves within-country analysis, through which recurring leadership themes and contextual conditions are identified separately for South Africa, Botswana, Namibia, Zimbabwe, Zambia, Mozambique, Lesotho and Eswatini. Maintaining an initial within-case focus is important because comparative research should first preserve the contextual integrity of individual cases before similarities and differences are examined across cases (Bartlett & Vavrus, 2017).

The fourth stage involves cross-country comparative analysis. Themes identified within each national context are compared to establish patterns of convergence, divergence and contextual variation. Particular attention is given to leadership competencies and behaviours recurring across several countries because these may indicate capabilities with broader Southern African relevance. At the same time, country-specific patterns are retained where the evidence suggests that particular institutional or socio-cultural conditions influence leadership practice (Galperin et al., 2024).

The final stage consists of interpretive analysis, whereby the comparative patterns are integrated with the conceptual framework to distinguish between a potential common leadership core and context-sensitive leadership capabilities. The analytical process can therefore be represented as:

Evidence identification → Coding and thematic categorisation → Within-country analysis → Cross-country comparison → Convergence/divergence analysis → Interpretive analysis → Proposed leadership-development framework

Analytical rigour and trustworthiness

Trustworthiness is particularly important in qualitative comparative research because interpretation can be influenced by differences in the quantity, quality and contextual focus of available evidence. Credibility, dependability, confirmability and transferability provide established criteria for evaluating qualitative research quality (Lincoln & Guba, 1985; Korstjens & Moser, 2018). Although these foundational methodological sources fall outside the preferred five-year publication window, they are appropriately retained because they establish methodological principles rather than provide contemporary substantive evidence.

Credibility is strengthened by drawing on multiple studies within each national context where evidence is available and by comparing findings across different

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organisational sectors. Triangulation across sources reduces reliance on individual studies and enables leadership patterns to be evaluated against a broader evidence base (Morgan, 2022). A common analytical framework is also applied across all countries to strengthen consistency. Dependability is supported through a transparent analytical process in which evidence is classified according to predefined dimensions before cross-country comparison. Confirmability is strengthened by distinguishing between patterns directly evident within the reviewed studies and higher-order interpretations developed through the comparative analysis.

An additional methodological safeguard involves distinguishing between absence of evidence and evidence of absence. The fact that a particular competency has received greater research attention in one country does not demonstrate that it is irrelevant elsewhere. This consideration is particularly important given the uneven distribution of leadership research across Southern Africa. Comparative conclusions are based on the weight and consistency of available evidence rather than simply the frequency with which particular concepts appear in publications.

Ethical considerations

The study relies on publicly available secondary scholarly and documentary sources and does not involve direct interaction with human participants or collection of primary personal data. Secondary-data research nevertheless requires adherence to principles of research integrity, accurate representation of original findings, appropriate attribution and transparent interpretation of existing evidence (Saunders et al., 2023). Particular attention is given to avoiding the decontextualisation of country-level findings. Evidence generated within one national or organisational environment is not automatically generalised to other Southern African contexts. This is consistent with the comparative orientation of the study and its recognition that leadership practices are integrated within particular institutional and socio-cultural environments (Galperin et al., 2024).

Methodological limitations

Several methodological limitations require acknowledgement. First, leadership scholarship is unevenly distributed across the selected countries, meaning that countries with larger research systems, particularly South Africa, may be represented by a greater volume of empirical evidence. Second, the reviewed studies originate from different organisational sectors and employ different

conceptualisations and measures of leadership and organisational effectiveness, limiting direct equivalence between all findings.

Third, secondary comparative analysis depends on the methodological quality and scope of existing research and cannot establish causal relationships between leadership development and organisational effectiveness. The proposed relationships should be interpreted as evidence-informed comparative propositions rather than empirically tested causal pathways. Future primary research could empirically validate the framework across Southern African organisations and examine whether leadership competency and behavioural requirements vary according to managerial level, sector and national context.

Comparative Findings and Analysis

The comparative analysis reveals that leadership development across the selected Southern African countries is characterised by both common capability requirements and significant contextual variation. Across South Africa, Botswana, Namibia, Zimbabwe, Zambia, Mozambique, Lesotho and Eswatini, leadership effectiveness is consistently associated with strategic capability, relational competence, adaptability, ethical conduct, employee development and the ability to mobilise people around organisational objectives (Da Fonseca et al., 2022; Barkhuizen & Masale, 2022; Choongo et al., 2023; Atiku et al., 2024; Muringa & Shava, 2024; Boane et al., 2024; Chirwa, 2025). However, the relative emphasis placed on these capabilities differs according to organisational sector, institutional maturity, governance conditions and socio-cultural context. The findings support a core-plus-context interpretation of leadership development, whereby a common set of leadership capabilities appears relevant across the region but requires contextual adaptation.

Strategic leadership and organisational direction

Strategic leadership emerges as one of the most consistent leadership dimensions across the selected countries. Effective leaders are expected to interpret changing organisational environments, establish strategic direction, align resources with organisational objectives and facilitate adaptation under conditions of uncertainty. These requirements are particularly evident in public-sector, education, energy, hospitality and entrepreneurial environments where leadership decisions directly influence organisational performance and institutional effectiveness (John et al., 2023; Choongo et al., 2023; Boane et al., 2024; Muringa & Shava, 2024; Huseynzada, 2024).

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Within Zambia, leadership approaches have been associated with organisational growth, employee performance and institutional quality across different sectors, demonstrating that strategic leadership is relevant beyond senior executive decision-making and extends into employee management and organisational culture (Choongo et al., 2023; Mwambela & Zulu, 2024; Thelma et al., 2025). Similarly, evidence from Mozambique associates strategic leadership with organisational performance in the hospitality sector, reinforcing the importance of aligning organisational resources and employee effort with changing competitive conditions (Boane et al., 2024).

Within South African municipalities, leadership capability is closely associated with institutional transformation and service-delivery expectations, suggesting that strategic competence must be combined with governance capability and operational execution (John et al., 2023; Muringa & Shava, 2024). The findings indicate that strategic leadership represents a common regional competency, although its application differs according to whether organisational effectiveness is measured through growth, service delivery, educational quality, sustainability or institutional transformation.

Relational and people-centred leadership

A second dominant finding concerns the importance of relational and people-centred leadership. Across several of the selected countries, leadership effectiveness is associated with the ability to communicate, establish trust, involve employees, develop talent and create supportive workplace relationships (Barkhuizen & Masale, 2022; Haricharan, 2023; Orekoya, 2024; Atiku et al., 2024; Chirwa, 2025).

Inclusive leadership is particularly prominent within the Namibian evidence, where employee engagement emerges as an important pathway connecting leadership behaviour with organisational sustainability (Atiku et al., 2024). The significance of inclusion extends beyond participation itself because inclusive leadership can strengthen perceptions of recognition, belonging and organisational support. Trust similarly influences the relationship between leadership and team climate, suggesting that employees' interpretations of leadership behaviour are central to organisational outcomes (Orekoya, 2024).

Botswana provides a related but distinct people-management emphasis. Leadership talent mindset is associated with talent-management practices and employee retention, indicating that leaders influence organisational effectiveness through decisions concerning employee development and long-term workforce

capability (Barkhuizen & Masale, 2022). Within Zambia, leadership behaviour is similarly linked with employee performance and motivation, while organisational culture shapes the extent to which leadership translates into positive employee outcomes (Mwambela & Zulu, 2024; Chirwa, 2025).

These findings demonstrate that leadership effectiveness cannot be reduced to strategic decision-making. Relational competence, employee development and inclusive behaviour represent important mechanisms through which organisational strategy is converted into employee contribution.

Self-awareness, ethics and leadership legitimacy

The analysis further identifies self-awareness, ethical conduct and leadership legitimacy as important dimensions of leadership effectiveness. Leadership behaviour is shaped by leaders' ability to regulate their own conduct, recognise their interpersonal impact and exercise authority in ways perceived as fair and legitimate (Da Fonseca et al., 2022; Olabiyi et al., 2024; Matsiliza, 2024).

The South African literature demonstrates particularly strongly the consequences of both constructive and destructive leadership behaviour. Self-awareness is associated with effective leadership outcomes, while authoritarianism, cronyism and self-serving conduct have been identified as significant organisational risks (Da Fonseca et al., 2022; Olabiyi et al., 2024). The contrast suggests that leadership development should not only strengthen positive competencies but also identify behavioural derailers capable of undermining trust, morale and institutional credibility.

Leadership legitimacy also appears strongly within the Namibian and Zimbabwean contexts. Governance arrangements, procedural fairness and relationships between leaders and followers influence perceptions of authority and trust (Chlouba, 2021; Chikohomero, 2023; Matsiliza, 2024). In these environments, leadership effectiveness is not determined solely by formal position but also by whether authority is perceived as legitimate, fair and responsive.

This finding strengthens the argument that ethical capability should be treated as a core leadership-development domain rather than a peripheral values component.

Leadership, organisational culture and employee behaviour

The findings provide strong support for organisational behaviour as an intermediary mechanism between leadership and organisational effectiveness. Leadership influences employee motivation, engagement, trust, commitment, employee voice, retention and perceptions of organisational culture, which

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subsequently shape organisational performance (Barkhuizen & Masale, 2022; Haricharan, 2023; Atiku et al., 2024; Mwambela & Zulu, 2024; Chirwa, 2025).

The Zambian evidence is particularly illustrative because leadership has been associated with employee motivation, performance, organisational culture, educational quality and organisational growth across multiple sectors (Choongo et al., 2023; Mwambela & Zulu, 2024; Chirwa, 2025; Thelma et al., 2025). Organisational culture appears especially important because it can strengthen or constrain the translation of leadership behaviour into employee motivation and performance.

Employee engagement similarly emerges as a significant behavioural mechanism within Namibia, while talent retention provides a related organisational-behaviour pathway within Botswana (Barkhuizen & Masale, 2022; Atiku et al., 2024). These findings indicate that organisational effectiveness is not produced solely through leadership decisions, but through the behavioural responses those decisions generate among employees.

The comparative analysis supports the proposition that leadership development influences organisational effectiveness partly through a sequence of behavioural mechanisms:

Leadership capability → Leadership behaviour → Employee response → Organisational outcome.

Leadership adaptability and organisational resilience

Adaptability emerges as another important cross-country capability, particularly within contexts characterised by economic uncertainty, institutional change, technological disruption or social transformation. Contemporary organisations require leaders capable of adjusting strategy, managing change and maintaining organisational continuity while responding to emerging challenges (Gurgu et al., 2022; Atiku et al., 2023; Choongo et al., 2023; Adesanya et al., 2025).

Leadership agility has become especially important in entrepreneurial and innovation-intensive environments where organisational survival may depend on rapid adaptation. The relationship between leadership approaches and FinTech growth in Zambia illustrates the significance of leadership in shaping innovation-oriented organisational performance (Choongo et al., 2023). Similar concerns arise within small and medium-sized enterprises, where leadership agility contributes to organisational resilience under uncertain conditions (Adesanya et al., 2025).

The importance of adaptability also extends to public institutions. Leadership during organisational change requires both strategic direction and the capacity to

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maintain service delivery while employees adjust to new organisational expectations (Atiku et al., 2023). The findings therefore suggest that adaptability should be treated as a core leadership competency across managerial levels rather than as a specialist change-management skill.

Inclusion, gender and access to leadership

The comparative findings also reveal that leadership development cannot be examined independently from questions of inclusion and access to leadership opportunities. Institutional and socio-cultural structures influence who enters leadership positions, how leadership authority is interpreted and whether different groups have equitable opportunities to develop leadership capability (Mooketsane & Monyeki, 2024; Nkambule & Perumal, 2024; Makamure, 2026).

Eswatini provides particularly strong evidence of gendered leadership structures, with patriarchal norms influencing women's experiences of leadership and progression into leadership roles (Nkambule & Perumal, 2024; Makamure, 2026). Related concerns concerning gender equality and governance are evident within Botswana, suggesting that leadership-development systems need to consider not only competency formation but also structural access to developmental opportunities (Mooketsane & Monyeki, 2024).

The findings broaden the meaning of leadership development. Effective leadership-development systems should not merely improve the capabilities of individuals already occupying leadership positions; they should also contribute to equitable leadership pipelines and organisational succession systems.

Cross-country convergence and divergence

The comparative analysis identifies several areas of convergence across the eight countries. Strategic thinking, people leadership, adaptability, ethical conduct, relational competence, stakeholder engagement and employee development recur across different national and organisational settings (Da Fonseca et al., 2022; Barkhuizen & Masale, 2022; Choongo et al., 2023; Atiku et al., 2024; Muringa & Shava, 2024; Boane et al., 2024; Chirwa, 2025). These recurring dimensions indicate the potential existence of a regional core of leadership capability.

Nevertheless, important areas of divergence are also evident. South African evidence places comparatively stronger emphasis on competency development, service delivery and dysfunctional leadership risks; Botswana foregrounds talent and human-capital sustainability; Namibia places greater emphasis on inclusion, engagement and legitimacy; Zambia demonstrates strong connections among

leadership, motivation, organisational culture, employee performance and growth; while Eswatini highlights gender and institutional access to leadership (Barkhuizen & Masale, 2022; Da Fonseca et al., 2022; Atiku et al., 2024; Nkambule & Perumal, 2024; Chirwa, 2025).

Zimbabwean evidence places greater emphasis on legitimacy, followership and institutional rebuilding, while Mozambique and Lesotho reveal the significance of institutional context, stakeholder relationships and adaptability (Chikohomero, 2023; Boane et al., 2024; Nkabane & Wantchami, 2024; Tagwirei, 2024; Makhetha & Ngozwana, 2026).

These differences should not be interpreted as mutually exclusive national leadership profiles. Instead, they reflect differences in the salience of particular leadership challenges within existing research and organisational environments. The findings support a regional leadership framework incorporating common capability domains while permitting national and organisational adaptation.

Emerging Southern African leadership capability architecture

The comparative findings indicate that leadership effectiveness across the selected Southern African countries is best understood through a multi-dimensional capability architecture rather than through reliance on a single leadership style. Across the evidence base, recurring leadership requirements cluster around strategic, people-oriented, relational, ethical, adaptive, inclusive, intrapersonal and contextual capabilities. Although the prominence of individual competencies differs across national and organisational environments, the comparative patterns suggest that these domains collectively constitute a plausible regional leadership core (Da Fonseca et al., 2022; Barkhuizen & Masale, 2022; Choongo et al., 2023; Atiku et al., 2024; Muringa & Shava, 2024; Mwambela & Zulu, 2024; Chirwa, 2025).

The emergence of this architecture is significant because the literature does not support the proposition that one leadership approach is sufficient across all contexts. Transformational, inclusive, strategic, instructional, responsible and participative leadership all appear relevant, but each captures only part of the broader capability required to lead effectively (Bush et al., 2022; Orekoya, 2024; Toendepi & Cele, 2024; Huseynzada, 2024). The comparative evidence points towards a capability-based approach, in which leadership effectiveness depends on the integration of multiple competencies and behaviours rather than adherence to a single leadership style.

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Strategic leadership forms one of the central dimensions of this architecture because leaders are expected to establish direction, align resources, interpret environmental change and convert strategy into organisational action. This requirement is evident across public, education, energy, hospitality and entrepreneurial environments, where leadership has been associated with service delivery, organisational growth, institutional performance and strategic transformation (John et al., 2023; Choongo et al., 2023; Boane et al., 2024; Muringa & Shava, 2024). However, strategic capability alone is insufficient. The comparative evidence consistently demonstrates that leadership outcomes are also shaped by the quality of relationships leaders establish with employees and stakeholders, placing people leadership and relational capability at the centre of effective leadership practice (Barkhuizen & Masale, 2022; Haricharan, 2023; Atiku et al., 2024; Chirwa, 2025).

Ethical and inclusive leadership constitute further core components because leadership legitimacy depends not only on performance outcomes but also on how authority is exercised. Fairness, accountability, transparency, participation and respect for diverse perspectives influence trust in leaders and the willingness of employees and stakeholders to support organisational objectives (Orekoya, 2024; Olabiyi et al., 2024; Nkambule & Perumal, 2024). The inclusion of ethical and inclusive capability is particularly important in contexts where leadership effectiveness is shaped by governance expectations, gendered institutional structures, perceptions of fairness and unequal access to leadership opportunities (Mooketsane & Monyeki, 2024; Nkambule & Perumal, 2024; Makamure, 2026).

Adaptability also emerges as a central requirement within the proposed architecture. Southern African organisations frequently operate within environments characterised by technological change, economic uncertainty, institutional reform and shifting stakeholder expectations. Leaders require the ability to respond to disruption, facilitate learning and maintain organisational continuity while adapting strategy and behaviour to changing conditions (Gurgu et al., 2022; Atiku et al., 2023; Choongo et al., 2023; Adesanya et al., 2025). The importance of adaptability also reinforces the relevance of intrapersonal leadership capabilities such as self-awareness, emotional regulation and reflective practice, because leaders must be able to adjust their own behaviour in response to feedback and changing circumstances (Da Fonseca et al., 2022).

Contextual leadership provides the final integrating dimension of the architecture. The cross-country evidence demonstrates that leadership capability cannot be separated from national, institutional, organisational and socio-cultural

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context. Leadership expectations concerning legitimacy, inclusion, authority, stakeholder engagement and organisational performance differ across countries and sectors, even where common competency domains are present (Chlouba, 2021; Chikohomero, 2023; Galperin et al., 2024; Nkabane & Wantchami, 2024). Contextual capability enables leaders to interpret and adapt broader leadership competencies to the environments in which they operate.

Against this background, Table 4 consolidates the recurring leadership dimensions identified through the comparative analysis and links each capability domain to observable leadership requirements and organisational implications.

Table 4: Emerging Southern African leadership capability architecture

Capability domain	Core leadership requirements	Indicative leadership behaviours	Organisational implications
Strategic leadership	Strategic thinking, direction setting, decision-making, environmental scanning and resource alignment	Sets clear direction, aligns priorities with organisational objectives, anticipates change and makes evidence-informed decisions	Improved performance, service delivery, organisational transformation and strategic alignment
People leadership	Coaching, motivation, talent development, empowerment and performance management	Develops employees, provides constructive feedback, recognises performance and supports succession	Increased engagement, employee performance, talent retention and workforce capability
Relational leadership	Communication, collaboration, trust-building, conflict management and stakeholder engagement	Communicates openly, builds productive relationships, encourages collaboration and manages conflict constructively	Improved commitment, participation, trust and organisational cohesion
Ethical leadership	Integrity, fairness, accountability, ethical judgement and responsible decision-making	Acts transparently, applies standards consistently, accepts accountability and challenges unethical conduct	Stronger governance, legitimacy, organisational trust and ethical culture

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Capability domain	Core leadership requirements	Indicative leadership behaviours	Organisational implications
Adaptive leadership	Change leadership, agility, innovation, resilience and learning orientation	Responds constructively to uncertainty, supports innovation, enables learning and adjusts leadership approaches when circumstances change	Greater organisational adaptability, resilience, innovation and transformation
Inclusive leadership	Diversity awareness, participative decision-making, empathy, equity and employee voice	Encourages participation, values diverse perspectives, creates opportunities for contribution and supports equitable leadership development	Increased inclusion, employee voice, engagement and leadership-pipeline diversity
Intrapersonal leadership	Self-awareness, emotional intelligence, self-regulation and reflective capability	Reflects on personal impact, manages emotions constructively, seeks feedback and adjusts behaviour	Improved behavioural effectiveness, credibility, interpersonal relationships and decision-making
Contextual leadership	Cultural intelligence, institutional awareness, stakeholder sensitivity and understanding of socio-economic context	Adapts leadership practices to organisational, sectoral and national conditions and balances competing stakeholder expectations	More contextually appropriate leadership, stakeholder legitimacy and sustainable organisational outcomes

Source: Authors' analysis based on Da Fonseca et al. (2022), Barkhuizen and Masale (2022), Choongo et al. (2023), Atiku et al. (2023), Haricharan (2023), Chikohomero (2023), Boane et al. (2024), Muringa and Shava (2024), Nkambule and Perumal (2024), Mwambela and Zulu (2024), Chirwa (2025), Thelma et al. (2025), and Makamure (2026).

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The architecture presented in Table 4 illustrates that the identified domains should not be interpreted as independent or mutually exclusive. Effective leadership requires the integration of capabilities. Strategic competence without relational capability may provide organisational direction but fail to secure employee commitment; people leadership without ethical capability may generate engagement while weakening fairness and accountability; and adaptability without contextual awareness may produce change initiatives that are poorly aligned with institutional or cultural realities (Da Fonseca et al., 2022; Atiku et al., 2024; Olabiyi et al., 2024). The value of the proposed architecture lies in the interaction between the domains rather than in their isolated application.

The findings further suggest that the architecture can support a core-plus-context leadership-development model. The core consists of the recurring strategic, people, relational, ethical, adaptive, inclusive and intrapersonal capabilities evident across multiple Southern African settings. Contextual leadership operates as the mechanism through which these core capabilities are adapted to national, institutional, sectoral and organisational requirements. This addresses the comparative finding that leadership competencies may have regional relevance while differing in their behavioural expression and relative priority across countries (Galperin et al., 2024; Muringa & Shava, 2024; Chirwa, 2025).

From a leadership-development perspective, the architecture also has practical value because each domain can be translated into competency standards, behavioural indicators and assessment criteria. Strategic leadership can be assessed through decision-making and strategic execution; people leadership through coaching and talent-development outcomes; relational leadership through trust and stakeholder measures; ethical leadership through governance and conduct indicators; adaptive leadership through change and innovation outcomes; inclusive leadership through participation and representation; intrapersonal leadership through self-awareness and feedback processes; and contextual leadership through the leader's ability to navigate institutional and stakeholder complexity. The capability architecture provides an evidence-informed basis for the development of leadership standards that can later be differentiated by organisational level.

Most importantly, the proposed architecture represents the transition from the comparative findings to the original contribution of the study. Rather than concluding merely that different leadership styles influence organisational outcomes, the study identifies a coherent set of leadership capability domains that integrate leadership development, behaviour and organisational effectiveness. This provides the basis for a contextually responsive Southern African leadership

framework in which common regional leadership standards can coexist with country-, sector- and organisation-specific adaptation.

Summary of comparative findings

The comparative findings demonstrate that leadership development contributes to organisational effectiveness primarily when leadership competencies are translated into behaviours that positively influence employees and organisational systems. Leadership creates organisational value not simply through strategic decision-making but through its effects on employee engagement, motivation, trust, performance, retention, organisational culture and adaptability (Barkhuizen & Masale, 2022; Haricharan, 2023; Atiku et al., 2024; Mwambela & Zulu, 2024; Chirwa, 2025).

The findings further demonstrate that effective leadership across Southern Africa requires a combination of shared capability and contextual responsiveness. Strategic leadership, people development, relational competence, ethical conduct and adaptability represent common regional requirements, while institutional, cultural, organisational and socio-economic conditions influence how these capabilities should be demonstrated in particular national environments.

The comparative evidence therefore supports the development of a core-plus-context Southern African leadership framework, in which common leadership standards are complemented by contextual competencies appropriate to particular countries, sectors, organisations and managerial levels.

Summary of comparative findings

The comparative analysis demonstrates that leadership development and organisational effectiveness across the selected Southern African countries are connected through a complex interaction of leadership capability, observable behaviour, employee responses and contextual conditions. Across South Africa, Botswana, Namibia, Zimbabwe, Zambia, Mozambique, Lesotho and Eswatini, the evidence consistently associates effective leadership with strategic direction, people development, relational competence, ethical conduct, adaptability and the capacity to respond to organisational and institutional demands (Barkhuizen & Masale, 2022; Da Fonseca et al., 2022; Choongo et al., 2023; Atiku et al., 2024; Boane et al., 2024; Muringa & Shava, 2024; Chirwa, 2025). The comparative findings challenge approaches that define leadership effectiveness predominantly through a particular leadership style and instead support a broader capability-based understanding of leadership.

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A particularly important finding is the distinction between leadership capability and leadership behaviour. Possessing strategic, relational or interpersonal competence does not necessarily generate organisational value unless those competencies are translated into behaviours experienced positively by employees and stakeholders. Communication, participation, empowerment, accountability, ethical conduct and employee development consequently represent important behavioural expressions of underlying leadership capability (Da Fonseca et al., 2022; Haricharan, 2023; Orekoya, 2024; Atiku et al., 2024). Conversely, authoritarianism, exclusion, cronyism and self-serving leadership behaviours may weaken organisational trust and undermine the potential benefits associated with formal leadership competence (Olabiyi et al., 2024).

The analysis also identifies organisational behaviour as an important connecting mechanism between leadership and organisational effectiveness. Leadership influences employee motivation, engagement, trust, commitment, retention, participation and performance, which in turn affect the organisation's capacity to achieve broader strategic and operational objectives (Barkhuizen & Masale, 2022; Haricharan, 2023; Atiku et al., 2024; Mwambela & Zulu, 2024; Chirwa, 2025). This relationship is particularly visible within the Zambian evidence, where leadership is associated with employee performance, organisational culture, motivation, entrepreneurial growth and educational quality across different organisational settings (Choongo et al., 2023; Mwambela & Zulu, 2024; Chirwa, 2025; Thelma et al., 2025). Similar relationships between leadership, talent retention, employee engagement and service delivery are evident across Botswana, Namibia and South Africa (Barkhuizen & Masale, 2022; John et al., 2023; Atiku et al., 2024).

Despite these areas of convergence, the analysis does not support the assumption of a homogeneous Southern African leadership environment. National and institutional contexts influence the relative prominence and expression of leadership capabilities. South African evidence gives particular attention to leadership competence, self-awareness, service delivery and dysfunctional leadership behaviours (Da Fonseca et al., 2022; John et al., 2023; Olabiyi et al., 2024; Muringa & Shava, 2024), while Botswana demonstrates stronger emphasis on talent orientation and human-capital sustainability (Barkhuizen & Masale, 2022). Namibian evidence foregrounds inclusion, engagement and institutional legitimacy (Atiku et al., 2023; Atiku et al., 2024), whereas Zimbabwean scholarship highlights leader–follower relationships, legitimacy and collective responsibility (Chikohomero, 2023; Tagwirei, 2024).

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Comparable contextual differentiation is apparent in Zambia, Mozambique, Lesotho and Eswatini. Zambian evidence places substantial emphasis on leadership style, employee motivation, organisational culture and performance (Choongo et al., 2023; Mwambela & Zulu, 2024; Chirwa, 2025; Thelma et al., 2025), while Mozambique illustrates the importance of strategic capability and adaptability within complex organisational and institutional environments (Harawa, 2024; Boane et al., 2024). Leadership evidence from Lesotho highlights governance, stakeholder collaboration and institutional development (Nkabane & Wantchami, 2024; Paul & Mosisili, 2025; Makhetha & Ngozwana, 2026), while Eswatini demonstrates the importance of inclusion, gender and institutional access to leadership opportunities (Nkambule & Perumal, 2024; Makamure, 2026).

The cross-country comparison consequently produces two complementary findings. First, sufficient convergence exists to identify a common Southern African leadership capability core, represented by strategic, people, relational, ethical, adaptive, inclusive and intrapersonal leadership. Second, the expression and relative importance of these capabilities are influenced by national, institutional, cultural, sectoral and organisational conditions. Contextual leadership operates as an integrating capability through which the common leadership core is interpreted and adapted to the environment in which leadership is exercised (Galperin et al., 2024; Toendepi & Cele, 2024).

The findings can consequently be summarised through the following relationship:

Leadership development → Leadership competencies → Leadership behaviours → Organisational behaviour → Organisational effectiveness with:

National + institutional + cultural + sectoral + organisational context operating across the relationship.

This finding provides support for the conceptual framework proposed earlier in the study while adding an important comparative insight: leadership development should neither be universally standardised without regard for context nor treated as entirely country-specific. Instead, the evidence supports a core-plus-context approach, in which common leadership capabilities provide consistency while contextual adaptation ensures relevance across different Southern African organisational environments.

The emerging leadership capability architecture represents the principal empirical-conceptual outcome of the comparative analysis. Its eight domains—strategic leadership, people leadership, relational leadership, ethical leadership, adaptive leadership, inclusive leadership, intrapersonal leadership and contextual

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leadership provide the foundation from which leadership-development standards, behavioural indicators and assessment criteria can subsequently be developed.

Discussion: Interpreting the relationship between leadership development and organisational effectiveness

The findings reinforce the proposition that leadership development should be understood as an organisational capability-building process rather than simply an individual developmental intervention. Leadership-development activities such as coaching, mentoring, experiential learning, feedback and formal development programmes acquire organisational significance when they strengthen competencies that are subsequently demonstrated through effective leadership behaviour (Douglas et al., 2021; Mbokota & Reid, 2022; Bangura & Lourens, 2025). The comparative evidence extends this argument by demonstrating that the organisational value of leadership development depends not only on what leaders learn but also on whether developmental outcomes are translated into behaviours capable of influencing employees, organisational systems and performance.

This distinction is theoretically important because leadership-development effectiveness is sometimes inferred from participation in development programmes rather than from subsequent behavioural or organisational outcomes. The findings instead indicate a developmental sequence in which leadership development builds capability, capability enables behaviour, behaviour shapes organisational behaviour, and organisational behaviour contributes to organisational effectiveness. Employee engagement, trust, motivation, commitment and retention become important mechanisms through which investment in leadership development may ultimately create organisational value (Barkhuizen & Masale, 2022; Haricharan, 2023; Atiku et al., 2024; Chirwa, 2025).

The findings also reinforce the need to move beyond leadership-style-centred approaches. Transformational, inclusive, strategic and participative leadership remain useful constructs, but the comparative evidence indicates considerable overlap in the competencies and behaviours charaterise these approaches (Bush et al., 2022; Choongo et al., 2023; Orekoya, 2024; Huseynzada, 2024). A capability-based perspective may provide greater practical utility because organisations can specify the competencies and behaviours required from leaders rather than requiring leaders to conform to a single theoretical leadership style.

Within the Southern African context, this capability-based perspective is particularly relevant because leadership operates within heterogeneous institutional and socio-cultural environments. Comparative African evidence cautions against

assuming that leadership practices developed in one national environment will operate identically elsewhere (Galperin et al., 2024). At the same time, the recurring leadership dimensions identified across the eight countries indicate that contextual variation does not eliminate the possibility of developing shared leadership standards. The findings provide support for the core-plus-context model emerging from this study.

The core-plus-context contribution

The central contribution of the study is the proposition that Southern African leadership development can be conceptualised through a core-plus-context architecture. The core comprises leadership capabilities demonstrating relevance across multiple national and organisational settings, while the contextual component recognises that the behavioural expression and prioritisation of those capabilities should respond to national, institutional, cultural, sectoral and organisational conditions.

This position provides an alternative to two competing assumptions. The first assumes that leadership competencies are sufficiently universal to permit the direct transfer of standardised leadership models between organisational and national environments. The second assumes that leadership is so culturally and institutionally specific that meaningful regional leadership standards cannot be developed. The comparative findings support neither extreme. Instead, common leadership requirements coexist with contextual differences, consistent with contemporary African leadership scholarship emphasising both shared relational orientations and substantial within-continent diversity (van der Westhuizen & Hewitt, 2021; Galperin et al., 2024; Toendepi & Cele, 2024).

The practical significance of this distinction is considerable. Organisations operating across Southern Africa could establish a common leadership foundation incorporating strategic, people, relational, ethical, adaptive, inclusive and intrapersonal capabilities while adjusting behavioural indicators and developmental priorities to the particular environment in which leaders operate. Contextual leadership becomes especially important within this model because it enables leaders to recognise when and how their leadership approach requires adaptation.

Organisational behaviour as the pathway to organisational effectiveness

A significant insight emerging from the comparative analysis is that the relationship between leadership and organisational effectiveness cannot be adequately understood as a direct relationship. Leadership operates largely through its influence on the behaviours, attitudes and experiences of organisational

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members. Employee engagement, motivation, trust, commitment, participation, retention and collaborative behaviour consequently represent important pathways through which leadership competencies and behaviours are translated into organisational outcomes (Barkhuizen & Masale, 2022; Haricharan, 2023; Atiku et al., 2024; Orekoya, 2024; Mwambela & Zulu, 2024; Chirwa, 2025).

This perspective shifts attention from leadership as an individual characteristic towards leadership as a relational and organisational process. Strategic capability, for example, may enable leaders to establish direction, but organisational effectiveness ultimately depends on whether employees understand, accept and enact that direction. Similarly, organisational change may be strategically appropriate, but its successful implementation depends on leaders' ability to communicate, establish trust, mobilise participation and maintain employee commitment during periods of uncertainty (Atiku et al., 2023; Gurgu et al., 2022; Huseynzada, 2024). Leadership effectiveness resides partly in the capacity to convert strategic intentions into collective organisational behaviour.

The comparative evidence provides support for this relationship across different Southern African settings. Employee engagement and inclusion feature prominently within Namibian organisational research, while talent development and retention are evident within the Botswana context (Barkhuizen & Masale, 2022; Atiku et al., 2024). Zambian evidence demonstrates relationships among leadership style, organisational culture, motivation, employee performance and organisational growth (Choongo et al., 2023; Mwambela & Zulu, 2024; Chirwa, 2025). South African evidence similarly connects leadership with employee well-being, service delivery and organisational performance while demonstrating the potential negative consequences of dysfunctional leadership behaviour (John et al., 2023; Haricharan, 2023; Olabiyi et al., 2024).

Trust appears particularly important within this relationship. Employees are more likely to participate, contribute ideas and support organisational objectives where leadership behaviour is perceived as inclusive, fair and credible (Orekoya, 2024; Atiku et al., 2024). Conversely, authoritarian, exclusionary or self-serving leadership can weaken trust and create organisational environments characterised by reduced participation and deteriorating employee relationships (Olabiyi et al., 2024). Ethical and relational capabilities should consequently be viewed as performance-relevant leadership requirements rather than merely desirable interpersonal characteristics.

Organisational culture provides another mechanism connecting leadership and employee behaviour. Leaders influence organisational culture through the

behaviours they model, decisions they reward, practices they tolerate and expectations they communicate. Culture can consequently strengthen or weaken the effect of leadership on employee motivation and organisational performance (Chirwa, 2025). This interaction indicates that leadership development cannot focus exclusively on changing individual leaders; organisations must simultaneously ensure that systems, incentives and cultural expectations reinforce the behaviours expected from those leaders.

The findings extend the proposed framework by positioning organisational behaviour as the transmission mechanism through which leadership capability creates organisational value. This has important implications for leadership assessment. If organisations evaluate leadership effectiveness exclusively through financial or operational performance measures, they may overlook earlier behavioural indicators such as declining trust, disengagement, deteriorating collaboration or increased turnover. Leadership assessment should consequently incorporate both organisational outcomes and employee-level behavioural indicators.

Implications for leadership development in Southern Africa

The findings have important implications for the design of leadership-development systems within Southern African organisations. The first implication is that leadership development should move beyond generic programmes that provide essentially the same development content to all leaders. Leadership requirements differ according to organisational responsibility, complexity and decision-making authority. Development systems should differentiate between the capabilities expected at operational management, senior management and executive leadership levels, while retaining a common set of underlying leadership domains.

At operational and managerial levels, greater emphasis may be required on translating organisational strategy into operational delivery, supervising employees, managing performance, communicating expectations, solving problems and maintaining technical and operational standards. Relational and people-management capabilities are particularly important at this level because managers frequently represent employees' most immediate experience of organisational leadership. Leadership behaviour at the operational level can have direct implications for motivation, engagement and performance (Haricharan, 2023; Mwambela & Zulu, 2024; Chirwa, 2025).

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At senior-management level, leadership requirements expand towards cross-functional coordination, strategic implementation, stakeholder management, change leadership, talent development and organisational capability building. Senior managers occupy an important connecting position between executive strategy and operational implementation and consequently require the ability to translate strategic priorities into coordinated organisational programmes while maintaining employee and stakeholder commitment (John et al., 2023; Atiku et al., 2023; Muringa & Shava, 2024).

Executive leadership requires a broader enterprise and institutional orientation. Strategic foresight, governance, ethical stewardship, organisational culture, external stakeholder management, institutional legitimacy, transformation and long-term sustainability become increasingly significant at this level. Executives must demonstrate not only organisational leadership capability but also the capacity to interpret broader institutional, socio-economic and stakeholder environments (Chikohomero, 2023; Matsiliza, 2024; Galperin et al., 2024).

Importantly, differentiation by leadership level should represent a change in the depth, scope and complexity of capability rather than the creation of entirely separate competency models. Ethical leadership, for example, remains relevant at all three levels, but its behavioural expression changes. An operational manager may demonstrate ethical leadership through fair allocation of work and consistent application of procedures; a senior manager may demonstrate it through transparent resource allocation and accountable decision-making; while an executive may demonstrate ethical leadership through organisational governance, institutional stewardship and the establishment of an ethical organisational culture.

The same principle applies to strategic leadership. Operational managers require sufficient strategic awareness to connect team objectives with organisational priorities, senior managers require the ability to translate strategy into integrated programmes and resource decisions, and executives require the capability to determine strategic direction and respond to changes in the external environment. Leadership standards should consequently be vertically differentiated while remaining conceptually integrated.

Leadership development should also be accompanied by appropriate assessment mechanisms. Self-assessment may support reflection and self-awareness but should not constitute the sole measure of leadership effectiveness. Multi-source feedback, behavioural observation, performance evidence, employee-engagement indicators, talent outcomes, stakeholder feedback and developmental assessment can provide a more comprehensive picture of leadership capability (Da Fonseca et al., 2022;

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Mbokota & Reid, 2022). The leadership architecture developed in this study can provide the basis for establishing behavioural indicators and assessment standards for different managerial levels.

Theoretical contribution of the study

The study makes several theoretical contributions to leadership-development scholarship. First, it integrates areas of research that are frequently examined independently by positioning leadership development, leadership competencies, leadership behaviours, organisational behaviour and organisational effectiveness within a connected explanatory architecture. This extends beyond approaches that examine relationships between particular leadership styles and isolated organisational outcomes.

Second, the study distinguishes between competency possession and behavioural enactment. This distinction is theoretically important because leadership capability generates limited organisational value if it is not demonstrated through behaviours experienced by employees and stakeholders. The proposed framework therefore separates what leaders are capable of doing from what leaders actually demonstrate in organisational settings. This provides a stronger basis for understanding why leadership-development interventions may improve individual knowledge without necessarily producing equivalent organisational improvements.

Third, the study identifies organisational behaviour as an explanatory pathway connecting leadership behaviour with organisational effectiveness. Employee engagement, motivation, trust, commitment, participation and retention are positioned as mechanisms through which leadership affects organisational outcomes rather than as disconnected employee variables (Barkhuizen & Masale, 2022; Haricharan, 2023; Atiku et al., 2024; Chirwa, 2025). This strengthens the conceptual connection between leadership-development scholarship and organisational-behaviour research.

Fourth, the comparative analysis contributes a core-plus-context perspective to Southern African leadership development. Existing research demonstrates the importance of context in understanding African leadership while also identifying recurring leadership characteristics across national environments (van der Westhuizen & Hewitt, 2021; Galperin et al., 2024; Toendepi & Cele, 2024). The present study advances this argument by proposing that regional leadership standards can contain a stable capability core while permitting contextual adaptation in their behavioural expression and developmental application.

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Finally, the study translates this conceptual contribution into an emerging eight-domain Southern African leadership capability architecture, comprising strategic, people, relational, ethical, adaptive, inclusive, intrapersonal and contextual leadership. Rather than proposing these dimensions as independent leadership styles, the framework conceptualises them as interconnected capabilities whose relative depth and behavioural manifestation vary according to leadership level and organisational context. The theoretical contribution can be expressed as:

Common leadership core + contextual adaptation + level-specific behavioural expectations → contextually responsive leadership capability

This contribution creates an important bridge between leadership theory and organisational practice because the framework can subsequently be operationalised into leadership standards, behavioural indicators, developmental interventions and assessment mechanisms.

Practical and managerial implications

The findings have direct implications for organisations seeking to design or strengthen leadership-development systems across Southern Africa. Leadership frameworks should move beyond broad competency statements and specify observable behavioural standards against which leadership capability can be developed and assessed. The eight capability domains identified in this study provide an evidence-informed foundation from which such standards can be constructed.

A particularly important practical implication is that organisations should establish a progressive leadership standard across managerial levels. The same core capability domains may apply throughout the leadership hierarchy, but expected proficiency should increase with organisational responsibility. This provides continuity in leadership expectations while recognising the increasing complexity associated with progression from operational management to senior management and executive leadership.

Leadership development should similarly be aligned with assessment. Coaching, mentoring, experiential learning, formal development programmes and succession initiatives should be linked to identified capability gaps rather than delivered as isolated developmental activities (Douglas et al., 2021; Mbokota & Reid, 2022; Bangura & Lourens, 2025). Assessment mechanisms could combine 360-degree feedback, behavioural interviews, employee surveys, performance evidence, assessment centres, stakeholder feedback and leadership-development plans, depending on managerial level and organisational context.

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The framework may also assist organisations operating across more than one Southern African country. A common capability architecture can provide regional consistency, while contextual leadership allows behavioural standards and development interventions to be adapted to local institutional and socio-cultural requirements. Such an approach avoids both the unrestricted transfer of externally developed leadership models and excessive localisation that prevents organisational consistency.

Ultimately, the practical value of the proposed architecture lies in its capacity to shift leadership development from programme participation towards demonstrated capability and organisational impact. Leadership-development effectiveness should be evaluated not only by whether leaders complete development interventions, but by whether they demonstrate improved leadership behaviours, positively influence organisational behaviour and contribute to measurable organisational effectiveness.

Proposed Southern African Leadership Development Framework

The comparative findings suggest that leadership development across the selected Southern African countries can be structured around a common capability core, while allowing the depth, scope and behavioural expression of each capability to vary according to leadership level and organisational context. The proposed framework retains the eight capability domains identified in the comparative analysis: strategic, people, relational, ethical, adaptive, inclusive, intrapersonal and contextual leadership, but differentiates expectations for executives, senior managers and managers.

This level-based differentiation is important because leadership responsibilities become progressively broader as organisational authority increases. Managers are primarily responsible for translating organisational priorities into operational delivery and employee performance; senior managers coordinate functions, implement strategy and build organisational capability; while executives shape strategic direction, organisational culture, governance and institutional legitimacy. The capability domains remain stable, but the required proficiency and behavioural complexity increase across leadership levels.

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Table 5: Proposed Southern African leadership development framework by management level

Capability domain	Executives	Senior managers	Managers	Indicative assessment tools
Strategic leadership	Shapes long-term direction, interprets external trends, allocates enterprise resources and aligns organisational strategy with institutional priorities	Translates strategy into functional plans, integrates priorities across departments and monitors strategic execution.	Connects team objectives with organisational priorities and ensures operational delivery	Strategy simulation, performance outcomes, assessment centre, executive 360° feedback
People leadership	Builds organisational leadership pipeline, sponsors succession and creates conditions for high performance	Develops managers and specialists, manages talent and addresses capability gaps	Coaches employees, manages performance and develops team capability	Talent-review outcomes, succession indicators, 360° feedback, employee-development records
Relational leadership	Builds strategic internal and external relationships and influences key stakeholders	Facilitates cross-functional collaboration and manages complex stakeholder relationships	Maintains effective employee relationships and resolves operational conflict	Stakeholder feedback, 360° assessment, behavioural interviews, employee surveys
Ethical leadership	Establishes ethical tone, promotes governance and demonstrates institutional stewardship.	Ensures ethical decision-making, transparent resource allocation and policy compliance	Applies organisational standards consistently and addresses inappropriate conduct	Ethics indicators, governance reviews, audit outcomes, behavioural assessments

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Adaptive leadership	Leads enterprise transformation, anticipates disruption and builds organisational resilience.	Leads change implementation and adjusts functional approaches to emerging risks.	Supports employees through change and adapts operational processes	Change-readiness measures, innovation outcomes, scenario-based assessment
Inclusive leadership	Creates organisational systems supporting diversity, participation and equitable leadership access	Ensures inclusive talent and decision-making practices within functions	Encourages employee voice, participation and fair treatment within teams	Inclusion surveys, employee voice measures, workforce indicators, 360° feedback
Intrapersonal leadership	Demonstrates executive maturity, reflective judgement, resilience and emotional regulation under complexity	Demonstrates self-awareness, openness to feedback and behavioural adaptability	Recognises personal impact, manages emotions and responds constructively to feedback.	Psychometric assessment, 360° feedback, coaching reports, reflective development plans
Contextual leadership	Interprets national, institutional and sectoral dynamics and protects organisational legitimacy	Adapts functional leadership to stakeholder, regulatory and organisational context	Applies organisational policies and leadership practices appropriately to local operational conditions	Stakeholder assessment, scenario exercises, contextual case analysis, performance review

Source: Authors' conceptualisation based on the comparative findings of the study.

The framework demonstrates that leadership development should not rely on one generic competency profile across all management levels. Instead, the same capability domains should be applied progressively. Strategic leadership, for example, is relevant to all leaders, but the expected scope differs substantially. A manager is expected to understand organisational strategy and translate it into team

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priorities, while a senior manager converts enterprise strategy into functional plans and coordinates implementation across units. At executive level, strategic leadership involves setting direction, interpreting external institutional and economic developments and making decisions with enterprise-wide implications.

A similar progression applies to people leadership. At managerial level, the emphasis is on supervision, coaching, performance management and immediate employee development. Senior managers carry broader responsibility for talent pipelines, functional capability and managerial development, while executives are expected to build organisational leadership capacity through succession planning, leadership development and workforce strategy. This distinction is consistent with the comparative evidence highlighting employee motivation, talent retention, engagement and capability as important mechanisms connecting leadership with organisational effectiveness (Barkhuizen & Masale, 2022; Haricharan, 2023; Mwambela & Zulu, 2024; Chirwa, 2025).

Ethical leadership should likewise remain a universal expectation but increase in organisational consequence with seniority. Managers demonstrate ethical leadership through consistent and fair treatment of employees and adherence to organisational procedures. Senior managers are required to integrate ethical judgement into resource allocation, performance decisions and functional governance, while executives establish the ethical tone of the organisation and assume responsibility for institutional stewardship and governance. This is particularly important given evidence that authoritarian, self-serving and exclusionary leadership behaviours can undermine trust and organisational credibility (Olabiyi et al., 2024; Nkambule & Perumal, 2024).

The framework further recognises adaptability as a core leadership capability rather than a specialist competence required only during major transformation. Managers must be able to adjust operational processes and support employees during change, senior managers must coordinate implementation and manage functional disruption, and executives must anticipate strategic shifts and position the organisation for long-term resilience. This reflects increasing leadership demands arising from technological transformation, economic uncertainty and changing organisational environments (Gurgu et al., 2022; Atiku et al., 2023; Choongo et al., 2023; Adesanya et al., 2025).

Contextual leadership operates across all capability domains. Its inclusion is important because the comparative findings demonstrate that leadership standards cannot be applied mechanically across different organisational and national environments. The behavioural expectations associated with stakeholder

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management, inclusion, authority and governance may require adaptation according to institutional arrangements, sectoral conditions and socio-cultural expectations (Chlouba, 2021; Galperin et al., 2024; Nkambule & Perumal, 2024). Contextual leadership enables the framework to preserve a common leadership standard while avoiding an assumption of uniform behavioural expression across Southern Africa.

Leadership proficiency levels

To support practical implementation, the framework should be accompanied by a common proficiency scale. This allows the same capability domains to be assessed consistently while recognising increasing expectations across leadership levels.

Proficiency level	Description
Level 1: Awareness	Understands the competency and its relevance but requires significant guidance in application
Level 2: Developing	Demonstrates the competency inconsistently and requires support in complex situations
Level 3: Proficient	Consistently demonstrates the competency within own area of responsibility.
Level 4: Advanced	Applies the competency effectively across complex, cross-functional situations and develops others
Level 5: Strategic mastery	Shapes organisational practice, influences institutional outcomes and establishes standards for others.

Indicatively, managers should ordinarily demonstrate at least Level 3, senior managers Level 4, and executives Level 5 in the capability domains most central to their roles. This should not, however, operate as an inflexible rule. Particular technical or specialist roles may require different competency profiles, while developmental assessments may identify capabilities requiring further strengthening.

Leadership assessment architecture

Leadership capability should be assessed using multiple sources rather than a single evaluation instrument. Self-assessment can support reflection but is insufficient as a standalone measure because leadership effectiveness is experienced by employees, peers, stakeholders and organisational systems. A balanced assessment architecture should combine behavioural, performance and developmental evidence**.**

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Assessment mechanism	Primary purpose	Most relevant levels
360-degree feedback	Evaluates observable leadership behaviour from multiple perspectives	Executives, senior managers, managers
Assessment centre	Evaluates strategic judgement, problem solving and behavioural capability	Senior managers and managers; executives for selection where appropriate
Psychometric assessment	Supports understanding of self-awareness, preferences and behavioural tendencies	All levels, particularly appointment and development
Behavioural competency interview	Assesses evidence of past leadership behaviour	All levels
Employee engagement and climate data	Indicates how leadership is experienced by employees	All levels
Stakeholder feedback	Assesses relationship management and credibility	Executives and senior managers
Performance outcomes	Links leadership capability to delivery and organisational results	All levels
Talent and succession indicators	Assesses people-development effectiveness	Executives and senior managers
Coaching and development plans	Supports developmental follow-through	All levels

The use of multiple assessment mechanisms reduces the risk of equating leadership effectiveness with either personality assessment or performance outcomes alone. Leadership performance should instead be evaluated through the interaction between capability, behaviour and results. For example, strong operational results achieved through persistent destructive leadership behaviour should not constitute evidence of effective leadership, just as positive employee relationships without delivery against organisational objectives should not represent complete leadership effectiveness.

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Development interventions by leadership level

Leadership-development interventions should also be differentiated according to the complexity of leadership responsibility. Managers may benefit particularly from structured people-management development, coaching skills, conflict management, performance management and operational decision-making. Senior managers require greater emphasis on strategic execution, cross-functional leadership, stakeholder management, change leadership and talent development. Executive development should focus more strongly on strategic foresight, governance, institutional leadership, culture, enterprise risk, complex stakeholder environments and executive judgement.

Development should combine formal learning with workplace experience. Coaching, mentoring, action learning, stretch assignments, cross-functional projects, leadership simulations and structured reflection can strengthen the transfer of leadership learning into practice (Mbokota & Reid, 2022; Bangura & Lourens, 2025). This is important because formal programmes alone cannot ensure behavioural change. The framework recommends an integrated development cycle:

Leadership standard → Capability assessment → Individual development plan → Targeted development intervention → Workplace application → Behavioural reassessment → Organisational outcome review

This cycle positions leadership development as an ongoing process of assessment, development, application and review rather than a once-off programme.

Contribution of the proposed framework

The proposed framework extends the comparative findings by translating the identified Southern African leadership capability architecture into a practical level-based model. Its principal contribution lies in combining common leadership domains, contextual adaptation and progressive proficiency expectations within a single architecture.

The framework addresses three recurring challenges identified in the literature. First, it moves beyond leadership-style classifications towards observable competencies and behaviours. Second, it recognises that leadership requirements vary by organisational level, even where the underlying capability domains remain consistent. Third, it accommodates contextual differences across Southern African organisational environments without abandoning the possibility of common leadership standards.

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The framework may consequently serve as a foundation for leadership-development programmes, recruitment and selection criteria, succession planning, performance management, competency assessment and leadership standards across organisations operating within the selected Southern African contexts. At the conceptual level, the framework can be expressed as:

Common capability core + level-specific proficiency + contextual adaptation + multi-source assessment = contextually responsive leadership development

This represents the principal practical contribution of the study and provides a basis for subsequent empirical testing across Southern African organisations.

Conclusion

Leadership development plays a critical role in shaping organisational behaviour and organisational effectiveness across the selected Southern African countries. The comparative evidence demonstrates that leadership effectiveness cannot be adequately explained through a single leadership style or generic competency model. Rather, effective leadership is characterised by a combination of strategic, relational, ethical, adaptive, inclusive, intrapersonal, contextual and people-development capabilities that influence how leaders engage employees, respond to change, exercise authority and contribute to organisational outcomes (Da Fonseca et al., 2022; Barkhuizen & Masale, 2022; Choongo et al., 2023; Atiku et al., 2024; Muringa & Shava, 2024; Chirwa, 2025).

A central conclusion of the study is that leadership development contributes to organisational effectiveness through an interconnected process. Developmental interventions strengthen leadership competencies; these competencies shape observable leadership behaviours; leadership behaviours influence employee attitudes and organisational behaviour; and these behavioural responses contribute to broader outcomes such as performance, service delivery, innovation, retention, sustainability and resilience (Douglas et al., 2021; Haricharan, 2023; Atiku et al., 2024; Mwambela & Zulu, 2024; Bangura & Lourens, 2025). Organisational behaviour functions as an important pathway through which leadership capability is translated into organisational value.

The comparative analysis further demonstrates that leadership across South Africa, Botswana, Namibia, Zimbabwe, Zambia, Mozambique, Lesotho and Eswatini is characterised by both convergence and divergence. Common leadership requirements are evident across the region, particularly in relation to strategic direction, people leadership, ethical conduct, adaptability, stakeholder engagement and relational competence. At the same time, national, institutional, cultural,

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sectoral and organisational conditions influence the relative importance and behavioural expression of these capabilities (Galperin et al., 2024; Nkambule & Perumal, 2024; Nkabane & Wantchami, 2024). The findings support a core-plus-context approach rather than either a completely universal or entirely country-specific leadership model.

Building on these findings, the study proposes an eight-domain Southern African leadership capability architecture comprising strategic leadership, people leadership, relational leadership, ethical leadership, adaptive leadership, inclusive leadership, intrapersonal leadership and contextual leadership. These domains provide a common foundation for leadership development while allowing behavioural expectations and proficiency standards to be differentiated according to managerial level and organisational context. The framework offers a basis for developing leadership standards for executives, senior managers and managers, supported by multi-source assessment, targeted development interventions and ongoing behavioural evaluation.

The study contributes to leadership scholarship by integrating leadership development, competencies, behaviours, organisational behaviour and organisational effectiveness within a single comparative framework. It also contributes practically by translating the comparative evidence into a leadership-development architecture that can inform leadership standards, succession planning, performance management, talent development and assessment across Southern African organisations.

The study is, however, limited by its reliance on secondary evidence and by the uneven distribution of contemporary leadership research across the selected countries. Future research should empirically test the proposed framework across different sectors and management levels and examine whether particular capability domains require different levels of emphasis in public, private, educational, regulatory and entrepreneurial environments. Longitudinal research would also be valuable in determining whether leadership-development interventions produce sustained behavioural change and measurable organisational outcomes over time.

Overall, the study demonstrates that leadership development should not be treated merely as a training activity, but as a strategic organisational capability. Its effectiveness depends on the extent to which development strengthens relevant competencies, translates into constructive leadership behaviour and creates organisational conditions that support employee contribution and sustainable organisational performance. The proposed Southern African leadership-

development framework therefore provides a contextually responsive foundation for strengthening leadership capability across diverse organisational environments.

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IMPACT OF ORGANISATIONAL CULTURE ON EMPLOYEE PRODUCTIVITY IN MANUFACTURING ORGANISATIONS

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Abstract

This study investigated the impact of organisational culture on employee productivity using Guinness Nigeria Plc. as the unit of analysis. The study identified training and development programmes, teamwork, reward, and communication as the basis to understand the presence of organizational culture in the workplace. Descriptive survey design method and structured questionnaires were adopted for the study while the sample size of seventy (70) was used. It was found that teamwork culture has a significant impact on employees' productivity and reward culture has a significant impact on employees' productivity while training and development programmes have a significant impact on employees' productivity and Communication culture has a significant impact on employees' productivity. It was concluded that the practice of teamwork, reward, communication, training and development programmes will improve productivity, thus recommended the sustenance of the practice with strong support from the top management and institute mechanism for employee feedback to ascertain the degree of operationalization.

Keywords: *organisational culture, teamwork, reward, training and development programmes, communication, employees' productivity.*

JEL Classification: M14, M53, J24

1. Introduction

The accomplishment of a firm objective is greatly reliant on the effectiveness of the employees as well as the causative organisational culture (Arora & Karamjeet, 2019). Organisational culture was perceived as a set of assumptions, beliefs, values, and ways of collaboration within an organisation, which develops with time and aids in the creation of a specific purposeful psychological and social environment that backs the firm's offerings (Bernthal & Emily, 2020). However, organisational management shaped the organisational culture as anticipated to strengthen organisational productivity (Yasas, Lakmini & Ruwan, 2020). Schein (2017) confirms that the organisational culture that an organisation embrace could tolerate the capability to negatively or positively influence the employees' attitudes and behaviours. This fortifies the need for the organisation leadership to ascertain that a culture that stimulates interdepartmental collaboration and generation of synergy is espoused. Kaplan and Moria (2021) define organisational culture as the beliefs, values, assumptions, and ways of life that result in a unique psychological and social environment that shapes how people interact and generally behave. As such, organisational culture is something that develops with time and is ultimately

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defined by the organisational philosophy, experiences, expectations, and values. Therefore, organisational culture influences individual member behaviours and depicts employees' interactions, inner workings, and even self-image in different ways (Jabrayilov, 2019)

Schein (2017) argues that a productive organisational culture is characterised by shared written and unwritten rules, customs, beliefs, and attitudes that are considered valid and contribute to all organisational stakeholders' mutual benefit. Afsar and Umrani (2019) explain that to ascertain optimum productivity of the employees, an appropriate organisational culture has to be established; a culture that stimulates interdepartmental collaboration and the creation of functional teams to carry out specific tasks. Furthermore, the employees must also be motivated to successfully carry out their responsibilities. Over the decades, innumerable scholars, including Khaire, Aleda, and Roth. (2021); Gennaro (2023); Ahsanullah, Najibullah, and Sarwar (2020) studied the concept of organisational culture and how it influences organisational productivity and employees' productivity; the effect on specific indicators of employees' productivity is yet to be fully explored. Employees' productivity is a function of the teamwork culture, training and development culture, reward culture, and communication culture. It is no doubt that organisational culture significantly affects these productivity constructs, which in turn decides the overall organisation's productivity. Organisational managers who do not understand the productivity of the employee's risk weakened productivity in the short term and compromise the application of functional strategies that are designed to improve the profit margins in the long term (McCune, John, & Mark, 2021).

Therefore, understanding the relationship between organisational culture and employees' productivity in terms of teamwork culture, training and development culture, reward culture, and communication culture is a subject that must be fully explored to fathom how the culture can be organized to enhance employees' productivity, organisational productivity and profitability. Sarala and Eero (2020) say that employees' productivity designates the efficiency of an employee in carrying out a particular task. Yasas, Lakmini, and Ruwan (2020) added to this definition by explaining that employees' productivity is also assessed by the goods and services provided in unit time. Increased productivity implies that the number of goods and services provided per unit time has increased, compared to a previous point in time, without compromising quality. Among other things, Johnson (2021) explains that the productivity of employees can be increased through investment in advanced technologies, which aid in increasing the rate of execution of specific tasks and improving the overall output. Motunrayo (2020) posits that

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organisational culture encompasses four main elements: work processes, leadership style, organisational climate, and organisational values. Organizational values aren't something you can hold or see, but they have an impact on all the people connected to the organisation. Mariyani, Aripin, and Darmanto (2023) explain that an organisation can't establish a strong culture without establishing specific values that bind all organisational actions. It is through the organisational values that an individual can be held responsible and accountable for their actions.

1.1 Statement of Problem

To understand the forms and consequences of organisational culture, the researcher has explored how various internal processes, such as individual and organisational selection and socialization, characteristics of powerful members, such as the organisation's founder or group of members, influence the content and intensity of the consensus that exists about organisational values. This study was embarked upon to look into the exogenous and endogenous cultural and human impediments that affect culture-productivity. Given this, since organisational. culture is a rational instrument designed by top management to shape the behavior of the employees in purposive way to achieve organisational goal, it becomes imperative to investigate the problems militating against organisational culture that cause ambiguity, inconsistency and bad leadership that affects organisational diversity for effective productivity and the extent to which an effective organisational culture can enhance the productivity of the workforce and the organisation at large. Therefore, since little work has been done in this area of study, this study will consider the following variables to employee productivity

This study investigated the remote and immediate factors responsible for lack of commitment, bad leadership, inconsistency in employee's attitude, decrease in employee's morale and negative alignment to organisational goals that makes the organisation receives unfavorable impact on output/productivity and proffering the right panacea/antidote which serves as a platform for restoring a positive attitude for effective productivity of organisations. Based on these problems, the objectives of this study were formulated. From the various scholars' works such as Melletus and Meruo (2020); Hauwa (2022); Gennaro (2023), Mareș and Mareș (2025) they have done great work in this area, but it still some areas that are yet to be researched properly. These areas include the impact of the following variables: teamwork culture, reward culture, training and development programmes, and communication culture. Therefore, this study considered the impact of the aforementioned variables teamwork culture, reward culture, training and development programmes, and communication culture on employees' productivity.

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1.2 Objectives of the Study

The primary objective of the study is to investigate the impact of organisational culture on employee productivity. The study aimed at achieving the following specific objectives which were to:

i. investigate the impact of teamwork culture on employees' productivity
ii. examine the impact of the reward culture of the organisation on employees' productivity
iii. investigate the impact of training and development programmes on employees' productivity
iv. examine the impact of the communication culture on employees' productivity.

2. Literature Review

2.1. Concept of Organisation Culture

Organisational culture is a critical aspect of organisational behaviour that influences employee behaviour, communication, decision-making, and the overall success of an organisation. It can be defined as the shared values, beliefs, assumptions, and practices that shape the behavior and interactions of people within an organisation. Several scholars have provided definitions of organisational culture, including Cameron, Breanne, Hiroaki, Keiko, Gentaro, and Alexander (2020); Denison and Schein (2021), all of which emphasise the importance of shared values and beliefs in shaping behaviour and interactions within an organisation. Understanding and managing organisational culture is essential for creating a positive work environment and achieving organisational success. In 2023, the definition of organisational culture remains largely consistent with earlier definitions, emphasizing the importance of shared values and beliefs.

Organisational culture embraces collective behavior, which refers to the actions, attitudes, and beliefs that emerge from the interactions of employees within the organisation (Hung, Su & Lou, 2022). It can be observed in the shared values, norms, and customs that guide the behavior of employees and shape the overall culture of the organisation. Collective behavior can take various forms, such as conformity to established norms, group decision-making processes, and the emergence of informal leaders and power structures. It can also manifest in shared attitudes towards work, customer service, and innovation. It is important because it can impact the effectiveness and productivity of the organisation as a whole. When employees share common values and beliefs, they are more likely to work together

towards common goals and achieve greater success. Conversely, when there is a lack of cohesion or conflicting values within an organisation, it can lead to decreased morale and productivity.

2.2. Functions of Organisational Culture

The following are the functions of organisational culture according to Bui, Phung, and Nguyen (2023). The guiding function of organisational culture: The guiding function of organisational culture refers to the culture that leads the whole organisation and all the employees' values and behavioural orientation towards the goal of the organisation. The essence of the construction of an outstanding organisational culture is to set up an internal force mechanism. The construction of the mechanism makes vast staff recognize that the organisation is striving for a lofty goal, which not only can produce creative tactics but also can make staff dare to make individuals sacrifice for realizing the organisational goal

The standardizing function of organisational culture: Through establishing a common value system, organisational culture forms a unified thought, makes faith from a kind of tendency in the staff's psychological deep layer, and then a kind of response mechanism is reconstructed in the transformation. As long as there is an inducement signal from outside, a positive response will take place and turn into the anticipated behaviour rapidly. By coordination and self-control, the collision of restraint to employees is weakened, the conflict of autonomy psychology with the reality of being managed is relieved, which makes a unifying and harmonious organisation from the top to the bottom. The agglomerating function of organisational culture: Organisational culture is the group consciousness created by the staff together. It is a kind of binder, unites the people of all respects and all levels around organisational culture, and creates cohesiveness and centripetal force to the organisation. Organisational culture connects employees' thoughts and feelings, and destiny with the safety of the organisation closely. At the same time, employee has a sense of ownership and acceptance of the organisation.

The motivating function of organisational culture: Organisational culture emphasizes people as the centre; its core is to create common values. Outstanding organisational culture means creating a kind of atmosphere where everybody is paid attention to and respected. Excellent cultural atmosphere usually produces a kind of incentive mechanism which makes each member's contribution get other employees' and leader's appreciation and reward in time. Encouraging the employees to dedicate themselves, make unceasing progress, and constantly innovate to realize self-value and the development of the organisation. In addition,

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the establishment of organisational culture does not only influence the enterprise itself but have a certain impact on the public, as well as domestic and international enterprises, it forms a part of a social culture while improving the enterprise's popularity, that is to say, organisational cultures have an enormous radiating function.

2.3. Typology of Organisational Culture

According to various sources such as McCune et al. (2021), Schein (2017), Cameron et al. (2020), and Vasconcelos (2022), several types of organisational culture can affect how employees work, how decisions are made, and the overall success of an organisation. These culture types include the Clan culture, which emphasizes collaboration and teamwork; the Adhocracy culture, which values creativity and risk-taking; the Market culture, which prioritizes achievement and competitiveness; and the culture of hierarchy is marked by having a clear structure and a focus on control. It is important to note that many organisations may exhibit a mix of these cultural types and that different departments or teams within an organisation may have their unique subcultures.

i. Clan culture: This type of culture emphasizes collaboration, teamwork, and employee empowerment. It is often found in family-owned businesses, small startups, or organisations that value a familial atmosphere. In clan cultures, workers often team up closely, paying attention to forming good relationships and making everyone feel like part of a team.

ii. Adhocracy culture: This type of culture is characterized by creativity, innovation, and risk-taking. These organisations tend to be dynamic and entrepreneurial, with a focus on experimentation and breaking the rules. Adhocracy cultures are often found in technology startups and other fast-paced industries.

iii. Market culture: This type of culture prioritises results, achievement, and competitiveness. These organisations tend to be highly focused on external factors such as sales, profits, and market share. Employees in Market cultures are often motivated by financial incentives, and productivity is closely monitored and measured.

iv. Hierarchy culture: This type of culture is characterized by structure, stability, and control. These organisations tend to have a clear chain of command, with well-defined roles and responsibilities. Employees in Hierarchy cultures

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are expected to follow rules and procedures closely, and decision-making authority is typically centralized.

It is important to recognize that organisational culture is not always easily categorized into distinct types and that organisations may demonstrate characteristics of multiple cultural types simultaneously. Moreover, different departments or teams within the same organisation may exhibit their unique subcultures. (McCune et al., 2021; Schein, 2017; Cameron et al. 2020 & Vasconcelos, 2022)

2.4. Determinants of Organisational Culture

Organisational culture is a crucial factor for any organisation, influencing the behavior, attitudes, and values of the employees, which, in turn, affect the overall productivity and effectiveness of the organisation. The determinants of organisational culture vary and depend on a range of factors, such as the environment, size, and objectives of the organisation, the characteristics of individuals within the organisation, the role of technology, and the organisation's history and ownership (Chatman & Sandra, 2020; Johnson, 2021). The environment in which an organisation operates can have a significant impact on its culture, as it shapes the values and behaviors of employees. For instance, a company operating in a highly competitive market may prioritize productivity and productivity, while a non-profit organisation may prioritize social impact and community involvement. Similarly, an organisation's size and objectives can shape its culture, with smaller organisations having a more informal and collaborative culture, and larger organisations having more formal procedures and hierarchies. The objectives and goals of an organisation can also shape its culture, as employees may prioritize different values and behaviors depending on the organisation's purpose and mission (Smith and Marianne, 2020)

Individuals within the organisation also play a critical role in shaping organisational culture, as their values, attitudes, and behaviors can either reinforce or challenge the existing culture. Furthermore, the role of technology is becoming increasingly important in shaping organisational culture, as it can change the way employees communicate, collaborate, and work. Finally, the history and ownership of an organisation can also influence its culture, as the values and traditions of the organisation's founders and leaders may continue to shape the organisation's culture long after they have left. Similarly, the ownership structure of an organisation can affect its culture, with private companies prioritizing profitability and growth, while non-profit organisations prioritize social impact and community

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involvement (Erica, Chang & Simon, 2022). Generally, the determinants of organisational culture are complex and multifaceted, and a range of factors can influence the values, behaviors, and attitudes of employees within an organisation. Leaders and managers seeking to create and maintain a positive and effective organisational culture must understand these determinants (Chatman et al., 2020).

2.5. Teamwork and Employee Productivity

According to Halid et al (2020), an employee team comprises individuals who depend on one another to accomplish tasks and share responsibility for the outcomes. Teamwork encourages people to cooperate, enhance individual skills, and constructive feedback without creating conflict among team members. For smooth functioning of an organisation teamwork has been described as an important factor. Most organisational activities become complex due to advancements in technology; therefore, teamwork is a major focus of many organisations. According to Melletus et al. (2020), teamwork is necessary for all organisational types, including non-profit organisations. Team members enhance their skills, knowledge, and abilities while working in teams (Gálvez, Tirado & Martínez, 2020). The productivity of a team must be higher than individual productivity when the work requires a broader scope of knowledge, judgment, and opinion. The advantage of teamwork is significant productivity growth in the spheres that require creative solving of different tasks, a high degree of adaptability, and operational management (Silas & Purity, 2022). Teamwork also creates an environment that facilitates knowledge and information exchange and so-called knowledge sharing.

Other advantages are the ability of new forms of work organisation to increase the innovative potential that may add value to products or services, moving them into less price-sensitive markets. Moreover, the ability of new forms of work organisation to increase the employability of workers through multiskilling and the acquisition of higher competencies in problem-solving, communication, and teamwork will help labor market adaptation and also support a new form of local and regional economic growth and regeneration. (Hauwa, 2022).

2.6. Reward Culture and Employee Productivity

Surveys over the years have shown that non-financial incentives are an effective leadership tool. For example, a survey by the Society of Inventive Travel Executives Foundation found that 63% of respondents regarded “a pat on the back” as a meaningful incentive (Gennaro, 2023). In another study that evaluated 65 possible incentives, four of the top five rewards rated as most motivating were

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manager-initiated, productivity-based, and required little or no money. Although studies define non-financial rewards in slightly different ways, they commonly emphasise that these incentives usually carry little or no cost. Ahsanullah et al. (2020) identify the following non-financial incentives, which can be operationalised as follows:

i. A manager personally congratulates an employee for a job well done.
ii. A manager writing a personal note for good productivity.
iii. A manager publicly recognises an employee for good productivity.
iv. A manager holds morale-building meetings to celebrate successes.

Other examples of non-financial reward systems can be found in both the academic and practitioner literature. For example, Anwar and Abdullah (2021) note that organisations that recognise and respect their employees tend to retain their recognised workers for longer periods because of increased loyalty and commitment. Skilled workers may not do their best if they don't feel inspired to work hard. One of the means that organisations can use to enhance employee motivation and productivity is to provide productivity-related compensation (McCune et al., 2021). A reward and compensation system is based on the expectancy theory, which suggests that employees are more likely to be motivated to perform when they perceive that there is a strong link between their productivity and the reward they receive (Hauwa, 2022 & Smith et al., 2020). In other words, the compensation system (e.g., profit sharing) contributes to productivity by linking the interests of employees to those of the team and the organisation, thereby enhancing effort and productivity.

Chatman et al. (2020) coin that cash rewards are welcomed by employees, and managers should never use this as a tool to motivate their employees to improve their productivity levels. Should this happen, there is a chance that the essence of the reward will be forgotten. The researcher says that managers should be aware of 'non-rewards'. Such rewards should be utilized sparingly and should not be used all the time. They are also described as being passive, and they don’t always lead to positive actions in the long run. Johnson (2021) claims that employees who can experience and receive recognition for their work are also able to have a better perception of their work, their workplace, and the people they work for. Thus, there is a need for the employer to make an effort to show the employee that his/her well-being is of concern to the organisation and the management and that the contribution of the employee towards the organisation is highly valued. This idea is further reiterated by Kaplan et al. (2021) that the recognition of contributions

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towards the organisation has a positive relationship with increasing the commitment of the employee towards the organisation and its objectives

2.7. Communication Culture and Employees' Productivity

Employee communication is the dissemination of information that is related to the daily productivity of an employer's job and also important if the worker is expected to be an effective member of staff. It connotes a consideration of human beings as a vital resource (Arora et al., 2019). Communication is the transfer of information from a sender to a receiver, with the message being understood by the receiver. Sarala et al. (2020) define organisational communication as "the central binding force that permits coordination among people and thus allows for organized behavior," and Chatman et al. (2020) argue that "the behavior of individuals in organisations is best understood from a communication point of view." In many ways, organisations have evolved in directions that make the latter view more appropriate. Effective communication is needed for the management to develop and sustain a competitive advantage for organisational productivity and improvement.

Good communication between leaders and workers is really important for a company to do well. Leaders need to enact strategies to improve communication that could lead to positive work consequences (Khaire et al., 2021). Improvements in supervisor-subordinate communication will assist organisations toward the goal of managing diversity by promoting equality and integration in the workplace. Effective communication succeeds when employees support the leader and the organisation if there is a belief that employees' efforts will be rewarded. Leadership succeeds when initiating a response or responding to change, and leadership is inextricably linked to the credibility of those leading. Constituents will become willingly involved to the extent that they believe in those sponsoring the change (Anwar et al., 2021). Melletus et al. (2020) noted that organisational communication has a significant positive relationship with affective commitment, while Pakize, Mahije, and Xhaviti (2023) found a strong link between communication processes, job satisfaction, and affective job commitment. Although the importance of communication in the workplace may seem self-evident, research continues to support its critical role. Studies have shown that when employees' needs are met through effective and satisfying communication, they are more likely to form strong and productive work relationships. This concept of "communication satisfaction", an individual's satisfaction with the flow of information and the quality of relationships within the organisation has been positively correlated with important outcomes such as job productivity and reduced

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turnover rates. In other words, how information flows in an organisation is critical to the way that personnel understand their relationship to and within the organisation. In short, as Smith et al. (2020) state that previous studies seem to reveal that the relationship between internal/employee communication and corporate effectiveness is more significant than what has previously been assumed.

2.8. Employee Productivity

Employee productivity is considered the backbone of the organisation when it leads to its development. The loyalty of a worker depends upon knowledge and awareness of a culture that improves the behavior of an organisation (Bernthal et al., 2020). The awareness of quality culture helps in improving worker productivity and organisational development. Organisational performance is the result of employees' productivity through the amount of their work output. A plethora of research introduces varied ways to evaluate organisational productivity, which include: the standard, quantity, knowledge, or ability of individuals, the accomplished works that are by the responsibility within a specific time. In other words, the assessment systems should have some standard parameters that may be relied upon (Kampini, 2018). The degree of achievement to which a worker fulfils the organisation's mission at the ground level is called productivity (Saad & Abbas, 2018). Saad and Abbas (2018) further elaborate that the task of a worker is made up of the degree of accomplishment of a specific goal or mission that defines boundaries of productivity. The ability of an organisation to establish strong relationships with resources presents effective and economical management of resources.

It is the responsibility of the management to introduce the organisational culture to its employees that may assist the workers to get familiar with the system of the organisation. Management should try to always keep a learning setting within the organisation. A proper understanding of organisational culture ought to lead to an improvement in employees' productivity. Thus, organisations need to get the loyalty of their worker towards the organisation (Wilmington, 2019). There has been important analysis within the literature to explore the impact of organisational culture on workers' productivity. Afsar et al. (2019) state that organisational culture can be used to measure the economic productivity of an organisation. However, organisations' superiorities can be varied since cultural traits differ from organisation to organisation and certain cultural traits could be a source of competitive benefits through causative ambiguity. The world is changing dynamically, and the level of worker expectations and satisfaction is also changing accordingly. This study took into consideration how organisational culture adapts

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overtime to cope up with such dynamic changes and meet the varied demands of worker expectations and their work productivity. A supportive culture is considered a psychological, especially when perceived from the leadership styles such as autocratic, democracy, and transformational leadership style (Huseynzada, 2024)

2.9. Culture and Productivity

Sandeep (2023) carried out a study on organisational Culture and Employee Productivity where the major objective of the study was to investigate the organisational culture and employee productivity. The study confirmed that today's work environment is undergoing a major shift due to determinants like globalization, growing advanced science, and improved technology. These factors are constantly presenting new challenges and creating new opportunities for workers When these changes occur, how workers feel about their jobs also starts to change. In this grow-or-die marketplace, the success of any organisation depends on its employees and the work culture. Happy and committed employees are important assets of any organisation, and the economic management of human resources in smart work cultures can ultimately increase the organisation's productivity as it maintains higher job satisfaction levels of the employees. Etalong (2022) carried out a study on the effect of organisational Culture on Employee Productivity: A Survey of Selected Public Sector Organisations in Enugu. This study explored the relationship between organisational culture and employee productivity. It does this by employing both descriptive and exploratory research designs using both primary and secondary instruments to collect data. A total of 100 employees from the Enugu State Ministry of Finance and Economic Planning, the Enugu State Civil Service Commission, the Enugu State Economic Planning Commission, and the Office of the Head of Service filled out a structured questionnaire, which was the main source of data used in the study. Secondary data came from government papers, textbooks, the internet, and journal publications.

The analysis's finding indicates that organisational norms have a significant impact on employee commitment within an organisation in terms of professional growth and development, recognition and rewards for good productivity, clear communication of the organisation's goals and values, and a positive work environment. Additionally, a well-structured work routine has a significant impact on how much work is completed by employees by improving productivity, time management, and work quality. The study makes the urgent recommendation that the Ministries, Departments, and Agencies (MDAs) under review establish and uphold strong organisational norms that encourage employee commitment with a

particular focus on professional growth and development, recognition and reward for good productivity, clear communication of organisational goals and values, and a positive work environment that fosters productivity. It's important for leaders to be aware of their preferred styles and to adapt them as necessary to create a positive and productive work environment. Minitries, Departments, and Agencies (MDAs) should promote employee delivery on workload to ensure productivity, productivity, time management, and adaptability

Erica et al. (2022) carried out a study on the effect of organisational Culture on Employee Productivity: A Survey of Selected Public Sector Organisations in Enugu. Employee productivity is significantly impacted by organisational culture because it helps employees match their goals with the organisation's overarching objectives. This helps ensure that public organisations uphold their obligation to provide end users with necessary services. This study's main goal is to explore the relationship between organisational culture and employee productivity. It does this by employing both descriptive and exploratory research designs using both primary and secondary instruments to collect data. One hundred (100) employees from the Enugu State Ministry of Finance and Economic Planning, the Enugu State Civil Service Commission, the Enugu State Economic Planning Commission, and the Office of the Head of Service took part in a structured questionnaire that was the main source of primary data. Secondary data came from government papers, textbooks, the internet, and journal publications. Statistical Package for the Social Sciences (IBM SPSS) was used to analyze the collected data and evaluate the hypotheses. The analysis's findings indicate that organisational norms have a significant impact on employee commitment within an organisation in terms of professional growth and development, recognition and rewards for good productivity, clear communication of the organisation's goals and values, and a positive work environment. Additionally, a well-structured work routine has a significant impact on how much work is completed by employees by improving productivity, time management, and work quality.

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should promote employee delivery on workload to ensure productivity, time management, and adaptability. Melletus et al. (2020) conducted a study on the impact of organisational culture on employee productivity at Nigerian Breweries Plc, Enugu. Using a descriptive survey design, 150 questionnaires were distributed to staff members, and the responses were analysed through SPSS regression analysis. The findings revealed that organisational culture had a positive and significant effect on both employee productivity and effectiveness at Nigerian Breweries Plc, Enugu. The study concluded that organisational culture plays a vital role in enhancing employee performance, which in turn leads to higher productivity and profitability. It also recommended that management implement adequate security measures to safeguard the interests of the organisation.

Similarly, Kenneth (2020) examined the effect of organisational culture on employee productivity at Addis Ababa University, Sidist Kilo Campus. The study aimed to identify issues affecting employee productivity in relation to organisational culture, focusing on four key dimensions: teamwork, training and development, reward and recognition, and communication. Primary data were collected through closed-ended questionnaires designed on a five-point Likert scale and distributed to selected employees. Out of a total population of 2,535 staff members, 345 were chosen as the study sample. The collected data were analysed using SPSS Version 23, and the results were presented in tables and figures for clarity. The data collected are presented and analyzed in the form of tables, figures and Descriptive statistics method of data analysis and linear regression analysis was also applied to present the major findings. The major findings which the researcher point out were, most respondents agreed upon the effects of organisational culture (consisting four dimensions indicated above) on employee productivity in general. The researcher has tried to give conclusion, recommendation and possible solutions for the problems and supporting ideas for positive said on the issues.

2.10. Underpinning Theory

This study is anchored on Edgar Schein's Cultural model and is premised on the notion that an entity's culture can be unraveled by having an observation of employees' reactions and their choices, as well as making an inquiry into their beliefs and cognitions concerning issues of rightness and proper conduct (Schein, 1995). The model employs the functionalist notion and views culture as a style of core postulations that are created, found out or forged by a particular set of people as it learns to meet its challenges of exterior adaptation and interior consolidation, which has functioned satisfactorily to be regarded as cogent, and hence is educated

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to new members as the right manner of thinking, of perception and feeling about these challenges (Schein, 1995). In the view of Schein (1995), an understanding of an entity's culture can begin with studying its artifacts, including its visible surroundings, employee relations, company rules, remuneration mechanisms, as well as other visible features.

3. Methodology

This research was geared towards a critical evaluation of the impact organisational culture on employees' productivity with Guinness Nigeria Plc as a case study. In this regard; descriptive survey design was employed in the development of the study. Kanholkar and Dharkar (2022) define research design as the scheme outline or plan that is used to generate answers to research problems. This study will employ descriptive research design. A descriptive study describes or defines a subject, often by creating a profile of a group of problems, people, or events, through the collection of data and tabulation of the frequencies on research variables or their interaction as indicated by Awaiko (2016). Population is the total collection of individuals to be studied and from which sample is drawn (Smith et al., 2020). Therefore, the targeted populations for this study were the staff of Guinness Nigeria Plc. Accordingly, the target population of the study was 85 employees as disclosed by the Head, Human Resources department of the organisation.

The complexity of the area under study prompted the researcher to adopt a random sampling technique. In a random sampling technique, the entire workers (staff) have equal probability of being selected. The participants were selected randomly from the various department of the organisation concerned. The sample size for the study is 70 randomly drawn among all the departments of the Guinness Nigeria Plc.

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4. Results

Table 1: Analysis of Respondent Bio-Data

Variables	Category	Frequency	Percentage (%)
Gender	Male	28	40
	Female	42	60
Age	18-25	25	35.7
	26-30	20	28.6
	31-40	10	14.3
	41 and above	5	7.1
Marital Status	Married	19	27.1
	Single	43	61.4
	Divorced	8	11.4
Education	WACE/ NECO	10	14.3
	B.sc/HND	36	51.4
	ND/NCE	17	24.3
	Others	7	10
	Additional Degree	2	2.9
Work Experience	Below 5	30	42.9
	5-10	22	31.4
	Above 10	18	25.7

Source: Field Survey, 2025

The demographic profile of the respondents showed that the majority were female: 42 (60.0%), while 28 (40.0%) were male (total n = 70). The largest age group was 18–25 years, with 25 respondents (35.7%), followed by 26–30 years with 20 respondents (28.6%). Ten respondents (14.3%) were aged 31–35 and another ten (14.3%) were 36–40, while 5 respondents (7.1%) were 41 years or older. Marital status distribution indicated that 43 respondents (61.4%) were single, 19 (27.1%) were married, and 8 (11.4%) were divorced. Regarding educational attainment, 10 respondents (14.3%) held diplomas, 36 (51.4%) held bachelor's degrees, 17 (24.3%) held professional qualifications, 7 (10.0%) had master's degrees, and 2 (2.9%) held additional degrees. With respect to years of service, 30 respondents (42.9%) had served less than 5 years, 22 (31.4%) had served between 5 and 10 years, and 18 (25.7%) had served more than 10 years.

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4.1. Data Analysis of the Responses

Table 2

Statement	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
Management embraces teamwork	28 (40.0%)	30 (42.9%)	5 (7.1%)	7 (10.0%)	0 (0%)
Environment for employee cooperation	37 (52.9%)	23 (32.9%)	5 (7.1%)	5 (7.1%)	0 (0%)
Teamwork assists in task performance	24 (34.4%)	36 (51.4%)	5 (7.1%)	0 (0%)	5 (7.1%)
Periodic training programmes	30 (42.8%)	31 (44.3%)	0 (0%)	6 (8.6%)	3 (4.3%)
Training assists in task completion	26 (37.1%)	31 (44.4%)	8 (11.4%)	5 (7.1%)	0 (0%)
Training enhances skills and productivity	21 (30.0%)	35 (50.0%)	0 (0%)	7 (10.0%)	7 (10.0%)
Managers recognize good performance	24 (34.3%)	22 (31.4%)	9 (12.9%)	8 (11.4%)	7 (10.0%)
Morale-building meetings held	32 (45.7%)	29 (41.4%)	4 (5.8%)	0 (0%)	5 (7.1%)
Employee contribution is valued	23 (32.9%)	31 (44.3%)	11 (15.7%)	0 (0%)	5 (7.1%)
Rewards influence effectiveness	18 (25.7%)	36 (51.4%)	11 (15.7%)	0 (0%)	5 (7.1%)
Communication enhances productivity	23 (32.9%)	31 (44.3%)	11 (15.7%)	0 (0%)	5 (7.1%)
Communication improves involvement	18 (25.7%)	36 (51.4%)	11 (15.7%)	0 (0%)	5 (7.1%)
Goals and objectives are well explained	26 (37.1%)	31 (44.3%)	8 (11.4%)	5 (7.1%)	0 (0%)

Source: Field Survey, 2025

The descriptive analysis shows that over 80% of the respondents agree or strongly agree on each teamwork item, indicating a robust teamwork culture.

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Disagreement never exceeds 10%, demonstrating that most employees feel well supported by collaborative practices. Table 2 also report how employees feel about training programmes. Between 80–87% of respondents find training programmes adequate and beneficial. Up to 10% dissent, indicating nearly universal satisfaction, but with a small group feeling their development needs are unmet. The table also summarize views on recognition and compensation. While morale-building activities are rated very positively (87.1%), fewer employees feel consistently recognized (65.7%), and 21.4% disagree that rewards drive productivity. This suggests that reward systems are effective overall but merit further transparency and consistency.lastly the table shows employees' views on company communication. Approximately 77% of respondents agree that communication fosters integration and commitment. Around 15% are neutral, and 7.1% strongly disagree, indicating generally positive but not universal satisfaction with internal communication.

4.2. Hypothesis Testing

Culture Dimension	Response Category	Observed (O)	Expected (E)	O–E	$(O–E)^2$	$(O–E)^2/E$
Teamwork	Strongly Agree	24	14	10	100	7.143
	Agree	22	14	8	64	4.571
	Undecided	9	14	-5	25	1.786
	Disagree	8	14	-6	36	2.571
	Strongly Disagree	7	14	-7	49	3.500
	Chi-square (χ^2)					**19.571**
Reward	Strongly Agree	25	14	11	121	8.643
	Agree	25	14	11	121	8.643
	Undecided	7	14	-7	49	3.500
	Disagree	6	14	-8	64	4.571
	Strongly Disagree	7	14	-7	49	3.500
	Chi-square (χ^2)					**28.857**
Training & Dev.	Strongly Agree	23	14	9	81	5.786
	Agree	24	14	10	100	7.143
	Undecided	10	14	-4	16	1.143
	Disagree	8	14	-6	36	2.571
	Strongly Disagree	5	14	-9	81	5.786

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Culture Dimension	Response Category	Observed (O)	Expected (E)	O–E	(O–E)²	(O–E)²/E
	Chi-square (χ^2)					**22.429**
Communication	Strongly Agree	23	14	9	81	5.786
	Agree	24	14	10	100	7.143
	Undecided	10	14	-4	16	1.143
	Disagree	8	14	-6	36	2.571
	Strongly Disagree	5	14	-9	81	5.786
	Chi-square (χ^2)					**22.429**

Source: Field Survey, 2025

For each of the four culture dimensions, the chi-square test produced values far exceeding the critical χ^2 of 9.488 (df. = 4, $\alpha = 0.05$), allowing us to reject every null hypothesis and confirm that each dimension is significantly associated with employee productivity. The teamwork dimension, employees who "Strongly Agree" (O = 24) and "Agree" (O = 22) that management embraces teamwork exceeded the expected count (E = 14) by ten and eight, respectively, while "Disagree" and "Strongly Disagree" fell short by six and seven. These deviations yield a total χ^2 of 19.571, demonstrating that the observed clustering in positive responses is highly unlikely under the null. For instance, Halid et al. (2020) emphasize that teams allow for greater cooperation and skill enhancement among employees in a non-competitive environment. Melletus et al. (2020) also reached a similar conclusion that team members share knowledge and provide judgment, which increases productivity, especially in complex tasks. Silas and Purity (2022) emphasize the fact that effective teamwork builds an environment that enhances knowledge sharing and, as such, fosters innovation and improved operational management, all of which enhances productivity. Our result is a remarkable χ^2, which suggests that more respondents "agree" or "strongly agree" than was anticipated, supporting these theories. It implies that a strong teamwork culture is required to enhance employees' output, confirming the alternative hypothesis.

The reward dimension produced the largest chi-square ($\chi^2 = 28.857$), driven by "Strongly Agree" and "Agree" counts, both eleven above expectation. Even the smaller neutral and negative cells contributed meaningfully when scaled by the expected frequency. Such a pronounced departure from chance supports the premise of expectancy theory, as McCune et al. (2021) and Hauwa (2022), for example, support the claim that profit sharing as productivity-related compensation binds employee interest to organisational objectives and increases motivation.

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Furthermore, non-financial forms of recognition, such as praise and acknowledgment, have been shown to enhance commitment and performance. According to Johnson (2021) and Kaplan et al. (2021), employees who are recognized demonstrate higher support for the organisation and commit more to the organisational goals. The current finding ($\chi^2 > 28.857$) establishes that at Guinness Nigeria Plc, the reward culture relative to the response pattern hypothesis, x2 (4, N = 1000) = 28.857, showed strong positive deviation response bias on the reward culture. This evidence fails to support H_0 and aligns with the literature indicating that strong reward policies increased employee productivity. In the training and development dimension, an excess of nine "Strongly Agree" and ten "Agree" responses generated a χ^2 of 22.429. This confirms that respondents view periodic training programmes as more than perfunctory: they see them as essential for meeting job demands. Smith et al. (2020) and Ada & Cross (2021) emphasize that training increases employee competence and efficiency, enabling organisations to meet their goals.

By upgrading skills and awareness of processes, effective training raises productivity and reduces waste (e.g., lower error rates). Empirically, Etalong et al. (2022) report that professional growth and development are strongly linked to employee commitment and output. Thus, our significant chi-square result (rejecting H_0) supports the idea that a culture prioritizing training and development leads to higher employee productivity, in agreement with the literature. Finally, the communication dimension, identical in its response pattern to training, also yielded $\chi^2 = 22.429$. The surplus of nine and ten positive responses again far outstrips chance, underscoring the critical role of clear, timely information flow. For instance, Mellitus et al. (2020) and Pakize et al. (2023) find strong links between open communication processes and employees' commitment and performance. Smith et al. (2020) note that almost every study reveals a more significant relationship between communication and organisational effectiveness than was previously assumed. The present significant χ^2 aligns with these findings: at Guinness Nigeria Plc., a culture of clear and regular communication appears to enhance employee output.

The two objectives 1 and 3 were supported; strong teamwork and strong training cultures positively correlate with higher employee productivity. H2 and H4 were not supported; reward culture and communication culture had no notable correlation with productivity in this case. Organisational culture theory incorporates the significance of teamwork and collaborative culture for performance. Likewise, human capital and learning organisation theories affirm

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that training and development increase productivity. The non-significant results for reward and communication indicate that while these elements may be important for morale, their effects on productivity are likely more complicated and depend on trust and fairness. In conclusion, the data suggests that Guinness Nigeria Plc. Teamwork and training elements of culture have direct implications on employee productivity. The management may want to bolster these areas further. Attention to fairness in rewards and the overall organisational communication may improve employee engagement, even if the productivity outcomes in this study were indirect.

Conclusion

It has been observed that organisational culture plays an important role in increasing/decreasing employees' work productivity. Increased job satisfaction, motivation, and commitment can result in higher levels of productivity if there is a supportive organisational culture. On the other hand, a bad or poisonous culture can have the opposite impact, resulting in lower levels of productivity, lower levels of job satisfaction, and lower levels of motivation. Organisations must develop and preserve a culture that appreciates and supports employee growth, well-being, and contribution to organisational objectives. This study succeeded in establishing the facts that organisational culture has a significant impact on employee performance using the following indicators: teamwork, training and development, reward, and communication, by looking at how they affect productivity. It cannot be overemphasized, as organisational culture plays a pivotal role in shaping the behavior, emotions, and productivity of employees in an organisation to bring about the attainment of the overall objectives of the organisation. Therefore, organisational culture is a key driver of organisational success, as it shapes employee attitudes, behavior, and ultimately business outcomes and focus should be on developing a strong and positive culture that aligns with their values and goals to promote employee engagement, productivity, and financial productivity. It was concluded that teamwork culture has a significant impact on employees' productivity, reward culture has a significant impact on employees' productivity, training and development programmes have a significant impact on employees' productivity, communication culture has a significant impact on employees' productivity.

Recommendations

Based on the findings and conclusion of the study, the recommendations are made for each of the four dimensions of organisational culture: teamwork, training and development, reward and recognition, and communication i.e. organisations

should create opportunities for employees to work together, share knowledge across teams, and learn from one another. Inter- and intra-departmental projects that require group effort should also be encouraged, as they help employees build stronger interpersonal relationships and improve collaboration. There should be avenue to develop human resources is essential for building a strong and capable workforce. Organisations should design well-planned on-the-job and off-the-job training programmes that match employees' specific tasks and responsibilities. Employees who receive relevant training are more likely to perform better, so training should be structured, scheduled, and provided regularly to enhance both skills and confidence at work.

Management should hold morale-boosting meetings or events to appreciate employees who perform well and to encourage others to do the same. In addition, occasional off-the-job recreational workshops can help reduce stress, improve motivation, and create a more positive working environment. Organisations should provide open and timely communication channels that allow information to flow easily across all levels. Employees should be able to communicate freely with one another and with management. It is also important for top management to seek feedback from employees to support better decision-making and guide necessary organisational changes.

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WORKPLACE BULLYING: MITIGATION STRATEGIES AMONGST TEMPORARY EMPLOYEES

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Abstract

Workplace bullying is a widespread challenge that affects employees and organizations worldwide, especially the vulnerable such as temporary employees. This paper investigated the mitigation strategies of workplace bullying from the temporary employees' perspectives in a higher education context by adopting a constructivist qualitative approach. All temporary employees within a selected higher education institution constituted the target population. A combination of purposive sampling and snowball sampling was used to draw a sample of 20 participants. The data collection technique used was semi-structured interviews while thematic analysis technique was used to analyze the collected data. Four themes emerged on the mitigation strategies of workplace bullying and are: (1) Establishing Clear Anti-Bullying Policies and Guideline; (2) Training and Awareness for Staff and Managers; (3) Confidential Reporting Systems and Fair Investigations; and (4) Psychological Support. The study recommends that higher education institutions should foster a positive culture that values the wellbeing of all employees and provide temporary employees as victims of bullying with psychological support to enhance their psychological wellbeing while bystanders should be empowered to confront bullying behavior. Furthermore, the bullies should be educated about the consequences of their bullying behavior.

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Introduction

Bullying in the workplace has become complex and widespread phenomenon, making it difficult for organizations to comprehend it as an organizational phenomenon. This is caused by its complexity as well as the many labels and terminology that researchers, the media, and the general public use interchangeably to describe the behavior. According to Walker (2025), workplace bullying is characterized as unwanted negative actions directed at an employee who is unable to defend themselves and the actions occur repeatedly overtime. Furthermore, workplace bullying encompassing incivility, aggression and harassment negatively affect organizational productivity and job satisfaction (Ihionu, 2025; Zheng *et al.,* 2025). Bulut and Hihi (2021) claim that workplace bullying can lead to detrimental consequences either psychological, physical, or even socioeconomic effects on victims.

Loredo *et al*. (2024) assert that workplace bullying is a pervasive worldwide problem that lowers employee morale, especially in higher education settings. Additionally, according to Zabrodska and Kveton (2012), between 18% and 32% of employees in higher education settings globally reported having encountered particular types of bullying. According to a University of the United States survey, 22% of employees had been bullied by their superiors while 7.2% employees in British higher education reported experiencing bullying within the previous six months, according to Keashly and Neuman (2018). Additionally, studies show that bullying at work is a major problem in South Africa. A study conducted in a South African higher education institution found that 44% experienced bullying more than once while 64% had witnessed bullying (Conco *et al,* 2021).

Mpabanga *et al.* (2023) assert that technological advancement and globalization altered employment situations, with many organizations choosing to rely on independent contractors or temporary employees as opposed to permanent employees. Nevertheless, temporary employees are more likely to experience workplace bullying compared to permanent employees. Djurkovic (2018) stated that temporary employees often face unique vulnerabilities, such as being denied rights or excluded from team benefits, which deeply impact their self-esteem and mental well-being. Workplace bullying is believed to persistently create feelings of defenselessness among temporary employees (Oluwatosin, 2020). Therefore,

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bullying at work among temporary employees is a serious problem when social isolation, employment uncertainty, and a lack of long-term protections increase the likelihood of abuse.

Temporary employment is common in higher education institutions. Thus, workplace bullying has been researched in higher education institutions in the United States of America, Europe, Finland, Scandinavia, Bulgaria, and other countries (Matlala & Mangena, 2023). This makes it significant to study the mitigating strategies amongst temporary employees in higher education institutions.

Temporary employees often occupy vulnerable positions with less job security, making them more susceptible to bullying and less likely to report it (Sekgobela & Matjie, 2025; Solomon & du Plessis, 2023). Understanding the prevalence and impact of bullying in this context can help in developing targeted interventions to protect this group. Additionally, the academic environment, characterized by a hierarchical structure, can exacerbate power imbalances, thereby contributing to bullying (Sekgobela & Matjie, 2025). Loredo *et al.* (2024) assert that academics in higher education institutions are more likely to be bullied because of the existing sociocultural control inequalities. Addressing these issues can improve the overall workplace culture, leading to increased job satisfaction and retention among temporary staff. Moreover, insights gained from such studies can inform policies that promote fairness and respect, enhancing the institution's reputation as a supportive employer (Liang, 2021).

In order to improve flexibility and adapt to the evolving higher education landscape, higher education institutions have depended more and more on temporary employment agreements throughout time (Solomon & du Plessis, 2023; Smithers *et al.,* 2025). As a result, temporary employees are essential to an organization's operations. Furthermore, temporary employees may be more vulnerable to workplace bullying than permanent employees due to elements including employment uncertainty and unequal power dynamics. Mokgolo and Molotsi (2025) discovered that power imbalances contribute to workplace bullying when superiors abuse power, resulting in victims feeling unsafe, unhappy and unwelcome. Similarly, Lanre-Babalola *et al.* (2024) found that absence of an alternative job exposes employees to supervisor abuse. This implies that temporary employees are more likely to be subjected to workplace bullying because they are powerless and have uncertain job security.

Despite existing workplace policies and labor regulations aimed at promoting safe and respectful work environments in South Africa, bullying among temporary employees continues to be a problem but receive limited attention. This creates a

need to explore effective mitigation strategies that can protect temporary employees, strengthen organizational interventions, and promote a fair and inclusive workplace culture.

Literature Review

Literature shows that mitigation strategies that organizations can use to manage workplace bullying include, among others, improving the work environment, applying policies and developing assistance policies and programmes (EAPs), and providing training interventions. The subsequent subsections provide an overview of these strategies.

Improved Work Environment

A supportive work environment can serve as a valuable strategy to reduce the negative impact of workplace bullying (Loredo et al., 2024). Research found that sufficient workplace support enables victims of workplace bullying to voice out their challenges, which assist to take necessary steps against the perpetrators of workplace bullying (Ciby & Raya, 2015; Issak *et al.,* 2025). Loredo *et al.* (2026) revealed that the prevalence of bullying in higher education settings can be reduced by providing platforms for victims to disclose bullying incidents to their colleagues and superiors, especially when this is accompanied by sufficient organizational support. Hodgins et al. (2020) assert that bullying does not go away unless employees receive sufficient support from their superiors and the organization as a whole. Thus, promotion of a positive culture can eliminate situational factors that promote aggression in the workplace.

Development and Implementation of Policies

There should be policies in place to serve as guidelines on the management of workplace bullying and all employees should be familiar with such policies (Smit, 2022). This should also include clear procedures for reporting, investigating, and handling bullying. Rayner and Lewis (2020) support this by emphasizing that policies should serve as a guide for both employers and employees, which requires equipping and educating employees and management to acquire skills needed to foster a harmonious environment and eliminate bullying behaviors. Furthermore, policies should include a professional code of conduct, signed by all employees and management to encourage anti-bullying behaviors (Coetzee & Van Dyk, 2018). Such steps assist to create a zero-tolerance of bullying behaviors (Pheko *et al.,* 2017).

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Mediation

Mediation is regarded as an effective intervention strategy in addressing reported workplace bullying (Blackwood *et al.,* 2020). Thus, when bullying is reported, management must take immediate action and thoroughly investigate the reported incident with care to avoid further harm (Lempp *et al.,* 2020). However, an unskilled mediator is more likely to cause harm than to better the situation, especially if the mediator does not fully understand what mobbing or bullying constitutes. Therefore, Anderson *et al.* (2020) suggest that professional counsellors should be involved in the process.

Employee Assistance Programmes

Employee Assistance Programmes, through counselling, are useful in the provision of support and empowering victims of workplace bullying as they assist to reduce the negative effects of workplace bullying (Li, 2020). Blackwood and Jenkins (2021) postulate that access to counselling services for affected contracted employees can be helpful by not just offering professional support to the victims but also assisting to create a supportive environment where victims feel encouraged to seek help without being judged.

Training Interventions

It is important for organizations to develop effective and rigorous interventions to mitigate and prevent workplace bullying. These may include provision of stress management training to equip employees with the competencies, skills, or coping resources needed to manage bullying (Liang, 2021). Adekanmbi *et al.* (2022) discovered that resilience enhances psychological wellbeing of employees, implying that resilience training programs can assist employees to cope with stress related to workplace bullying. Training interventions aimed at raising awareness of people's interpersonal effect in the workplace in order to promote a more civil and harmonious work environment can provide employees with the competencies to cope with stressors (Lempp *et al.,* 2020). Furthermore, awareness campaigns aimed at equipping managers and employees with knowledge about their duties and responsibilities towards a promotion of bullying free environment can reduce workplace bullying (Keashly *et al.,* 2020).

Theoretical Background

In early research, DeKeseredy and Barbara (2006) stated that most theories of bullying are fundamentally inadequate since they are centered around related issues of the bullying phenomenon. For the purpose of this paper, a Three-Way Model,

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encompassing intrapersonal, interpersonal and intra-group dimensions of workplace bullying was found to be relevant.

De Cuyper et al. (2009) presented a Three-Way model-intrapersonal, interpersonal, and intra-group dimensions as one of the theories supporting the idea of addressing workplace bullying. Bullying behavior occurs at the intrapersonal level as a result of an individual's frustrations within the organization and how they are handled. Thus, employment dissatisfaction, employment strain, work overload, and institutional changes are a few examples of such frustrations. Employees may therefore be more likely to become victims or offenders if these grievances are not addressed or resolved.

Interpersonal and managerial disputes form the basis of the interpersonal level (De Cuyper et al., 2009). Workplace or personal issues among employees, or even the presence of both, can lead to interpersonal disputes. The degree of formal or informal authority controls the degree of unsuccessful conflict resolution, resulting in group conflict escalation (León-Pérez et al., 2019). In highly unresolved conflict settings, high-ranking employees are more likely to become bullies. Therefore, improved conflict management strategies can de-escalate the likelihood of bullying behavior and eliminate the likelihood of employees becoming bullies or victims of bullying.

Lastly, the intra-group level is predicated on theories emphasizing that bullying behavior within an organization may originate from its interactional patterns (Baillien et al., 2009). Thus, a group of employees within the same organization may persistently gang up against an individual through various forms of malevolent behaviors, which has a detrimental effect on the victims and the functioning of the overall organization (Loredo, 2026). Organizational cultures of gossip, teasing intimidation, isolation, humiliation, innuendo, and the propagation of hostile rumors are examples of intra-group workplace bullying (D'Cruz & Noronha, 2019).

Research Methodology

The study adopted a constructivist qualitative approach to explore the mitigation strategies of workplace bullying amongst temporary employees at a selected higher education institution. Academic and support personnel who were temporarily employed at the selected higher education institution in South Africa made up the target population. Since the focus was on exploring the mitigating strategies of workplace bullying amongst temporary employees, a combination of purposive sampling and snowball sampling was utilized to collect data. Semi-structured interviews were used to collect data from twenty (20) participants. Before collecting research data, ethical clearance was obtained from the Turfloop

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Research and Ethics Committee (TREC/56/2024: PG). Thus, data collection process commended upon obtaining ethical approval and gatekeeper permission letter from the management of the selected higher education institution. Participants were included in the study regardless of their gender, color, ethnicity, or educational background. The data gathered from the interviews was analyzed using thematic content analysis technique after transcription.

Findings and Discussions

There are four themes that emerged as strategies to address workplace bullying during thematic analysis: namely, establishing clear anti-bullying policies and guidelines; training and awareness for staff and managers; confidential reporting systems and fair investigations; and psychological support and restorative interventions.

Theme 1: Establishing Clear Anti-Bullying Policies and Guidelines

Establishing Clear Anti-Bullying Policies and Guidelines has emerged as a mechanism for addressing workplace bullying among temporary employees. Harrison et al. (2020) describe it as the development and formal documentation of rules that explicitly define unacceptable behaviors, outline reporting and handling procedures for bullying incidents, and set out disciplinary consequences for perpetrators.

Participants expressed a strong need for formalized institutional policies that clearly define bullying and outline procedures for reporting. Participant 4 explained, "*There was no policy that protected us as temporary employees when we were bullied. When I reported my supervisor for shouting at me and overloading me with work, HR told me there was nothing they could do because my contract was ending. That made me feel completely unprotected, and I stopped reporting. If there were a clear policy, I would have had the confidence to take the matter further.*" Participants 5, 7 and 14 shared the same perception. This lack of structure left employees uncertain about how to protect themselves. Research by Tran (2017) supports this finding, showing that unclear or absent policies create a permissive culture where bullying becomes normalized. A study by Rayner and Lewis (2020) also highlights that institutions without defined reporting channels foster fear and silence among employees, particularly those in contract positions. Establishing clear anti-bullying frameworks ensures that all staff, including temporary employees, have equal access to justice and institutional protection (Moraca & Vivian, 2024).

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Without written procedures, many victims were unsure whom to approach or how complaints would be handled. Participant 9 shared, *"I went to HR after my supervisor made sexual advances towards me and then punished me when I refused. HR said they would 'investigate,' but nothing ever happened, leaving me vulnerable. It made me realize there was no proper system to protect people like me. I felt betrayed and exposed because there was no clear process to follow or assurance of confidentiality"*. Participants 1,3,8 and 12 shared the same view. This illustrates the confusion and harm caused by the absence of institutional protocols. Escartin et al. (2021) found that institutions lacking transparent complaint mechanisms often experience low reporting rates and high rates of bullying recurrence. Clearly defined procedures, such as confidential reporting, time-bound investigations, and consistent enforcement, empower employees to seek help without fear of retaliation (Matlala & Mangena, 2023). Embedding such protocols into organizational culture transforms policy from symbolic compliance into genuine protection.

Clear reporting lines and confidentiality clauses are essential. Participant 6 said, *"Also, HR just brushed me off and said it was 'normal' for temps to be treated differently. There was no visible enforcement of any rules against bullying, and that silence gave managers more power to continue. If there were a visible anti-bullying policy, it would reassure staff that the institution takes accountability seriously"*. Visible enforcement reassures staff that the institution is accountable. Similarly, it was discovered that policies alone are ineffective without consistent enforcement and visible accountability (Salin, 2021; Salin & Hoel, 2020; Salin & Notelaers, 2020). When employees witness disciplinary action against perpetrators, institutional credibility increases, and bullying behaviors decline (Hodgins *et al.*, 2020).

The findings highlight that without institutionalized anti-bullying policies, temporary employees remain exposed to abuse, silence, and systemic neglect. A formal policy does more than define bullying; it establishes a protective framework for addressing complaints fairly and consistently. Safodien (2022) also agrees that formal policies signal organizational commitment, giving victims confidence to report incidents without fear of retaliation or dismissal. Clear policies must include reporting lines, response timelines, confidentiality clauses, and disciplinary actions against perpetrators. Importantly, these policies should be communicated across the institution and backed by leadership to avoid being merely symbolic (Smit & Du Plessis, 2016). For temporary employees, a visible and enforced anti-bullying policy is both a safeguard and a source of reassurance, ensuring that their dignity and rights are upheld.

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Theme 2: Training and Awareness for Staff and Managers

Training and Awareness for Staff and Managers has also emerged as a way of managing workplace bullying. Training and awareness for staff and managers refers to structured educational programmes designed to equip all levels of an organization to identify, prevent, and respond to bullying behaviors, thereby promoting a respectful and inclusive workplace culture (Loredo *et al.,* 2026; Walker, 2025). Loredo *et al.* (2026) assert that there are benefits that higher education institutions can reap from cultivating culture of civility and inclusion.

Preventing bullying requires comprehensive staff training, including leadership, to identify and respond to abusive behavior. Participant 19 stated, *"She would say I am incompetent even when I did everything right. She did not even realize that he was bullying me, she said she was just being strict and firm with me. I later understood that she genuinely thought this was her way of managing, but it destroyed my confidence. I feel like supervisors need to be trained to know the difference between being firm and being abusive."* Participants 11,16,18 and 20 shared the same sentiment. This highlights the importance of sensitization workshops that distinguish between assertiveness and harassment. Research by Salin and Hoel (2020) confirms that lack of awareness and inadequate managerial training are major contributors to bullying in organizations. Findings by Keashly *et al.* (2020) show that when supervisors receive targeted training on appropriate communication, conflict resolution, and respect for authority, incidents of unintentional bullying decline significantly. Such interventions help create emotionally intelligent leaders who foster supportive, inclusive work environments.

Training builds awareness and fosters empathy among staff. Participant 11 explained, *"Moreover, I was constantly excluded and ignored; many colleagues saw it happening, but no one said anything. They told me privately that they were scared to get involved or that they did not know what to do. That silence made the bullying worse because it felt like I was fighting alone. If people had training on how to intervene or support someone, maybe I would not have felt so isolated"*. Participants 15, 17 and 20 also supported that providing employees with strategies to support victims creates a collective safety net and discourages silence. This aligns with findings by Escartín et al. (2021), who emphasized that bystander training empowers employees to recognize and respond to bullying effectively. It was discovered that when colleagues are educated on intervention techniques and empathy, collective responsibility increases and tolerance for abuse decreases

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(Blackwood *et al.,* 2026; Liang, 2021). Awareness initiatives also reduce passive complicity, strengthen organizational unity and moral accountability.

Leadership training should include modules on emotional intelligence and constructive communication. Participant 3 shared, *"Even when I reported nothing happened, supervisors really need training because most of them do not know how to lead without intimidating people. My supervisor would always raise his voice and embarrass me in meetings as if that was the only way to show authority. That is not leadership, it is bullying, and it breaks people down. If they were trained to manage with respect and guidance, staff would not feel so degraded."* Managers play a crucial role in either enabling or challenging toxic behavior. Similarly, a study by Olaleye and Lekunze (2024) found that emotionally intelligent leadership is key to preventing workplace bullying and promoting psychological safety. When leaders are trained to use empathy and constructive feedback, employee satisfaction and engagement improve markedly (Woodrow & Guest, 2016). This shift transforms the workplace into a culture of mutual respect and accountability, where bullying behaviors are actively discouraged (Liang, 2021).

The testimonies show that training and awareness are not optional but essential for preventing workplace bullying. When both staff and managers are educated about respectful conduct, boundaries, and support strategies, organizations can create a safer and healthier environment. Awareness programmes also empower bystanders to act rather than remain silent (Smit, 2022). Jacobs and De Wet (2015) believe that training must be both theoretical and practical, equipping employees and supervisors with fundamental tools to respond to and prevent bullying effectively.

Theme 3: Confidential Reporting Systems and Fair Investigations

Confidential Reporting Systems and Fair Investigations have also emerged as effective ways to address workplace bullying. Hoel and Einarsen (2020) describe Confidential Reporting Systems and Fair Investigations organizational mechanisms that allow employees to raise concerns about bullying in a safe, private manner, followed by an impartial, timely investigation that treats both accuser and accused fairly. For example, robust systems ensure anonymity, protection against retaliation, and transparency about processes and outcomes (Ballard & Easteal, 2018).

A crucial mechanism for managing workplace bullying is the establishment of confidential, anonymous reporting platforms. Participant 5 remarked, *"I was scared of retaliation, so I never reported it felt too risky."* A system that protects anonymity encourages more employees to come forward. It reduces the fear of backlash and gives vulnerable staff a voice. Confidentiality builds trust in the

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reporting process. A study by Nielsen et al. (2020) supports this, noting that employees are far more likely to disclose bullying when confidentiality and non-retaliation guarantees are explicit. Moreover, a study by Ayoko (2022) revealed that anonymous reporting mechanisms increase psychological safety and trust in organizational justice.

Participants highlighted the need for impartial investigation procedures. Participant 10 explained, *"They just asked my supervisor what happened and took his word for it. No investigation, no accountability, just indifference. It was crushing to realize that no one would stand up to him, he had too much power, and I was just another temporary staff member."* Participants 1, 3 and 18 shared the same perception. This kind of biased inquiry further victimizes the complainant and undermines credibility. Institutions should ensure that HR or external mediators handle reports with neutrality. Fair processes protect both the accuser and the accused. Clear timeframes and feedback loops must also be part of the system. Salin (2021) echoes these findings, highlighting that impartial investigations are essential for organizational credibility and employee trust. Blackwood et al. (2020) indicate that when complaints are mishandled or perceived as biased, victims experience secondary trauma and disengagement.

Participant 13 said, *"When I speak to my supervisor, she would say the very same thing that I should just work and maybe they will give me a permanent position, and she would say I should leave her office. I reported the incidents, and I waited weeks for feedback, and no one ever told me what they decided."* Delayed or opaque procedures discourage future reporting. Transparency and timely communication are essential for resolution. A trustworthy process reinforces the institution's commitment to justice and ethical conduct (Malete, 2025).

Theme 4: Psychological Support

Psychological Support has also emerged as one of the most effective methods for dealing with workplace bullying. Anderson *et al.* (2020) argue that psychological support is an organizational provision, such as counselling, debriefing, peer-support groups, and mediation, designed to help victims of workplace bullying recover emotionally, rebuild their resilience, and return to functional performance. A study by Nielsen *et al.* (2020) has reported that employees with higher levels of resilience and social support experienced fewer long-term psychological consequences after exposure to workplace bullying, indicating the protective value of support systems.

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Beyond policy and reporting, participants emphasized the need for emotional and psychological support. Participant 8 shared, "*This completely destroyed me and I remember I requested to schedule for a counselling appointment that's going to take a week without coming to work, they said they will come back to me because they really need me to be at work every day, and after everything I went through, they denied me counselling session and eventually none was offered."* Participants 3, 4, 7, 10, 12 and 19 shared the same perception Institutions should provide access to internal or external counselling services. These services help employees process trauma and regain emotional stability. Mental health support demonstrates care and responsibility (Smit, 2022). Similarly, Loredo *et al.* (2026) emphasize the importance of higher education institutions to assist the victims of bullying by prioritizing healing and restoration. Restorative practices, such as mediation and conflict-resolution workshops, were also suggested. A study by D'Cruz and Noronha (2019) found that access to counselling and emotional support plays a pivotal role in post-bullying recovery. Blackwood and Jenkins (2021) also revealed that employees who received timely psychological assistance reported higher resilience and faster reintegration into the workplace. Conversely, the absence of support intensified trauma and prolonged disengagement (Aristidou *et al.,* 2020). This underscores the organizational duty to provide structured mental health interventions.

Participant 1 noted, "*When I tried to seek assistance about this bullying behavior, no one wanted to entertain me. If someone had just mediated early on, it would not have escalated."* Intervening before bullying becomes entrenched can preserve working relationships. Mediation allows both parties to understand harm and set boundaries. It is a proactive, healing alternative to purely punitive measures. Empirical findings by Salin and Hoel (2020) support this notion, showing that restorative mediation fosters early resolution and mutual understanding between conflicting parties. Blackwood *et al.* (2020) believe that mediation reduces repeated conflicts and encourages accountability through constructive dialogue. By focusing on relationship repair rather than punishment, it strengthens trust and improves team dynamics (Mokgolo & Chigo, 2024).

Providing debriefing sessions and follow-up after interventions can restore confidence and inclusion. Participant 2 stated, "*I made a decision to report the bullying further, and still I felt completely alone even after I reported it; it was like I was the problem."* Emotional follow-up reminds victims they are supported beyond procedural responses. It also allows institutions to monitor long-term recovery. Together, these mechanisms foster a culture of healing rather than punishment. Research by Nielsen and Einarsen (2018) also affirms that ongoing

psychological support, including post-incident follow-ups and peer counselling initiatives, significantly improves emotional recovery. Moreover, research by Moloi et al. (2025) emphasize that when institutions maintain communication with victims, it rebuilds trust and reduces turnover. Providing such continuous care strengthens both individual resilience and organizational commitment, leading to a healthier, more empathetic work environment (Olaleye & Lekunze, 2024).

Conclusions

The findings of this study reveal the mitigation strategies that can be used to address the negative consequences of workplace bullying among temporary employees. These include establishing clear anti-bullying policies and guideline, training and awareness for staff and managers, confidential reporting systems and fair investigations, and psychological support. The broader implications of implementing these findings span across multiple domains, namely; enhanced psychological wellbeing of temporary employees as victims, heightened bystander enlightenment to confront bullying, enhanced bullies' enlightenment to stop bullying and empowered management to promote bullying-free work environment, which eventually improve the wellbeing and functioning of the entire organization. Therefore, it is important for higher education institutions to foster a positive culture that values the wellbeing of all employees, irrespective of their employment status and the repercussions for workplace bullying should be made transparent for perpetrators and other employees to know that any form of bullying can never be tolerated. The long-term success, productivity, and sustainability of higher education institutions fundamentally depend on the well-being of all employees.

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EMPOWERING SEMI-SKILLED ARTISANS THROUGH RECOGNITION OF PRIOR LEARNING

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Abstract: *The artisanal sector contributes significantly to employment creation, vocational development and national productivity worldwide, yet many semi-skilled artisans remain constrained in their career progression because years of workplace competence are not matched by formal, industry-recognised qualifications. Recognition of Prior Learning (RPL) schemes address this gap by providing structured processes for assessing and certifying experiential learning; South Africa's Artisan Recognition of Prior Learning (ARPL) programme is one such scheme, alongside comparable initiatives in the Nordic countries, Kenya, Tanzania and elsewhere. This paper reviews the literature on RPL and ARPL-type initiatives to assess their contribution to the empowerment of semi-skilled artisans. The review identifies four ways in which such recognition supports empowerment, it strengthens artisans' confidence and professional identity; improves job opportunities and career flexibility; enables higher salaries and better working conditions; and increases artisans' contribution to sectoral productivity. The review also considers critical perspectives: certification alone does not guarantee employment where qualified artisans exceed available jobs, and persistent gender disparities may limit women's ability to convert recognition into comparable career advancement or pay. Overall, RPL schemes appear to be effective empowerment tools, but their potential depends on increasing awareness, coordinating institutions, making assessments accessible, and sustaining long-term stakeholder commitment.*

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JEL Classification: I25, J24, J44, O15

1. Introduction

The artisanal sector plays a role in supporting economies and generating jobs and vocational training opportunities for individuals worldwide (Franz, Dulvy and Marock, 2022). However, despite the important contributions made by the artisanal sector, many semi-skilled artisans encounter significant challenges when attempting to advance their careers due to the lack of formally recognised qualifications (Masiza, 2020). Although these semi-skilled artisans possess many years of relevant practical experience within the work environment, they do not have formal certifications which limit their ability to develop professionally, reduces their chances of finding higher paying/secure employment and limits their capacity to contribute fully to and benefit financially from the sector (Ayeni and Ibori, 2023). Similar trends have been reported across sub-Saharan Africa and beyond, where many unqualified skilled construction workers are unaware of available training programs/certification programs that would validate their skills (Wandia & Ralwala, 2024; Macharia, 2023).

Research on the implementation of one such scheme, South Africa's Artisan Recognition of Prior Learning (ARPL) programme, identified language, costs, limited awareness and inconsistent institutional support as continued barriers to recognition (Mokgatetswa, 2022) barriers that echo those documented in comparable programmes elsewhere (Mbunda, Lello & Tesha, 2020; Macharia, 2023).

Schemes of this kind allow artisans to have their work-related experience and skills formally certified by comparing their work-based experience to nationally accepted occupational standards (Xaba, 2023). South Africa's ARPL programme is a representative example: it offers an alternative route into a full trade qualification through national trade testing, without candidates needing to meet traditional entrance requirements, and is open to both formal and informal sector candidates (Mokgatetswa, 2022).

In South Africa, the formalised structure of ARPL is based upon nationally approved criteria and guidelines published in 2017, which set out goals of improving access to trade testing; identifying obstacles to recognition, creating resources and assuring quality; and outlining the responsibilities of employers,

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unions, providers and registered assessors (DHET, 2017). Comparable governance arrangements underpin RPL systems elsewhere, Nordic countries coordinate validation of prior learning through a small number of mandated bodies (Husted *et al.,* 2020), while Kenya and Tanzania have developed sector-specific frameworks for informal construction workers (Mbunda, Lello and Tesha, 2020; Waweru and Oluoch, 2023).

In many countries, RPL is strategically embedded within national skills-development policy. In South Africa, for example, the National Development Plan sets a target of 30,000 qualified artisans annually by 2030 and recognising previously unrecognised but experienced workers is treated as one pathway towards that goal (NPC, 2012).

South Africa's National Artisan Apprenticeship and Artisan Development Strategy 2030, published in 2022, subsequently incorporated ARPL into a streamlined artisan development model, confirming recognition of prior learning as an integral, long-term component of the artisan development pipeline rather than merely a transitional step (DHET, 2022). This pattern of moving recognition from the margins to the core of national skills strategy is increasingly visible in other jurisdictions as well (Husted et al., 2020; Waweru and Oluoch, 2023).

Recognition of prior learning is an international best practice that validates experiential learning and links it to formal qualification frameworks (Husted et al., 2020). Regional studies in Tanzania and Kenya demonstrate how similar programs positively impact informal/unskilled construction workers (Mbunda, Lello & Tesha, 2020; Waweru & Oluoch, 2023).

Upon successful completion of an RPL or ARPL-type assessment, artisans receive formal recognition consistent with the level of their occupation. Such recognition enhances both their profession's reputation and marketability (Momanyi, Riechi & Khatete, 2022).

This paper examines the international body of literature on recognition of prior learning and artisan development, using South Africa's ARPL programme as a detailed illustrative case alongside evidence from other countries. The purpose of this review is to evaluate whether RPL and ARPL-type schemes make meaningful contributions to enhancing the empowerment of semi-skilled artisans.

The primary thesis posited in this paper is that RPL and ARPL-type schemes function as more than simply certification mechanisms for verifying artisans' administrative credentials; they are developmental tools that build individual confidence, expand job/career options, increase wages/working conditions, and maximise the overall economic contribution of the artisanal workforce.

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The organisation of this paper is as follows. Section 2 reviews the international literature on RPL and ARPL-type schemes in thematic categories. Section 3 describes the methodology used in conducting this literature review. Section 4 summarises the results/findings of this review. Section 5 explores the implications of the findings presented herein for policy/practice. Finally, Section 6 presents conclusions drawn from this review.

2. Literature Review

The literature highlights the transformative potential of RPL and ARPL-type schemes in empowering semi-skilled artisans. Studies indicate that recognition of prior learning not only enhances artisans' confidence and self-esteem but also improves their employability, earnings prospects and capacity to contribute to the economy (Macharia, 2023; Waweru and Oluoch, 2023). This section reviews the literature under four themes: the role of RPL and ARPL in validating experiential learning; the enhancement of confidence and self-esteem, the improvement of employability and career advancement; and access to higher wages, better working conditions and enhanced economic contribution.

2.1. RPL and ARPL and the Validation of Experiential Learning

A large amount of research has framed Recognition of Prior Learning (RPL) as an alternative way for non-formal educational settings to recognise and validate competencies developed outside formal education. Validation of prior learning has become a common practice in several Nordic countries, where it functions through the coordination of responsibility, funding and quality assurance amongst a small number of mandated organisations (Husted et al., 2020). Similar multi-agency coordination underpins ARPL in South Africa, where responsibility is divided amongst the South African Qualifications Authority (SAQA), the Quality Council for Trades and Occupations (QCTO), the National Artisan Moderation Body (NAMB) and the Sector Education and Training Authorities (SETAs). In several countries, RPL-type mechanisms have also been framed as instruments of redress and economic empowerment for historically marginalised workers; in South Africa, for example, such mechanisms have been considered tools to rectify the historical exclusion of black workers from formal certification (Xaba, 2023). Research into the construction industry more broadly frames skills development and recognition as critical elements for transforming industries (Masiza, 2020).

Studies in both regional areas reinforce this conceptual framework. Informal construction workers in Tanzania encounter notable obstacles when attempting to

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have their skills recognised through RPL, such as awareness levels, costs associated with RPL and the design of assessments used during RPL (Mbunda, Lello and Tesha, 2020). Semi-skilled construction workers in Kenya have demonstrated low awareness regarding existing on-site training and certification programs which restricts their participation in these programs regardless of whether they exist (Macharia, 2023; Wandia and Ralwala, 2024); however, assessments of the informal Jua Kali sector indicate that RPL provides a feasible pathway to formalise competence within Technical and Vocational Education and Training (TVET) institutions (Waweru and Oluoch, 2023). Collectively, this literature indicates that the main benefit of ARPL is closing the gap between experience based-knowledge and formal qualification frameworks. However, its effectiveness relies on factors related to awareness, accessibility and institutional design (Momanyi, Riechi and Khatete, 2022).

Among the available national case studies, the most detailed evidence comes from Mokgatetswa (2022), who conducted a qualitative study examining barriers to and enablers of South Africa's ARPL programme amongst government employees and ARPL learners in Gauteng province. On the enabling side, Mokgatetswa's study determined that ARPL creates opportunities for previously disadvantaged individuals to continue learning, increases workplace competency, enhances social cohesion through equal access to qualifications and enables recognised artisans to contribute more significantly to the economy. On the barrier side, Mokgatetswa's study determined that language is the greatest obstacle preventing learners from completing ARPL many learners have no reading or writing ability in English due to limited access to formal schooling. Additionally, Mokgatetswa's study identified other significant barriers including a lack of awareness regarding ARPL, poor marketing of ARPL resulting in low enrollment figures; the expense of implementing ARPL without government support; lengthy periods required for assessments; lack of commitment from management, and insufficient collaboration between training institutions and employers relative to placing successful candidates in employment (Mokgatetswa, 2022). Comparable barriers have been documented in other national contexts, including limited awareness among construction workers in Kenya (Macharia, 2023; Wandia and Ralwala, 2024) and cost and design-related obstacles to RPL uptake in Tanzania (Mbunda, Lello and Tesha, 2020). These results illustrate that the empowering potential of RPL and ARPL-type schemes is contingent upon decisions made during implementation, a topic to which this paper will return in the Discussion section.

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As a worked example, South Africa's ARPL process, established by its national criteria and guidelines, requires applicants to provide a supporting documentation package along with a portfolio of relevant work experience. The supporting documentation package is reviewed by a technical panel composed of registered assessors. Successful candidates are then subjected to an evaluation interview combined with a practical demonstration as part of the assessment process. Competency gaps identified during the assessment process are resolved through either workplace or accredited gap training, followed by a second assessment. Upon completion of all components of the process, candidates receive a statement outlining the results of their assessments and providing them access to the national trade test. Upon successful completion of the national trade test, candidates are certified as a qualified artisan (DHET, 2017). South Africa's national roll-out commenced in October 2017 with five initial trades including welding, boilermaker, mechanical fitter, diesel mechanic and motor mechanic, with additional trades gradually added since commencement (Republic of South Africa, 2018). Figure nr. 1 illustrates this process; comparable sequences of application, assessment, gap training and certification are found in RPL systems in other countries, though the specific institutions and terminology vary.

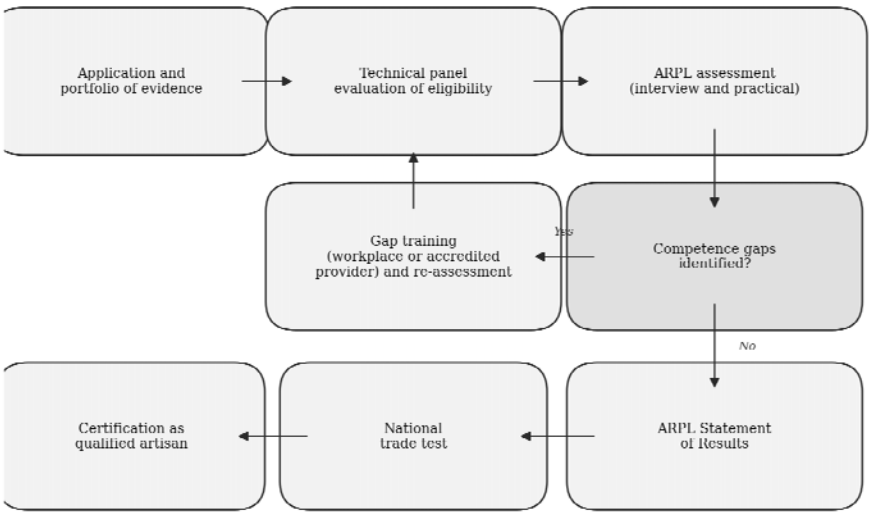


Figure nr. 1. Key stages of a typical RPL/ARPL process for semi-skilled artisans, illustrated using South Africa's ARPL programme.
Source: author's synthesis based on DHET (2017).

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2.2. Enhancement of Confidence and Self-Esteem

Recognising an artisan's skills through the process of becoming registered through ARPL is about more than just getting a certification, it recognises the many years of hands-on practice and expertise that each artisan brings to their work (Bertola *et al.,* 2020) and thereby provides the artisan with renewed feelings of pride, achievement and professional status. The research on developing skills amongst disadvantageous groups have shown that formally validating competence can be very powerful to give people a feeling of being capable and to enable them to seek opportunities (Liu, Saldanha & Mithas, 2024). Similar studies regarding women artisans indicate that the acknowledgement and formalization of their labor reshapes how they view themselves and the value they put on their work (Singh & Jamal, 2022; Arora, 2023); additionally, these studies demonstrate that the recognition of artisans' labor is a necessary condition for the ability to participate effectively in decisions related to economic activities (Ovadia & Amoafo, 2023). These studies span a range of economies (India, Guatemala, Tanzania and Ghana) where craftsmanship competence is developed almost exclusively informally, outside of credentialising systems, and their findings translate readily to other artisanal economies with similar informal skill-formation patterns, including South Africa. Therefore, the documented psychological results that formally seeing one's competence leads to increased confidence in one's abilities, speak directly to the circumstances of semi-skilled artisans targeted by RPL and ARPL-type schemes more generally. Moreover, given the persistent gender disparity in the skilled trades internationally, this aspect is especially relevant. In South Africa, for example, women continue to represent less than 20 percent of individuals participating in the skilled trades, while at least 80% of artisans across trades are male (Akoobhai, Duncan & Mogane, 2017), and evidence from Ghana's informal construction industry demonstrates that young female artisans face multiple obstacles in addition to those presented by informality and gender (Awuku, 2023). Hence, mechanisms to recognise women's experiential competency have high potential for empowerment across contexts.

The empowerment resulting from recognition relates to behaviour as well. When artisans receive formal validation of their skills, they enter the labour market with greater confidence and are more likely to apply for jobs requiring higher levels of responsibility, accept additional challenging duties and responsibilities, and pursue additional education/training (Macharia, 2023).

When artisans feel empowered as a result of receiving recognition, they begin to see their work with a new-found sense of purpose and professionalism, which

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enhances both job satisfaction and productivity. Thus, the confidence effect created by recognition is not simply an individual accomplishment; instead, it serves as a catalyst for the overall professional growth of artisans.

2.3. Improvement in Employability and Career Advancement

The ARPL certification allows semi-qualified artisans to apply for jobs that were out of their league before and provides them with formal proof of their competence that they can take with them wherever they go (Saner, Yiu and Rush, 2020). The process creates a straight-line relationship between an artisan's recognised qualification and the skill gained through actual experience, giving employers the kind of reassurance that is typically needed to hire someone (Momanyi, Riechi and Khatete, 2022). Once an artisan has completed a recognition process, he or she is likely to have more job opportunities available to him/her, especially in large companies and in parts of the construction sector which are more formalised (Mbunda, Lello and Tesha, 2020). Schemes such as South Africa's ARPL offer artisans additional routes into the workforce because they eliminate the requirement for a formal education that was previously a barrier to trade testing for many skilled yet un-certified workers (Mokgatetswa, 2022). Research about the learning paths of craftsmen working in the construction field confirms that significant competence is produced through working practices, however this competence will produce career benefits only if it can be shown and validated (Mselle, Phoya and Eliufoo, 2022).

In addition to creating a competitive advantage during an individual's first few years in the workforce, certification serves as a launching pad for ongoing professional development. This mirrors broader findings on career management, where the deliberate capitalisation of practitioners' competences and structured career planning are shown to underpin successful career progression across professional fields, not only in artisanal trades (Chirimbu, 2022). The literature regarding employability emphasizes that credentialing operates along-side skills, network relationships, and attitudes toward employment as forms of employability capital that individuals use to advance in their careers over time (Nghia et al., 2020; Nghia *et al.,* 2022). Formal recognition may provide qualified artisans with greater access to supervisory and/or management-level positions, which are often reserved for individuals with formally recognised qualifications and therefore create a pathway for vertical movement within organisations (Rashid and Ratten, 2021). Recognition of an individual's competency may serve as a foundation upon which to build specialised knowledge and skills and thus foster a climate of continued learning (Lu *et al*., 2022). Research regarding evaluation of employability

development programs demonstrates that these types of programs are most successful when the results of programmatic activity are evaluated systematically and modified accordingly (Glerum and Judge, 2021). Similarly, studies examining career-based training and mentoring illustrate the value of planned support systems in conjunction with certification (Okolie *et al*., 2020).

Recognised artisans are generally better positioned to start their own businesses or work independently than those who do not hold formal certifications. Recognised artisans' potential clients and financial institutions have increased confidence in their capabilities. This confidence can aid in acquiring licenses necessary to conduct business in regulated trades (Rashid and Ratten, 2021). Entrepreneurial research among craft producers illustrates how structured learning and validation facilitate the transition from informal production to viable entrepreneurship (Katre, 2020) and that skill recognition increases the sustainability of artisanal livelihoods (Torralba-Burrial and Dopico, 2023). In terms of economic impacts at the macroeconomic level, professionalising artisanal work through appropriate technologies and recognition can increase productivity, wages and employment locally (Eglash *et al*., 2020; Robinson et al., 2021).

2.4. Access to Higher Wages, Better Working Conditions and Enhanced Economic Contribution

Recognition of skills may have a direct impact on the income levels and working environment of artisans. By making artisans' private competence visible to third parties via formal certification, the latter are able to place themselves in a better negotiating position vis-à-vis wage payment by converting the private competence into public evidence of value (Asri *et al*., 2022). On the side of employers, they will be prepared to pay higher salaries where they can rely on skilled craftsmen being certified and thus capable of maintaining their productivity and quality (Eglash *et al*., 2020). Furthermore, recognising skills helps create safe and productive work environments, since employers know that artisans hold the necessary knowledge to carry out their work safely and professionally (Mselle, Phoya & Eliufoo, 2022). As such, case studies among artisan-based businesses illustrate that formalisation/recognitions enhance both the producers' competitive positions within the market and the overall working conditions (Jaisingh, 2021; Ferreira *et al.,* 2021).

The advantages associated with recognition are however, not limited to individual artisans alone. They are available to the entire sector and the broader economy. A workforce whose skills have been formally acknowledged and/or

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accepted as competent, is far better placed to meet industrial benchmarks, react to technological innovation and contend with their counterparts within national and global economies (Adamu & Shakur, 2023). Research conducted in various artisanal industries illustrates that an established sense of professional identity amongst artisans and credible indicators of quality determine how competitively artisans produce (Nikolaidou, Kouzeleas & Goussios, 2023; Dupin & Wezel, 2023), and that acknowledgement of artisans' expertise results in higher social standing for craft occupations compared to others (Terrile, 2023). International research regarding artisan communities in the Global South indicate that the formalisation and development of artisanal skills are closely linked to artisan's livelihoods, products quality and the extent to which these products reach markets (Tewari & Rao, 2022; Yadav, Patoju & Yadaveni, 2022; Mukherjee, 2024). It should be noted at this juncture that while much of this international literature pertains to craft and heritage productions, whose market structure differs from those of the heavily regulated construction and engineering sectors that form the bulk of most national ARPL-type delivery, many of the literature's empirical findings relate to how recognition impacts bargaining power, quality signaling, and access to markets (mechanisms); whereas very few provide information about magnitude. Skills development is regarded internationally as one of the key levers for achieving local economic development and sectoral transformation, including within South Africa's construction sector (Masiza, 2020), while experience gained through ARPL implementation there shows that recognition improves artisans' access to employment opportunities and therefore increases their ability to make meaningful contributions to economic expansion (Mokgatetswa, 2022). Consequently, the literature provides support for the proposition that ARPL contributes both to individuals' empowerment and to the economy-wide benefits of increased productivity, quality assurance and competitiveness.

2.5. Critical Perspectives and Limitations of Recognition

While a fair evaluation of RPL and ARPL-type schemes also needs to consider the important criticisms expressed in the critical research literature, initial reactions toward the introduction of such schemes have often been negative in various countries. Some academics have viewed recognition as an unjust process and feared that validating experience-based knowledge would reduce the quality of education and training (Mokgatetswa, 2022). In South Africa, these fears are reflected in the DHET's (2017) emphasis on registered assessors, moderation and quality control in developing the national criteria and guidelines for ARPL.

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However, these fears also point out that the credibility of recognition should continue to be demonstrated instead of being simply assumed.

There is another major consideration relating to certification and employment. As Nghia et al. (2020) have noted, credentials represent only one of the types of employability capital that individuals use to generate labor market outcomes together with their relevant skills, social networks, orientations toward work, and labor market conditions. In fact, tracer studies of new graduates from South Africa's apprenticeship programme show very positive employment rates averaging about 79 percent yet there is a serious over-supply of trained artisans concentrated in a few trades where training is readily accessible, which suggests a continuing supply-demand mismatch (Akoobhai et al., 2017), a pattern also noted in other national contexts (Wandia and Ralwala, 2024). Thus, recognition transforms competence into a credential; however, it does not by itself generate the labour-market demand that turns a credential into an employment opportunity. Therefore, the key to achieving successful empowerment through RPL and ARPL-type schemes is to ensure that they are aligned with labour market intelligence and supported through collaborative placement initiatives, which have historically been absent in South Africa's implementation of ARPL (Mokgatetswa, 2022).

A further constraint of scale exists due to limited availability of evidence, a problem not confined to any one country. In South Africa, for example, while the Department of Higher Education and Training (DHET) publishes a variety of statistical reports related to post-school education and training, publicly available data on ARPL specifically are fragmented. Consolidated information on participation rates, completion rates, and outcomes is not regularly reported, and much of what is known about ARPL publicly comes from responses to parliamentary questions rather than routine reporting. For example, in response to a parliamentary question, the DHET reported that during one recent reporting period approximately 614 ARPL candidates nationally were assessed and approved to take a trade test, of which 460 completed trade tests with a pass rate of 75.9% among those tested (Republic of South Africa, n.d.). Given that South Africa's National Development Plan sets a goal of producing 30,000 qualified artisans annually (National Planning Commission, 2012), the scale of this throughput demonstrates that ARPL presently functions at the margins of that country's artisan development system, rather than at its core. This finding highlights both the unrealised potential of RPL-type mechanisms as empowerment tools and the significant gaps in public reporting, in South Africa and elsewhere, that preclude even basic outcome evaluations of the empowerment claims made in this paper.

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Another consideration relates to how recognition mechanisms may unintentionally replicate the inequalities they aim to address, and this intersectionality is evident across several national contexts. Data from South Africa's implementation of ARPL indicate that because it requires candidates to undergo English-language based assessments with associated costs, it predominantly serves candidates who already possess formal educational qualifications, rather than the most disadvantaged artisans for whom it was originally intended (Mokgatetswa, 2022). Age compounds this issue in that context, workers who had the least access to schooling earlier in life form an older workforce cohort that is least able to overcome barriers presented by English-language assessment, even though Akoobhai *et al*., (2017) tracer study found that students are increasingly enrolling in artisan training programmes at older ages and completing them after increasing amounts of time. Geography represents a further axis along which inequality intersects internationally, since travelling costs to assessment centres are typically borne disproportionately by candidates residing farther away (Mokgatetswa, 2022), so geographic proximity tends to favour those who already live near assessment centres. Gender cross-cuts all of these axes: despite efforts to recruit women into the trades, the imbalance in numbers of men and women in each trade in South Africa has increased significantly in recent years (Akoobhai *et al*., 2017). In South Africa specifically, however, one historically disadvantaged group black workers, whose access to formal certification was long restricted shows evidence of improved representation, with recent cohorts of apprentice students demographically closer to the wider population (Akoobhai *et al*., 2017), a finding that reinforces that recognition mechanisms can intentionally improve equity when they are designed to do so.

In summary, therefore, while this paper asserts that RPL and ARPL-type mechanisms are legitimate empowerment tools whose ability to empower artisans depends upon specific design and implementation decisions that have been clearly identified it does not assert that they provide unconditional empowerment. Rather, the critical literature converts the assumption underlying the empowerment case into an agenda one concerning issues such as accessibility, demand alignment and equitable practices which will be addressed in detail in the next section.

3. Materials and Methods

To identify the potential of RPL and ARPL-type schemes to empower semi-skilled artisans internationally, we conducted a research methodology based upon a literature review. We located relevant literature from databases such as Google

Scholar, Scopus and EBSCOhost. In addition to this database search we used institutional repository collections and the policy collections of national skills authorities, including South Africa's Department of Higher Education and Training (DHET) and South African Qualifications Authority (SAQA), to locate additional relevant literature. Our initial search parameters included combinations of "recognition of prior learning", "RPL" and "artisans recognition of prior learning", "ARPL", "trade testing" and "TVET". The search parameters were restricted to only include English language sources published mainly between 2010 and 2024. All sources that addressed the theme of either the recognition or formalization of experiential knowledge or skills of artisans and semi-skilled workers were included. A deliberately broad geographic focus was maintained, drawing on sources from South Africa and sub-Saharan Africa as well as the Nordic countries, South and Southeast Asia, and other regions with documented RPL or ARPL-type schemes, so that no single country's experience would dominate the analysis. Sources addressing non-empowerment related aspects such as training or education were excluded.

We employed a thematic analysis methodological approach to analyze our collected data. Patterns of relevance emerged in respect of confidence and professional identity, employment prospects and career opportunities, earnings and working conditions, and the economic contributions made by skilled tradespeople. These themes formed the basis of our review and subsequent results. Employing a thematic approach permitted us to organize and compare evidence across multiple studies, locations and disciplinary domains. It also provided us with the opportunity to investigate how ARPL is referenced both individually and collectively in terms of worker empowerment and workforce development. While this research has not generated original empirical evidence, it provides a synthesis of existing published evidence to present an argument regarding the value and potential for effective implementation of RPL and ARPL-type schemes across different national contexts. There are two limitations associated with the methodological approach employed in this project. Firstly, while there may be advantages to relying solely on published sources, this methodological approach also presents risks associated with publication bias towards positive outcomes. This is because successful evaluations are much more likely to achieve publication than evaluation reports which detail program failures. Although inclusion of dissertations, policy documents and grey literature somewhat mitigated against this problem, it was not eliminated. Secondly, while empirical work specific to ARPL remains limited, many of the inference's presented in this review rely heavily upon

secondary literature developed from the broader RPL, employability and artisan development fields. Therefore, while our conclusion(s) can be regarded as indicative and hypothesises for future empirical examination, they should be viewed as speculative rather than definitive.

4. Results

The review has found that ARPL transforms the working lives of semi-skilled artisans primarily by enhancing their self-confidence in relation to their occupation and providing them with validation of the skill-set they have acquired over the course of their working life. Many people who develop extensive knowledge and/or experience in their work may never receive formal acknowledgement of this in a structured context. However, once artisans acquire a formal qualification and therefore officially validated proof of competence in their area of expertise, it reinforces their belief in the standard of their own skills. This increases artisans' confidence when engaging with both their job and the labour market (Macharia, 2023).

As a result, the review indicates that ARPL increases the chances of artisans entering into employment and enhances their overall employability. ARPL allows artisans to enter occupations and positions that would otherwise remain closed to them due to lack of formal education/training or other restrictions. It does so through offering a means for artisans to obtain fully-recognised trade qualifications and allowing those without formal education/training the opportunity to sit for trade tests, provided they are able to overcome barriers to implementation such as costs, languages, and lack of understanding/awareness of the existence of the programme (Mokgatetswa, 2022).

Secondly, the review suggests that ARPL has increased the number of career options available to artisans as well as their ability to advance to higher-level jobs. With formally recognised qualifications, artisans are now able to apply for positions that would have been unavailable to them in the past. This gives them a competitive advantage in a rapidly changing and increasingly certification-based labour market (Nghia *et al.,* 2022; Saner, Yiu and Rush, 2020). Additionally, recognition acts as a diagnostic tool: during the assessment process, artisans identify areas where additional training is needed and therefore can focus training and continually upgrade their skills (Okolie *et al*., 2020; Glerum and Judge, 2021). Through linking applied skills to qualifications and standards that are formally recognised throughout each industry, ARPL provides artisans with enhanced income potential and offers a pathway towards social mobility as well as entry into supervisory and management-oriented positions (Lu *et al*., 2022; Rashid and

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Ratten, 2021). In addition to generating enhanced income potential and pathways toward social mobility, formally recognised qualifications improve the status and recognition artists receive from their peers and community members.

Thirdly, the review establishes that ARPL is advantageous in developing a more efficient, competent and stable workforce. By comparing artisans' skills to established standards, ARPL allows for a consistent quality level of craftsmanship to be achieved across the entire artisan workforce while promoting ongoing learning (Lu *et al*., 2022; Mselle, Phoya and Eliufoo, 2022). An effective and skilled artisan workforce is directly related to several positive economic effects including increased competitiveness in domestic and foreign markets, enhanced production levels, as well as increased abilities to innovate and adopt new methods and technologies (Adamu and Shakur, 2023; Eglash *et al*., 2020).

Table no. 1 presents a summary of the main categories of benefit identified in the literature.

Table no. 1. Summary of ARPL benefit categories identified in the literature.

Benefit category	Description	Illustrative sources
Confidence and self-esteem	Validation of practical skills strengthens morale, professional identity and willingness to pursue opportunity.	Bertola *et al.* (2020); Liu, Saldanha and Mithas (2024); Macharia (2023)
Employability and advancement	Certified competence widens access to formal employment, promotion and further training.	Saner, Yiu and Rush (2020); Nghia et al. (2022); Rashid and Ratten (2021)
Economic gains	Recognition improves wage-bargaining position, income and working conditions.	Asri *et al.* (2022); Eglash *et al.* (2020); *Ferreira et al.* (2021)
Sector competitiveness	Alignment of skills with industry standards enhances productivity, quality and innovation.	Adamu and Shakur (2023); Dupin and Wezel (2023); Masiza (2020)

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5. Discussion

The research provides a number of important implications for both practice and policy, and the common theme throughout all of the implications is that the constraints placed on ARPL are well known and have been identified through multiple pieces of evidence across national and regional contexts. Therefore, the challenge faced by policymakers in this regard is primarily one of executing solutions based upon what is now well-known about ARPL's constraints, rather than continuing to diagnose them. In order to increase the number of semi-skilled artisans that are able to access skills recognition and certification through ARPL, coverage and reach need to be expanded. Low levels of awareness have been reported as the single most consistent barrier to accessing ARPL, therefore increasing awareness will be necessary to increase take-up. This may be achieved through targeted outreach activities, for example through community-based workshops and information sessions held at vocational centers. Additionally, partnerships with regional artisan organizations could serve as another mechanism for raising awareness regarding ARPL (Mbunda, Lello & Tesha, 2020; Waweru & Oluoch, 2023).

In addition to increased reach and awareness, there needs to be improved coordination and cooperation among stakeholders. For example, employers can assist in ensuring that assessments reflect current employer requirements; educational and training providers can assist with providing expertise related to assessment processes and articulating ARPL credentials into further learning opportunities; while governmental agencies can assist in providing financial support for the program, as well as providing policy backing and assisting with integrating ARPL into national skills development plans (Franz, Dulvy & Marock, 2022; Momanyi, Riechi & Khatete, 2022). As noted previously, international experience suggests that validation of prior learning recognises systems perform best when there is institutional coordination (as opposed to fragmentation); however, in South Africa there currently appears to be limited collaboration among training institutions and employers implementing ARPL, resulting in new graduates being unable to find employment after completing their training due to lack of support (Mokgatetswa, 2022) a gap also noted in other national contexts where placement support has not kept pace with certification (Waweru and Oluoch, 2023).

Lastly, attention must be given to designing the ARPL process itself to be accessible. An examination of the evidence from the implementation of ARPL reveals that English language assessment places disadvantageous burdens on individuals who did not complete school; the costs associated with participating in

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ARPL are borne by the candidate themselves and are not subsidised by the government; and lengthy timescales for conducting assessments result in lost income for working candidates (Mokgatetswa, 2022). Therefore, responding to these issues involves developing assessment methods that are linguistically accessible (e.g. by offering assessments in candidates' first languages rather than a single official or colonial language, as South Africa could do by adding indigenous languages alongside English), reducing the length and complexity of the assessment process, offering subsidies to candidates who cannot afford to participate, decentralizing delivery via mobile or regionalized assessment platforms to reduce travel burdens experienced by candidates far removed from certified assessment sites; and potentially developing differentiated recognition pathways for candidates with and without formal educational backgrounds (Mokgatetswa, 2022). Failure to address these issues may limit the ability of ARPL to meet its intended purpose of supporting disadvantaged artisans.

Additionally, regular, comprehensive evaluations of ARPL's effectiveness are recommended. Evaluations of ARPL should examine the methodologies employed during assessments, the degree to which the assessments are relevant to industry requirements; the extent to which candidates are successful in securing employment following completion of assessments; and solicit feedback from a range of stakeholder groups including candidates who completed assessments under the auspices of ARPL, assessors involved in administering assessments under ARPL, and employers hiring candidates assessed under the auspices of ARPL. Research indicates that effective employability interventions require systematic measurement of outcomes and use of results to inform intervention redesign (Glerum & Judge, 2021). Evaluations should include tracking of candidates' post-completion employment status and wages earned. Tracer studies on recently qualified artisans demonstrate that such tracking can be feasible and beneficial (Akoobhai, Duncan & Mogane, 2017). Tracking similar data elements for candidates assessed under ARPL would enable testing of assertions made about the empowerment benefits of ARPL.

ARPL should be viewed as a bridge to future education and career advancement rather than an endpoint. While the program acknowledges the existence of prior skills and knowledge, its maximum value is realized when it serves as a foundation for continued education and career development. Development of clear articulation paths for additional qualifications, specialised workshops, mentorship programs, and connection of ARPL to apprenticeships or higher education will enhance its value (Lu *et al*., 2022; Okolie et al., 2020; Nghia *et al*., 2020). Integration of ARPL

within larger workforce development frameworks will support ongoing professional development for artisans and strengthen resilience, adaptability and sustainable long-term growth in the artisanal sector.

The limitations identified in this review also identify a research agenda. Given the relatively sparse empirical evidence on ARPL and fragmented public statistics on its performance, the most significant next step will be primary research. A tracer study, modelled on previous studies that traced employment status and wages earned by recently qualified artisans (Akoobhai, Duncan & Mogane, 2017), would follow the employment status and wages earned by individuals completing ARPL assessments over time. Survey research involving current or prospective candidates on the qualitative barriers identified in previous studies (Mokgatetswa, 2022) will establish their relative weights at a large scale. Comparative analyses of ARPL compared to recognition mechanisms developed in Kenya and Tanzania (Waweru & Oluoch, 2023; Mbunda, Lello & Tesha, 2020), which similarly operate within informal sectors in response to the same underlying conditions will provide further insights into whether alternative approaches could provide similar value.

Alongside these recommendations, routine collection and dissemination of statistics related to uptake rates and outcomes of individuals completing assessments under ARPL by authorised entities would transform the administrative practices of ARPL into an evidence-based system. The conclusions derived in this paper should be interpreted as hypotheses that can be tested by the proposed research efforts.

6. Conclusions

RPL and ARPL-type schemes allow semi-skilled artisans to formally recognise their prior learning and gain formal recognition of their occupational competency. The research clearly shows that the formal recognition of an artisan's prior learning has numerous positive outcomes, such as increased self-confidence, increased employment opportunities, improved wage scales and working conditions, and enables them to pursue career advancement and promotion opportunities, including leadership positions (supervision/management).

The positive impacts of such recognition extend beyond the individual level and have broader economic implications. Once artisans achieve formal recognition of their learning, they will be able to contribute more positively to the economy than they would if they were without formal recognition. Furthermore, formal recognition encourages innovation within traditional craft industries and leads to

higher quality standards for artisanal goods, thereby enhancing competition amongst artisanal businesses both domestically and globally.

In addition to providing economic benefits to artisans and the economy, RPL and ARPL-type schemes are intended to enhance the development of a robust artisanal sector. The standardisation of skills assessment processes creates professional consistency across the artisanal sector and provides consumers/investors with credible indicators of quality. Further, such schemes assist artisans to identify career paths and thus provide a mechanism for articulating a formal profession akin to those in other sectors.

However, as South Africa's experience with ARPL illustrates, the success of any such scheme ultimately relies upon its effective implementation. All stakeholders, including government departments, institutions of learning, and private sector organisations, must demonstrate sustained commitment to recognition through financial backing, the inclusion of RPL and ARPL-type schemes within national skill development strategies, and the ongoing review and development of assessment processeslessons that apply as much to countries considering new schemes as to those, like South Africa, refining established ones.

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INTEGRATING OPERATIONS MANAGEMENT PRINCIPLES INTO HUMAN RESOURCE MANAGEMENT: A CONCEPTUAL FRAMEWORK FOR REGULATORY INSTITUTIONS

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Abstract

Public-sector regulatory agencies operate under sustained pressure to deliver compliance oversight efficiently while remaining accountable to legislative mandates and a wide range of stakeholders. This article advances a conceptual framework that integrates selected operations management (OM) principles with human resource management (HRM) practices to strengthen regulatory effectiveness. Drawing on qualitative evidence from the South African public-sector regulatory environment, analysed thematically, the framework aligns four OM principles, namely transformation, quality, productivity and performance measurement, with the pillars of strategic HRM, mediated by the human resource business partner model. Findings indicate

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that fragmented coordination between operational and people-management functions undermines efficiency, generates duplicated effort and weakens the line of sight between individual roles and organisational objectives, whereas deliberate integration supports talent acquisition, employee engagement, performance management and data-driven decision-making. The proposed framework offers public administrators a structured approach to aligning human capital with process optimisation and contributes to the limited literature on OM-HRM integration in non-commercial regulatory contexts. The article sets out the theoretical foundations of the framework, presents the empirical themes supporting each of its components and discusses the implications for regulatory practice, before acknowledging the limitations of a qualitative design.

Keywords: *operations management; human resource management; public sector; safety regulation; strategic alignment*

JEL Classifications: M12, M54, L92, H83

Introduction

Regulatory agencies in the public sector occupy a distinctive position in modern economies. They are expected to enforce compliance impartially, safeguard the public interest and operate with the discipline of well-run organisations, yet they frequently do so under constrained budgets, demanding statutory reporting obligations and intense public scrutiny. Within this setting, the way an agency organises its work processes and manages its people is not a peripheral administrative concern but a determinant of regulatory effectiveness itself (Knies, Boselie, Gould-Williams, & Vandenabeele, 2024). A regulatory agency whose processes are inefficient, or whose workforce is under-developed and disengaged, will struggle to discharge its mandate regardless of the legal authority vested in it.

This article addresses a persistent gap between two management disciplines that are typically studied and practised in isolation. Operations management concentrates on the design and control of the processes through which an organisation transforms inputs into outputs. In contrast, human resource management concerns the acquisition, development, deployment and engagement of the workforce that performs those processes (Boon, Den Hartog, & Lepak, 2019). In many organisations, the two functions operate in parallel rather than in concert, each pursuing its own objectives, measured against its own indicators and reporting through its own line of authority. The central argument advanced here is

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that their deliberate integration produces tangible benefits for a public-sector safety regulator and that this integration can be expressed as a usable conceptual framework rather than left as an aspiration.

The discussion proceeds from qualitative research within the South African public-sector regulatory environment, the bodies established by statute to oversee safety, conduct, standards and compliance across various domains of national life. These organisations provide an instructive setting because their mandates depend simultaneously on rigorous operational processes and on a skilled, motivated workforce capable of exercising sound regulatory judgement. Neither dimension is sufficient alone: well-designed processes operated by a disengaged workforce, or a talented workforce constrained by chaotic processes, will each produce sub-optimal regulation. The setting therefore foregrounds the interdependence that the proposed framework seeks to capture.

The article is organised as follows. It first establishes the theoretical foundations on which the framework rests, drawing together resource-based, strategic HRM, operations management, institutional, governance and stakeholder perspectives. It then describes the qualitative method by which the supporting evidence was generated. The findings section presents the empirical basis for the framework, documenting both the costs of fragmentation and the benefits of integration as experienced by participants. The framework itself is then set out in detail, component by component. A discussion section considers the theoretical and practical implications, after which the limitations of the study are acknowledged and conclusions drawn.

The regulatory context

The setting for this analysis is the South African public-sector regulatory environment: the statutory bodies charged with overseeing safety, standards, conduct and compliance across domains such as transport, health, finance, communications, energy and the environment. Although these regulators differ in mandate and sector, they share several defining features. Each discharges its mandate through oversight activities such as inspections, audits, investigations and enforcement (Short, 2021). Each is established and constrained by statute and is accountable to a responsible ministry, the legislature and, ultimately, the public. These institutional arrangements shape the authority, governance and operational discretion of public organisations (Guy Peters, 2022). Each regulator also depends on a workforce comprising specialist operational employees who perform the core regulatory work and support employees who sustain the organisation's

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administrative and strategic functions (Knies et al., 2024). In the South African context, these characteristics are evident in the operation of safety regulatory institutions, although specific mandates and governance arrangements differ across sectors (Mashoko & Shivambu, 2015). These common features make it meaningful to examine challenges and practices characteristic of the regulatory sector rather than those peculiar to a single organisation.

This context shapes the integration challenge in specific ways. The technical complexity of regulated domains requires deep and continuously updated workforce capability, placing a premium on how employees are recruited, developed, deployed and retained (Armstrong & Taylor, 2020; Boon et al., 2018). The statutory basis of regulatory mandates constrains how agencies may organise and exercise their authority, while their obligation to maintain continuous oversight limits the operational disruption they can tolerate during organisational restructuring (Dewey, 2022; Guy Peters, 2022). Furthermore, the public character of these bodies means that their management of both processes and people is subject to heightened expectations of accountability, procedural fairness, transparency and public value (Knies et al., 2024). The framework developed in this study is therefore calibrated to these institutional, operational and workforce conditions. This contextual calibration distinguishes it from integration models developed primarily for commercial settings.

Literature Review

Operations management and human resource management have traditionally developed as distinct fields of scholarship and organisational practice. Operations management concentrates on the design, coordination and improvement of processes through which resources are transformed into organisational outputs, while human resource management focuses on acquiring, developing, supporting and retaining the employees responsible for executing those processes (Armstrong & Taylor, 2020; Slack et al., 2016). However, treating the two functions separately can create a misalignment between operational requirements and workforce capability. An organisation may design efficient processes without ensuring that employees possess the capacity, motivation and support required to implement them. Conversely, it may invest substantially in its workforce without establishing the operational systems through which employee capability can be converted into organisational performance.

The literature increasingly recognises that organisational outcomes depend on the interaction between people, processes, technology and strategy rather than on

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the independent performance of individual functions (Boon et al., 2018; Brown et al., 2018). This need for integration is particularly important in public-sector regulatory agencies, where performance depends on specialist expertise, procedural consistency, statutory compliance and public accountability. This literature review examines strategic human resource management and workforce capability, operations management in service and public-sector settings, the integration of human resource and operational practices, the enabling role of the human resource business partner, and the distinctive conditions of public-sector regulation. It concludes by identifying the limited scholarly attention given to integrated operations and people management within non-commercial regulatory institutions.

Strategic human resource management and workforce capability

Strategic human resource management is concerned with the deliberate alignment of an organisation's workforce, people-management practices and strategic objectives. Unlike traditional personnel administration, which concentrates primarily on operational activities such as processing appointments, administering leave and maintaining employee records, strategic human resource management positions employees and their capabilities as central to organisational performance (Armstrong & Taylor, 2020; Bailey et al., 2018). This perspective is particularly relevant to public-sector regulatory organisations because the execution of their mandates depends heavily on the specialist knowledge, professional judgement and technical competence of their employees. Regulatory authority established through legislation is therefore insufficient if an organisation lacks the workforce capability required to translate that authority into effective inspections, audits, investigations, compliance decisions and enforcement actions.

The strategic importance of workforce capability is partly explained by the resource-based view. The resource-based view proposes that organisational performance is influenced by the possession and effective deployment of valuable, rare and difficult-to-imitate resources (Barney, 1991). Human capital—comprising employees' knowledge, skills, experience, competence and professional judgement—is consequently regarded as a strategic organisational resource (Boon et al., 2018). However, the literature cautions that possessing capable employees does not automatically produce improved organisational performance. Human capital generates value when it is appropriately organised, supported and deployed through complementary structures, technologies, leadership practices and operational processes (Davis & DeWitt, 2021). For a regulatory agency, this means that technical expertise must be connected to clearly defined roles, reliable

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workflows, suitable decision-making authority and adequate organisational resources. The resource-based view is introduced briefly here to explain the strategic relevance of human capital and is developed more fully in the theoretical foundations section.

A central principle of strategic human resource management is the alignment of HR practices. The literature distinguishes between vertical and horizontal alignment. Vertical alignment refers to the extent to which HR strategies and practices support the organisation's mandate, strategic priorities and performance objectives. Horizontal alignment concerns the internal consistency among different HR practices, ensuring that recruitment, development, performance management, reward and employee support reinforce rather than contradict one another (Boon et al., 2019; Boxall & Purcell, 2022). In a public-sector regulatory organisation, vertical alignment requires workforce planning and development priorities to be derived from the regulatory mandate and operational workload. Horizontal alignment requires, for example, recruitment criteria to correspond with job requirements, learning programmes to address identified capability gaps, and performance measures to reflect the same competencies and outcomes for which employees were recruited and developed.

Recruitment, development, deployment and retention are therefore interdependent components of workforce capability. Recruitment enables an organisation to attract employees with the qualifications and competencies required to perform specialist regulatory work. Development sustains and updates this capability as legislation, technology, regulated sectors and operational risks evolve. Deployment concerns the allocation of employees and their expertise to the areas where they are most needed, while retention protects the organisation against the loss of scarce knowledge, institutional memory and technical capacity (Armstrong & Taylor, 2020). Weakness in any one of these areas can undermine the effectiveness of the others. Recruiting specialist employees has limited value if they are not continuously developed, appropriately deployed or retained. Similarly, training cannot resolve workforce shortages where recruitment and succession planning remain inadequate. Strategic workforce capability consequently requires these practices to be managed as a connected system rather than as separate HR activities.

The retention of experienced employees is especially important in public-sector organisations. Early retirement can result in the loss of institutional knowledge, specialist expertise and mentoring capacity, particularly where succession planning and knowledge-transfer arrangements are underdeveloped. Tjale et al. (2025) highlight the organisational consequences of early retirement in the public service,

demonstrating why workforce planning should anticipate retirement risk and facilitate the transfer of knowledge before experienced employees leave. For regulatory organisations that depend on scarce technical capabilities, retirement trends should therefore inform succession planning, talent development and workforce deployment.

Workforce capability is also influenced by employees' educational qualifications, professional experience and the organisation's ability to recognise and utilise these forms of human capital. Akintayo and Olagunju (2026) demonstrate that educational qualifications and work experience can shape the relationship between human resource investment and organisational performance. Although their study evaluates financial performance in a commercial context, the underlying principle is applicable to regulatory organisations, where qualifications and accumulated professional experience influence the quality of technical judgement and mandate execution. This reinforces the need for workforce planning, talent management and performance systems that account for both formal qualifications and experience-based capability.

This systems perspective is strongly reflected in contemporary strategic HRM scholarship. Boon et al. (2019) show that HR practices are more appropriately understood as interconnected systems or bundles whose combined influence may be more important than the effect of individual practices. The effectiveness of performance management, for example, may depend on whether employees have received suitable training, whether their roles are clearly defined, whether managers provide adequate support and whether recognition practices reinforce the required behaviours. Treating these activities independently can produce contradictory organisational signals and fragmented employee experiences. For the present study, the HR system is represented through ten interrelated pillars: workforce planning; talent management; learning and development; performance management; reward and recognition; employee wellness; employment relations; organisation development; HR service delivery; and HR technology. These pillars should not be interpreted as stand-alone programmes, but as mutually reinforcing components of the organisation's overall workforce system.

The literature generally identifies a positive relationship between strategically aligned HR practices, human capital development, employee commitment and organisational performance (Hamadamin & Atan, 2019). Nevertheless, this relationship is neither automatic nor independent of context. Knies et al. (2024) emphasise that the contribution of strategic HRM to public-sector performance is shaped by institutional arrangements, public accountability, organisational

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mandates and the meaning assigned to performance. In a commercial organisation, HR performance may be connected to profitability, market share or competitive advantage. In a regulatory body, workforce capability must instead be evaluated through outcomes such as the quality and consistency of regulatory decisions, the timely completion of inspections and investigations, compliance improvement, public safety and responsible use of public resources. The literature therefore supports the strategic importance of human capital while also demonstrating that workforce capability must be aligned with operational processes if it is to contribute meaningfully to regulatory performance. This relationship provides the basis for examining the integration of strategic human resource management and operations management in the subsequent sections.

Operations management and organisational performance

Operations management concerns the design, coordination, control and continuous improvement of the processes through which organisations transform inputs into outputs (Slack et al., 2016). Inputs may include employees, information, technology, infrastructure, financial resources and specialist knowledge, while outputs may take the form of products, services, decisions or public outcomes. Although operations management developed largely within manufacturing, its principles are increasingly applied to service and knowledge-intensive organisations because all organisations rely on processes to create value and accomplish their objectives (Barnes, 2018; Brown et al., 2018). Operations management therefore provides a useful perspective for examining how regulatory agencies organise their resources and activities to discharge their statutory mandates.

Service design provides an additional perspective on how organisational processes can be structured around stakeholder requirements. Although Blagorazumnaia et al. (2025) examine service design within educational management, their analysis demonstrates that service quality depends on the coordination of processes, people and stakeholder needs. This principle is transferable to regulatory organisations, where inspections, investigations, reporting and stakeholder engagement constitute interconnected services. Applying a service-design perspective can help regulators examine how internal workflows and employee responsibilities combine to produce accessible, consistent and responsive regulatory services.

In a public-sector regulatory organisation, operational processes differ from conventional manufacturing processes because the outputs are largely intangible

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and knowledge based. They include inspections, audits, investigations, compliance assessments, enforcement decisions, safety interventions and regulatory reports. These outputs frequently require specialist judgement and cannot always be standardised in the same way as physical production. Nevertheless, they depend on clearly designed workflows, appropriate allocation of responsibilities, consistent decision-making criteria and reliable information. Operations management can consequently assist regulators in examining whether their activities are organised in a manner that supports timely, consistent and legally defensible regulatory outcomes.

The transformation principle provides the foundation for understanding these activities. It views an organisation as a system that converts inputs into outputs through interconnected processes (Slack et al., 2016). Within a regulatory agency, legislation, regulatory information, professional expertise, technology and financial resources constitute important inputs. These inputs are processed through activities such as planning, inspections, evidence assessment, consultation, reporting and enforcement. The resulting outputs include regulatory decisions, compliance notices and safety interventions, while the intended longer-term outcomes include improved compliance, reduced regulatory risk, public safety and institutional trust. This distinction is important because completing a high number of regulatory activities does not necessarily demonstrate that the desired public outcomes have been achieved.

Quality is another central principle of operations management. In a regulatory setting, quality refers not only to the speed or volume of work but also to its accuracy, consistency, reliability and procedural defensibility. A regulatory decision may be produced efficiently but still be of poor quality if it is based on incomplete evidence, inconsistently applies regulatory standards or fails to comply with procedural requirements. Quality management therefore requires clearly defined standards, effective controls, appropriate employee competence and mechanisms for identifying and correcting deficiencies (Oakland, 2020). Because regulatory outputs often affect organisations, employees and members of the public, the consequences of inconsistent or poor-quality processes may extend beyond internal inefficiency to legal challenge, reputational damage and weakened public confidence.

Productivity concerns the relationship between resources used and outputs achieved. Public-sector organisations face pressure to demonstrate that limited public resources are being used responsibly, but productivity cannot be reduced to producing a greater volume of regulatory activities at a lower cost. An exclusive

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focus on volume may encourage the completion of more inspections or investigations without sufficient consideration of their quality, complexity or effect. Productivity in a regulatory environment should therefore reflect the organisation's ability to deploy its workforce and other resources where they can make the greatest contribution to regulatory risk reduction and mandate achievement. This requires the regulator to balance efficiency with quality, fairness, compliance and public value.

Performance measurement enables an organisation to assess whether its processes and resources are producing their intended results. Effective performance-measurement systems connect operational activities with strategic objectives and provide information for accountability, learning and continuous improvement (Nudurupati et al., 2017). However, public-sector performance is difficult to measure because it involves multiple stakeholders, competing objectives and outcomes that may only become visible over extended periods (Van der Kolk & Kaufmann, 2022). Regulators must consequently avoid relying exclusively on activity-based indicators such as the number of inspections completed or reports produced. These indicators should be complemented by measures of timeliness, quality, consistency, compliance improvement, risk reduction and stakeholder confidence.

The literature therefore establishes that transformation, quality, productivity and performance measurement are interdependent rather than isolated operations management principles. Transformation processes define how resources are converted into regulatory outputs; quality determines whether those outputs are reliable and defensible; productivity assesses how effectively resources are used; and performance measurement provides evidence about whether the processes achieve their intended objectives. However, operational systems do not function independently of employees. Their effectiveness depends on workforce competence, role clarity, motivation, leadership and organisational support. This interdependence creates the need to integrate operations management with strategic human resource management rather than treating operational design and workforce capability as separate organisational concerns.

Integration of operations management and human resource management

Operations management and human resource management are closely connected because organisational processes are designed, implemented, monitored and improved through people. Operations management determines how work should flow, how resources should be allocated, how quality should be controlled

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and how performance should be measured. Human resource management influences whether employees possess the competence, motivation, support and behavioural expectations required to operate those processes effectively. Despite this interdependence, the two disciplines have frequently developed as separate areas of scholarship and organisational practice. This separation can result in operational decisions being made without sufficient consideration of workforce implications and HR initiatives being introduced without adequate understanding of operational requirements.

The literature suggests that organisational performance is not determined solely by the quality of individual resources but by how effectively those resources are combined and coordinated. Strategic human capital becomes valuable when it is embedded in organisational systems that enable employees to apply their knowledge and abilities to productive activities (Boon et al., 2018). Similarly, efficient operational processes cannot achieve their intended objectives when employees lack the necessary competence, role clarity, resources or commitment. The relationship between people and processes should therefore be understood as reciprocal. Operational systems shape employee behaviour and performance, while employee knowledge and experience influence how operational systems are implemented and improved.

The fragmentation of operations and HRM can create several organisational difficulties. Operational restructuring may introduce new processes, workloads or technologies without assessing whether the organisation has the required skills or staffing capacity. This can result in unrealistic job requirements, capability gaps, employee resistance and declining service quality. Conversely, recruitment, training or performance-management initiatives may fail to improve organisational outcomes when they are not directed towards clearly identified operational needs. HR practices that function independently from process requirements may consequently increase organisational activity without strengthening operational capability. Integration is therefore necessary to ensure that operational changes are supported by suitable workforce planning, job design, development and performance-management practices.

Technological transformation further strengthens the need for integration. Digitalisation, data analytics and automation alter both operational processes and the capabilities required from employees. Introducing technology is consequently not only an operational or information-technology decision; it also affects job design, skills requirements, decision-making authority, employee development and performance expectations (Hecklau et al., 2016; Kim et al., 2021). Where

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technological change is managed without HR involvement, organisations may acquire sophisticated systems without developing the workforce capability required to use them effectively. Where HR planning is disconnected from technological and operational strategy, learning and development initiatives may focus on competencies that do not correspond with emerging organisational requirements.

Digital transformation affects organisational strategy, operational processes and workforce requirements simultaneously. Yaneva et al. (2023) show that the pursuit of digital excellence creates both organisational opportunities and implementation challenges, requiring organisations to align technology adoption with process redesign and employee readiness. Regulatory organisations should therefore assess whether employees possess the capabilities needed to use new systems, whether existing processes have been redesigned appropriately and whether digital initiatives contribute to regulatory quality rather than merely automating inefficient practices.

Artificial intelligence further intensifies the relationship between workforce capability and operational innovation. Imperio (2026) identifies artificial intelligence as a potential contributor to organisational competitiveness, while Allegro (2025) connects AI-enabled innovation with human resources, creativity and strategic problem-solving. Ivkovic and Luzija Ivkovic (2023) similarly highlight the opportunities and challenges associated with artificial intelligence and natural-language-processing models in business decision-making. Although these studies are not situated in public-sector regulation, they demonstrate that the value of artificial intelligence depends on human judgement, organisational readiness and responsible implementation. Regulators introducing AI-supported systems must consequently align technology governance, process design, employee development and decision-making accountability.

Integrated management also strengthens the relationship between employee performance and organisational productivity. Shrouf et al. (2020) found that human resource practices contribute to strategic performance partly through their influence on productivity. This suggests that productivity is not produced by process design alone but also by the organisational conditions under which employees perform their work. Clear roles, suitable skills, employee support, appropriate recognition and effective performance management can affect the reliability and efficiency with which operational activities are completed. Integration consequently allows organisations to interpret productivity as a combined people-and-process outcome rather than as the responsibility of operations management alone.

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In a public-sector regulatory agency, integration requires operational priorities to inform workforce decisions and workforce evidence to inform operational planning. Inspection targets, investigation workloads, regulatory risks and statutory reporting requirements should influence staffing levels, competence requirements and development priorities. In turn, information about vacancies, skills shortages, employee wellness, performance constraints and succession risks should shape operational commitments and resource allocation. This reciprocal exchange can reduce the likelihood of an organisation adopting operational plans that its workforce cannot deliver or investing in HR programmes that make little contribution to its regulatory mandate.

The literature therefore supports the need for closer alignment between workforce capability and operational processes. However, much of the existing scholarship examines this relationship in manufacturing, commercial services or technologically transforming organisations, where integration is generally associated with productivity, competitive advantage and profitability (Hecklau et al., 2016; Vrontis et al., 2022). Less attention has been given to integration in public-sector regulatory agencies, where operational effectiveness must be balanced with statutory compliance, procedural fairness, accountability and public value. This contextual gap supports the need for a framework that explains how operations management principles and strategic HRM practices can be systematically connected within a non-commercial regulatory environment.

The human resource business partner as an integrating mechanism

The human resource business partner model emerged from the repositioning of HR from a predominantly administrative function to a strategic contributor involved in organisational decision-making. Under this model, HR practitioners work directly with operational managers to ensure that workforce considerations inform business planning, process design and organisational change. The HR business partner is therefore expected to understand both people-management practices and the operational environment in which employees perform their work. This dual understanding enables the role to connect strategic human resource management with organisational priorities rather than allowing HR activities to operate as isolated administrative interventions (Caldwell, 2008; Stankevičiūtė & Kalvaitienė, 2024).

A central contribution of the HR business partner is translating operational requirements into workforce implications. New operational targets, regulatory responsibilities, technologies or process changes may affect staffing levels,

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competence requirements, job design, workload distribution and employee development. The HR business partner assists operational managers in identifying these implications and determining the appropriate HR response. Similarly, the role communicates workforce evidence—such as vacancy trends, scarce-skills risks, employee performance, wellness concerns and succession vulnerabilities—to operational leaders. This reciprocal exchange allows operational decisions to be informed by workforce realities and HR decisions to be grounded in the organisation's operational requirements.

The HR business partner can support integration across the complete employment cycle. During workforce planning and recruitment, the role helps determine the number and type of employees needed to meet operational priorities. In learning and development, the business partner links capability-building initiatives to identified process, technology and performance requirements. In performance management, the role assists in aligning individual and team objectives with operational outputs and the organisation's broader mandate. It can also ensure that reward, recognition, employee wellness and employment-relations practices support rather than undermine expected standards of performance. The model consequently creates a mechanism through which the different HR pillars can be connected to operational planning and implementation.

The effectiveness of the model depends substantially on the relationship between the HR business partner and operational managers. McCracken et al. (2017) explain that this relationship develops over time and is influenced by trust, credibility, role understanding and the willingness of line managers to involve HR in meaningful decisions. An HR business partner who is consulted only after operational decisions have already been made is unlikely to influence workforce planning or process design effectively. Equally, operational managers may not value HR advice when the HR practitioner has a limited understanding of the organisation's work, performance pressures or regulatory mandate. Effective business partnering therefore requires early involvement, access to relevant operational information and mutual recognition of the expertise contributed by HR and operational leaders.

Research suggests that the HR business partner model can contribute to organisational performance by strengthening internal efficiency and strategic alignment (Wach et al., 2022). However, its effectiveness is not guaranteed merely by creating positions bearing the HR business partner title. Caldwell (2008) cautions that the model can suffer from ambiguous expectations and competing interpretations of what constitutes strategic contribution. Business partners may

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remain occupied with transactional matters, lack the authority required to influence operational decisions or experience tension between representing organisational priorities and responding to employee concerns. The role may also become fragmented where responsibility is unclear between business partners, specialist HR units and shared-service functions.

These limitations are particularly relevant in public-sector organisations, where HR activities are shaped by legislation, formal procedures, collective employment arrangements and heightened expectations of fairness and accountability. The HR business partner must support operational effectiveness while ensuring that workforce decisions remain legally compliant, procedurally fair and consistent with public-sector values. Strategic contribution in this environment should not be interpreted as prioritising operational efficiency at the expense of employee rights or due process. Instead, the role should enable the organisation to reconcile operational requirements with responsible and sustainable people management.

The literature therefore positions the HR business partner as a potentially important integrating mechanism between operations management and human resource management. The role can connect operational planning with workforce capability, promote consistency across HR practices and sustain alignment as organisational conditions change. Its contribution nevertheless depends on sufficient operational knowledge, professional credibility, clearly defined authority and meaningful participation in decision-making. Within the proposed framework, the HR business partner is consequently treated not as an additional HR pillar but as the mechanism through which the HR pillars and operations management principles are continuously connected.

Operations and people management in public-sector regulatory organisations

Public-sector organisations operate under institutional conditions that distinguish them from private enterprises. While private organisations are generally assessed through profitability, market position and shareholder value, public organisations are expected to create public value, implement legislation, use public resources responsibly and remain answerable to government and citizens. These multiple expectations influence how organisational performance is defined and how operational and workforce decisions are made. Public-sector management must consequently balance efficiency with legality, procedural fairness, transparency, equity and accountability (Knies et al., 2024). An initiative that

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improves operational speed but compromises due process or consistency cannot be regarded as successful within this environment.

Regulatory agencies represent a particularly demanding category of public organisation because their authority and responsibilities are established through legislation. Their operations include monitoring regulated entities, conducting inspections and audits, investigating possible non-compliance, making regulatory determinations and applying enforcement measures. These activities require processes that are consistent and legally defensible while remaining responsive to different levels and forms of regulatory risk (Short, 2021). The statutory character of regulation may limit managerial discretion because agencies must act within prescribed mandates and procedures. It also heightens accountability because regulatory decisions can affect organisational licences, economic activity, employee safety and broader public interests.

The South African regulatory environment reflects these operational complexities. Regulatory agencies across transport, finance, health, communications, energy and environmental governance differ in their specific mandates, but they generally depend on technical expertise, reliable evidence and consistent decision-making. In the rail sector, for example, the regulatory system must respond to local infrastructure, operational and safety conditions while maintaining an effective oversight regime (Mashoko & Shivambu, 2015). This illustrates why regulatory practices cannot simply be transferred from commercial organisations or international settings without considering the relevant legislative, institutional and operational context. Process improvement in a regulator must remain aligned with the purpose and boundaries of its statutory mandate.

People management in public organisations also differs in important respects from private-sector HRM. Public employees may be motivated by opportunities to contribute to society and serve the public interest in addition to receiving material rewards. Research indicates that public-service motivation can positively influence employee engagement, although the relationship is shaped by organisational and cultural conditions (Ding & Wang, 2023). This has implications for recruitment, development, recognition and performance management. Regulatory organisations need employees with suitable technical qualifications, but they also require individuals who understand the public-interest responsibilities, ethical expectations and accountability associated with regulatory authority.

Public-sector employment is generally characterised by formal rules, standardised procedures and heightened expectations of consistency and procedural fairness. These arrangements can protect employees and promote equitable

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decision-making, but they may also reduce flexibility and lengthen recruitment, restructuring or performance-management processes. HR practices must therefore enable regulatory responsiveness without disregarding established employment requirements. Employee engagement is particularly important in this context because unclear roles, insufficient development, excessive workloads and weak organisational support can affect both employee well-being and the reliability of regulatory work. The literature identifies job resources, leadership, meaningful work and organisational support as important antecedents of engagement within the public sector (Zahari & Kaliannan, 2023).

Performance measurement presents an additional challenge. Regulatory organisations frequently rely on measurable outputs such as the number of inspections, audits, investigations or enforcement actions completed. Although these indicators are useful for monitoring activity, they do not necessarily demonstrate whether regulation has improved compliance, reduced risk or enhanced public safety. Public-sector performance measurement must account for multiple objectives and stakeholders, as well as outcomes that are difficult to quantify or attribute directly to a single organisational intervention (Van der Kolk & Kaufmann, 2022). The prevention of harm, for example, may be an important regulatory outcome even though it is more difficult to observe and measure than the completion of an inspection.

These conditions demonstrate that the integration of operations management and human resource management in a regulatory organisation cannot be driven by efficiency alone. Operational decisions affect workforce capacity, job demands, development needs and employee well-being, while HR decisions influence whether the agency can maintain suitable expertise, deploy it effectively and sustain critical regulatory processes. Integration must therefore balance productivity and process improvement with capability, fairness, accountability and public value. Although the public-management literature acknowledges the importance of context in the relationship between HRM and organisational performance, it provides limited guidance on how specific HR practices should be systematically aligned with operational principles in regulatory agencies (Knies et al., 2024). This limitation leads directly to the gap addressed by the present study.

Gap in the integration literature

The reviewed literature demonstrates substantial development within both operations management and strategic human resource management. Operations

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management scholarship explains how organisations design, coordinate, measure and improve the processes through which resources are converted into outputs. Strategic HRM literature establishes that human capital and coherent HR systems contribute to organisational performance when they are aligned with organisational strategy (Boon et al., 2018; Boon et al., 2019). Despite this shared interest in organisational performance, the two bodies of literature have largely developed along separate paths. Operations management frequently treats employees as one category of input within a wider transformation system, while HRM research often examines workforce practices without sufficiently considering the operational processes through which employee capability is converted into organisational outputs.

A related gap concerns the direction of the relationship between people and processes. Some approaches imply a largely one-directional relationship in which employees are recruited, trained and managed to implement operational processes that have already been designed. This interpretation underestimates the contribution employees make to process design, problem-solving and continuous improvement. In knowledge-intensive organisations, professional judgement and practical experience shape how formal processes are interpreted and applied. Integration should therefore be understood as reciprocal: operational requirements inform HR planning and development, while workforce capability and employee experience inform operational design and improvement. Existing literature offers limited explanation of how this reciprocal relationship can be structured and sustained at organisational level.

The contextual concentration of existing research presents a further limitation. Much of the scholarship connecting human resources, technology and operational performance is situated within manufacturing, Industry 4.0 and commercial-service organisations (Hecklau et al., 2016; Vrontis et al., 2022). In these settings, integration is generally justified through improved productivity, profitability, innovation or competitive advantage. These outcomes are relevant to organisational effectiveness but cannot be transferred uncritically to public-sector regulatory agencies. Regulatory organisations do not exist to generate profit or compete for market share. Their performance is evaluated through mandate achievement, regulatory quality, compliance, public safety, accountability and responsible use of public resources.

Public-sector HRM research acknowledges that institutional context influences the relationship between HR practices and organisational performance (Knies et al., 2024). Performance-measurement literature similarly recognises the complexity of defining and evaluating public-sector outcomes (Van der Kolk & Kaufmann, 2022). Nevertheless, these insights have not been sufficiently connected to operations

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management. There remains limited research explaining how public-sector workforce planning, talent management, development, performance management, reward, wellness, employment relations, organisation development, HR service delivery and HR technology should be aligned with operational principles such as transformation, quality, productivity and performance measurement.

The human resource business partner literature provides a possible mechanism for connecting people management with operational decision-making. Existing studies demonstrate that the HR business partner model can support strategic alignment and internal efficiency (Wach et al., 2022). However, the literature does not adequately explain how the role should mediate a systematic relationship between specific HR pillars and operations management principles within a statutory regulatory environment. It also offers limited guidance on how the HR business partner should balance operational demands with procedural fairness, employee interests, public accountability and legislative constraints.

The literature therefore reveals a conceptual, contextual and practical gap. Conceptually, there is insufficient integration between operations management and strategic HRM scholarship. Contextually, existing integration research concentrates predominantly on commercial and manufacturing organisations rather than public-sector regulators. Practically, limited guidance is available on the organisational mechanism through which workforce and operational alignment can be implemented and sustained. The present study addresses these gaps by developing an empirically informed framework that aligns strategic HRM pillars with transformation, quality, productivity and performance measurement, with the HR business partner operating as the connecting mechanism. The framework is specifically calibrated to the statutory, accountability and public-value requirements of a South African public-sector regulatory organisation.

Table 1 analyzes the principal themes emerging from the reviewed literature and demonstrates how they inform the present study. It highlights the contribution of each body of literature, its relevance to public-sector regulatory organisations and the limitation that remains unresolved. The synthesis shows that the literature provides substantial knowledge about workforce capability, operational performance and public-sector management individually but offers limited guidance on their systematic integration within a regulatory agency.

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Table 1: Literature synthesis informing the integration of operations management and human resource management

Literature theme	Main focus in the literature	Key insight	Relevance to the present study	Identified limitation or gap
Strategic HRM and human capital	Alignment of workforce practices with organisational strategy and development of employee capability (Holbeche, 2022; Jackson et al., 2018)	Employee knowledge and competence are strategic resources that must be developed, deployed and retained.	Explains why specialist regulatory capability is essential for executing the statutory mandate.	Provides limited explanation of how workforce capability should be connected to operational process design.
HR systems and organisational performance	Management of recruitment, development, performance, reward and retention as connected practices rather than isolated activities (Belcourt et al., 2022; Nankervis et al., 2022)	Coherent HR practices can provide employees with consistent expectations and organisational support.	Supports the treatment of the ten HR pillars as an interconnected workforce system.	HR systems are often examined without sufficient consideration of operational workflows and regulatory outputs.
Operations and process management	Transformation of inputs into outputs through process design, resource allocation and workflow control (Krajewski et al., 2019;	Organisational effectiveness depends on clearly designed, coordinated and continuously improved processes.	Explains how regulatory resources are converted into inspections, investigations, decisions and enforcement actions.	Employees are sometimes treated primarily as operational inputs rather than active contributors to process improvement.

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Literature theme	Main focus in the literature	Key insight	Relevance to the present study	Identified limitation or gap
	Schroeder et al., 2022)			
Quality, productivity and performance	Improvement of process consistency, resource use, output quality and performance measurement (Dixit & Arora, 2021; Evans & Lindsay, 2019)	Productivity must be considered together with quality and the achievement of strategic outcomes.	Supports the framework's quality, productivity and performance-measurement principles.	Commercial performance measures do not fully capture public safety, compliance, fairness and public value.
Business-process improvement	Redesign of organisational workflows to reduce fragmentation, duplication and delays (Nkomo & Marnewick, 2021; Zaini & Saad, 2019)	Process improvement requires coordination across organisational functions rather than isolated departmental interventions.	Supports the need to address siloed working and improve cross-functional regulatory processes.	Process-reengineering studies may understate employee capability, participation, wellness and employment-relations implications.
HR technology, artificial intelligence and digital transformation	Digital HR systems, personnel-document management, AI-supported decision-making and organisational readiness (Allegro, 2025; Hurloiu et al., 2023; Imperio, 2026; Ivkovic	Digital technologies can improve information, innovation and decision-making when supported by appropriate workforce capabilities, processes and governance.	Informs the HR-technology pillar and its alignment with transformation, productivity and performance measurement.	Much of the literature is situated in commercial or general business contexts and provides limited guidance for accountable AI and digital transformation in regulatory

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Literature theme	Main focus in the literature	Key insight	Relevance to the present study	Identified limitation or gap
	& Luzija Ivkovic, 2023; Yaneva et al., 2023)			organisations.
HR business partnering	Strategic participation of HR practitioners in operational planning and decision-making (Caldwell, 2008; McCracken et al., 2017)	HR business partners can translate operational needs into workforce actions and bring workforce evidence into operational decisions.	Provides the proposed mechanism for connecting the HR pillars with operations management principles.	Effectiveness depends on role clarity, credibility, operational knowledge and access to decision-making.
Public-sector strategy and performance	Achievement of statutory objectives, accountability and public value in non-commercial organisations (Niven, 2016; Steiss, 2019)	Public organisations must balance efficiency with legality, fairness, stakeholder expectations and public outcomes.	Establishes the institutional conditions within which the integration framework must operate.	Public-sector literature provides limited practical guidance on integrating people and processes within regulatory agencies.
Organisational resilience	Strategic and operational capacity to anticipate, respond to and recover from disruption (Annarelli & Nonino, 2016)	Resilience requires both adaptable processes and sustainable workforce capability.	Demonstrates why continuous alignment is necessary when regulatory risks and organisational conditions	Resilience literature does not fully specify how HR and operations should be structurally integrated.

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Literature theme	Main focus in the literature	Key insight	Relevance to the present study	Identified limitation or gap
			change.	
Overall integration gap	Alignment of strategy, people, technology and processes across organisational functions	Workforce capability and operational effectiveness are mutually dependent.	Provides the basis for developing an integrated OM–HRM framework for a public-sector regulator.	No sufficiently developed framework systematically aligns the ten HR pillars with transformation, quality, productivity and performance measurement through the HR business partner role.

Source: Authors, 2026

The analysis reveals that the literature offers well-developed but largely fragmented explanations of workforce management, operational effectiveness, process improvement, technology and public-sector performance. Strategic HRM scholarship explains how organisations build and align workforce capability, while operations management research explains how resources and activities are organised to produce reliable outputs. Business-process and digital-transformation studies demonstrate the importance of cross-functional change, whereas public-sector literature highlights accountability, fairness and public value. However, these perspectives are rarely combined into a single framework appropriate to a statutory regulatory organisation. The gap is therefore not an absence of knowledge about people or processes individually, but an absence of a structured mechanism for aligning them continuously. The proposed framework responds to this gap by linking the ten HR pillars with four operations management principles through the HR business partner role

Conclusion of the literature review

The literature reviewed demonstrates that operations management and human resource management provide complementary explanations of organisational

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performance. Operations management focuses on the design, coordination and improvement of the processes through which organisational resources are converted into outputs. Strategic HRM focuses on building, organising and sustaining the workforce responsible for implementing and improving those processes. Pycraft et al. (2020) emphasise that operations management applies to the coordinated transformation of organisational resources, while Holbeche (2022) demonstrates the importance of aligning people-management decisions with organisational strategy. Viewed together, these perspectives suggest that workforce capability and operational processes should not be managed as independent organisational systems.

The literature also shows that organisational effectiveness depends on the alignment of multiple internal elements rather than isolated improvements within individual functions. Recruitment may provide an organisation with technically competent employees, but their contribution will remain constrained when roles, processes, technologies and performance expectations are poorly designed. Similarly, process redesign or technological investment may fail when employees are not adequately prepared, supported or involved. Cooke (2018) argues that HRM research and practice must be understood within their specific organisational and institutional contexts. This is especially important for public-sector regulators because workforce and operational practices are influenced by statutory mandates, formal accountability arrangements and public expectations.

Integration is also relevant to organisational resilience. Regulatory agencies must maintain essential oversight activities while responding to legislative changes, emerging risks, technological developments, constrained resources and changing stakeholder expectations. Annarelli and Nonino (2016) describe organisational resilience as involving both strategic and operational capabilities that enable an organisation to prepare for, respond to and adapt to disruption. From this perspective, resilience depends on more than operational continuity plans. It also requires sufficient staffing, adaptable competencies, institutional knowledge, leadership capability and employee support. Integrating operations management and HRM can therefore strengthen the regulator's capacity to sustain its mandate during periods of organisational or environmental change.

The literature further demonstrates that performance measurement must reflect organisational purpose. Commercial indicators cannot be transferred directly to public-sector organisations whose performance is determined by public value, accountability and mandate achievement. Steiss (2019) maintains that strategic management in public and non-profit organisations requires goals and performance

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measures that respond to their distinctive institutional purposes. Niven (2016) similarly explains that government and non-profit performance systems should connect operational activity with strategic objectives, stakeholder expectations and public outcomes. Regulatory agencies should consequently assess not only the number of inspections, audits or investigations completed but also their quality, consistency, timeliness and contribution to safety and compliance.

Overall, the literature establishes three central conclusions. First, capable employees cannot produce sustainable regulatory performance without effective processes, systems and operational support. Second, efficient processes cannot deliver reliable regulatory outcomes without competent, engaged and appropriately deployed employees. Third, the relationship between people and processes must be continuously maintained as organisational priorities, technologies and regulatory risks change. Despite these points of convergence, the literature provides limited guidance on how strategic HRM practices and operations management principles can be systematically connected in a public-sector regulatory agency. This limitation supports the development of the proposed integration framework. The following section presents the theoretical foundations that explain the relationship between human capital, HR alignment, operational transformation, institutional requirements and stakeholder expectations.

Theoretical Foundations

The proposed framework draws on complementary theoretical perspectives that explain different dimensions of the relationship between workforce capability, operational processes and organisational performance. The resource-based view and human capital theory explain why employees' knowledge, skills, experience and professional judgement constitute important organisational resources, particularly in knowledge-intensive regulatory environments (Barney, 1991; Becker, 1964). Strategic human resource management theory extends this reasoning by explaining how workforce practices should be vertically aligned with organisational priorities and horizontally integrated as a coherent HR system. Operations management theory provides the process perspective by explaining how human, technological, informational and financial inputs are transformed into reliable organisational outputs and public outcomes.

The theoretical foundation also incorporates the human resource business partner model as the organisational mechanism connecting workforce considerations with operational decision-making. Institutional and governance theories locate this integration within the statutory, legitimacy and accountability

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requirements governing public-sector regulators, while stakeholder theory recognises the legitimate interests of employees, regulated entities, government and the public. No single theoretical perspective adequately explains all these dimensions. Their combined application therefore provides the theoretical foundation for examining how human resource management and operations management can be systematically integrated to strengthen regulatory capability, accountability and organisational performance.

The resource-based view and human capital

The resource-based view explains organisational performance by focusing on the strategic value of resources controlled by an organisation. According to Barney (1991), resources can support sustained organisational advantage when they are valuable, rare, difficult to imitate and appropriately organised. Although the theory was originally developed in commercial settings, its fundamental reasoning is applicable to public-sector organisations. A regulatory organisation's effectiveness similarly depends on its ability to acquire, develop, organise and deploy the resources required to execute its statutory mandate.

Human capital theory complements the resource-based view by explaining the value embedded in employees' knowledge, qualifications, skills, experience and professional judgement. Becker (1964) proposes that investment in education, training and development increases individuals' productive capacity. At organisational level, these investments can strengthen the collective expertise required to perform complex and knowledge-intensive work. In a regulatory agency, human capital is particularly important because inspections, audits, investigations, compliance assessments and enforcement decisions depend heavily on specialist competence and the responsible exercise of professional judgement.

The possession of capable employees does not, however, automatically translate into organisational capability. Wright et al. (2001) distinguish between human capital held by individual employees and the organisational systems through which that capital is coordinated and used. Employees' expertise becomes strategically valuable when it is supported by suitable roles, technologies, workflows, leadership arrangements, decision-making authority and organisational routines. A regulator may therefore employ highly qualified specialists while still experiencing poor performance if their capabilities are not appropriately coordinated, deployed or supported.

The resource-based view and human capital theory jointly establish the workforce-capability foundation of the proposed framework. Human capital theory

explains why the organisation must invest in acquiring, developing and retaining employee competence, while the resource-based view explains why this competence must be effectively organised and deployed. Integration with operations management is therefore necessary to convert individual knowledge and professional expertise into collective regulatory capability, consistent operational outputs and sustainable public value.

Strategic human resource management

Strategic human resource management theory explains how an organisation's people-management practices contribute to the achievement of its strategic objectives. Wright and McMahan (1992) define strategic human resource management as the planned pattern of human resource deployments and activities intended to enable an organisation to accomplish its goals. The theory therefore moves beyond the administration of individual HR activities and focuses on how workforce decisions collectively support organisational strategy, capability and performance.A central element of strategic human resource management is vertical alignment. Vertical alignment refers to the connection between HR practices and the organisation's mandate, strategic priorities and operational requirements (Delery & Doty, 1996). In a regulatory organisation, workforce planning, recruitment, development and performance-management decisions should be derived from the expertise, staffing capacity and professional standards required to implement the statutory mandate. Vertical alignment ensures that HR priorities are determined by organisational and operational requirements instead of functioning as disconnected administrative programmes.

Strategic human resource management also emphasises horizontal alignment, which concerns consistency among different HR practices. Recruitment, employee development, deployment, performance management, reward and retention should function as a mutually reinforcing system rather than as separate activities (MacDuffie, 1995). For example, the competencies used to recruit regulatory specialists should correspond with subsequent development programmes, performance expectations and recognition practices. Contradictory HR practices may create unclear expectations and weaken the organisation's ability to develop and sustain the required workforce capability.

Strategic human resource management theory provides the alignment logic of the proposed framework. It explains how HR practices can collectively develop the workforce capability identified through the resource-based view and human capital theory. However, strategic alignment cannot be achieved through HR practices

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alone. Operational information concerning workloads, process requirements, quality standards, technologies and performance constraints must inform workforce decisions. Strategic human resource management theory is therefore connected with operations management theory to ensure that the HR system supports the practical requirements of regulatory delivery.

Operations management theory

Operations management theory explains how organisations design, coordinate, control and improve the processes through which resources are transformed into outputs and outcomes. The transformation model views organisational activity as a system in which inputs—including employees, information, technology, infrastructure and financial resources—are converted through interconnected processes into valued outputs (Pycraft et al., 2020). This logic applies to public-sector regulatory organisations because their statutory responsibilities are executed through operational processes, even though their outputs are predominantly services, decisions and public outcomes rather than physical products.

The transformation principle provides the first operations management component of the proposed framework. In a regulatory organisation, specialist expertise, legislative authority, regulatory information and technology constitute important inputs. These resources are applied through activities such as inspections, investigations, evidence assessment, consultation and enforcement. The resulting outputs include regulatory reports, compliance decisions and enforcement actions, while the intended outcomes include improved compliance, reduced risk, enhanced safety and increased public confidence. The transformation principle therefore connects workforce capability with the processes through which the regulatory mandate is implemented.

Quality and productivity provide the second and third operations management principles. Quality concerns the extent to which regulatory processes and outputs are accurate, consistent, reliable and legally defensible. It requires appropriate standards, competent employees, process controls and mechanisms for identifying and correcting deficiencies (Evans & Lindsay, 2019). Productivity concerns the relationship between organisational resources and the outputs or outcomes achieved. In a public-sector regulator, productivity should not be interpreted simply as increasing the volume of completed activities. It must account for the quality, complexity and public-value contribution of the work performed.

Performance measurement constitutes the fourth operations management principle. It enables the organisation to determine whether its resources and

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processes are producing their intended outputs and outcomes. Neely et al. (1995) conceptualise performance measurement as the process of quantifying the efficiency and effectiveness of organisational action. In a regulatory environment, measurement should therefore combine activity indicators—such as completed inspections or investigations—with indicators of timeliness, quality, consistency, compliance improvement, risk reduction and stakeholder confidence. This broader approach prevents operational success from being assessed solely through the volume of work completed.

Operations management theory consequently provides the process logic of the proposed framework. Transformation explains how organisational resources are converted into regulatory outputs; quality evaluates the reliability and defensibility of those outputs; productivity considers how effectively resources are utilised; and performance measurement establishes whether operational activities contribute to the intended regulatory outcomes. These principles depend on competent and appropriately supported employees. Their integration with strategic human resource management theory therefore enables operational requirements to inform workforce practices and workforce capability to support process performance.

The human resource business partner model

The human resource business partner model provides the organisational mechanism through which workforce capability and operational requirements can be connected. The model emerged from efforts to reposition HR from a predominantly administrative function to a strategic contributor involved in organisational planning and decision-making. Ulrich (1997) identifies the strategic partner role as one through which HR practices are aligned with organisational priorities while maintaining the function's responsibilities for administrative efficiency, employee contribution and organisational change. In the proposed framework, the human resource business partner model is treated as an organisational practice model rather than as a complete explanatory theory. The model requires HR practitioners to work closely with operational managers and develop a detailed understanding of the organisation's mandate, processes, performance requirements and operating environment. This enables the HR business partner to translate operational requirements into workforce implications. Changes in regulatory priorities, workloads, technologies or processes may require adjustments to staffing, competencies, job design, employee development and performance expectations. Conversely, workforce information concerning vacancies, scarce skills, employee performance, wellness, succession risks and

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organisational capacity can be incorporated into operational planning and resource-allocation decisions.

Within the proposed framework, the HR business partner acts as the connecting mechanism between the HR system and operations management principles. The role enables operational requirements relating to transformation, quality, productivity and performance measurement to inform workforce planning and other HR practices. It also ensures that workforce capability and employee-related evidence influence operational decisions. The model therefore supports a reciprocal relationship: operations management informs HR priorities, while HR evidence and expertise inform operational design and implementation. The effectiveness of the model depends on more than assigning an HR practitioner the title of business partner. Strategic contribution requires operational knowledge, professional credibility, access to relevant information, clearly defined authority and early participation in decision-making (Ulrich et al., 2008). The role may have limited influence when HR practitioners remain occupied mainly with transactional responsibilities or are consulted only after operational decisions have been finalised. The proposed framework consequently positions the HR business partner neither as an additional HR pillar nor as a substitute for line-management accountability. Instead, the role provides the continuous coordination mechanism through which workforce and operational alignment can be established, monitored and adjusted as organisational conditions change..

Institutional and governance theories

Institutional theory explains how organisations are shaped by the legal, normative and cultural environments within which they operate. Organisations do not select structures and practices solely according to technical efficiency; they also adopt arrangements that demonstrate legitimacy and conformity with recognised expectations (DiMaggio & Powell, 1983; Scott, 2014). This perspective is particularly relevant to public-sector regulatory organisations because their authority, responsibilities and operating boundaries are established through legislation and public policy.

DiMaggio and Powell (1983) distinguish among coercive, normative and mimetic institutional pressures. Coercive pressures arise from legislation, government requirements, oversight arrangements and other formal obligations. Normative pressures emerge from professional standards, ethical expectations and accepted practices associated with regulatory work. Mimetic pressures occur when organisations adopt structures or practices used by comparable institutions,

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particularly under conditions of uncertainty. These pressures influence how a regulator designs its operational processes, structures HR practices and demonstrates that its decisions are legitimate and procedurally defensible.

Governance theory complements the institutional perspective by focusing on how authority is exercised, decisions are made and organisational conduct is directed and controlled. Public-sector governance requires clear accountability, transparency, ethical conduct, appropriate oversight and responsible stewardship of public resources (Bovaird & Löffler, 2003). Effective governance therefore extends beyond compliance with legislation. It also requires the organisation to establish decision-making arrangements, internal controls and reporting processes that support responsible mandate execution.

Institutional and governance theories establish the contextual boundaries of the proposed integration framework. They demonstrate that the integration of HR and operations management cannot be driven by efficiency and productivity alone. Workforce and operational decisions must remain consistent with statutory requirements, procedural fairness, professional standards and public accountability. These theories therefore ensure that process improvement, workforce deployment and performance management are pursued in ways that strengthen rather than compromise organisational legitimacy, governance and public confidence.

Stakeholder theory

Stakeholder theory proposes that organisations should consider the legitimate interests of individuals and groups that affect or are affected by their activities (Freeman, 1984). The theory challenges the assumption that organisational decisions should respond to only one dominant interest. Instead, organisational effectiveness depends partly on recognising, balancing and responding to multiple stakeholder expectations. This perspective is especially relevant to public-sector regulatory organisations because their decisions affect employees, regulated entities, government institutions and members of the public. Stakeholders may differ in their interests, influence and urgency. Mitchell et al. (1997) explain that stakeholder importance can be assessed through the attributes of power, legitimacy and urgency. Government and oversight bodies possess formal authority and expect mandate achievement, legal compliance and responsible resource use. Regulated entities expect consistent, proportionate and procedurally fair oversight, while the public expects effective regulation, improved safety and protection of the public interest. Employees expect fair treatment, suitable development,

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organisational support and working conditions that enable them to fulfil their responsibilities effectively.

These expectations may not always be fully compatible. Increasing regulatory activity, for example, may satisfy demands for stronger oversight but also place additional pressure on workforce capacity and organisational resources. Efforts to increase efficiency may reduce operational costs while creating concerns about process quality, employee well-being or procedural fairness. Stakeholder theory therefore requires the organisation to consider both the intended benefits and the possible consequences of workforce and operational decisions. This does not mean that every stakeholder demand must receive equal priority; rather, decisions should be transparent, justified and consistent with the regulator's statutory mandate. Stakeholder theory provides the public-value and interest-balancing dimension of the proposed framework. It ensures that the integration of human resource management and operations management is not evaluated only through internal efficiency or productivity. Integrated decisions must also contribute to employee capability and fairness, consistent treatment of regulated entities, accountable stewardship of public resources and reliable public outcomes. Stakeholder considerations therefore shape how the framework's workforce and operational components are designed, implemented and evaluated.

Theoretical analysis

The theoretical perspectives incorporated in this study perform distinct but complementary functions. The resource-based view establishes that specialist workforce capability can constitute a strategically valuable organisational resource, while human capital theory explains the importance of investing in employees' knowledge, skills and professional development. Strategic human resource management theory provides the alignment logic through which workforce practices are connected vertically with organisational priorities and horizontally with one another. Operations management theory provides the process logic by explaining how organisational inputs are transformed into quality regulatory outputs and public outcomes. The human resource business partner model provides the organisational mechanism through which workforce and operational alignment can be implemented and continuously maintained. Institutional and governance theories establish the statutory, legitimacy and accountability boundaries within which such integration must occur. Stakeholder theory extends the framework beyond internal organisational efficiency by requiring workforce and operational

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decisions to consider their effects on employees, regulated entities, government and the public.

No single theory fully explains the relationship between workforce capability, operational processes and regulatory performance. The theoretical perspectives are therefore applied complementarily rather than competitively. Together, they explain:

- why workforce capability is strategically valuable;
- how HR practices should be aligned;
- how organisational resources are transformed into regulatory outputs;
- how workforce and operational decisions can be connected;
- which institutional and governance requirements constrain these decisions; and
- whose interests must be considered when evaluating organisational performance.

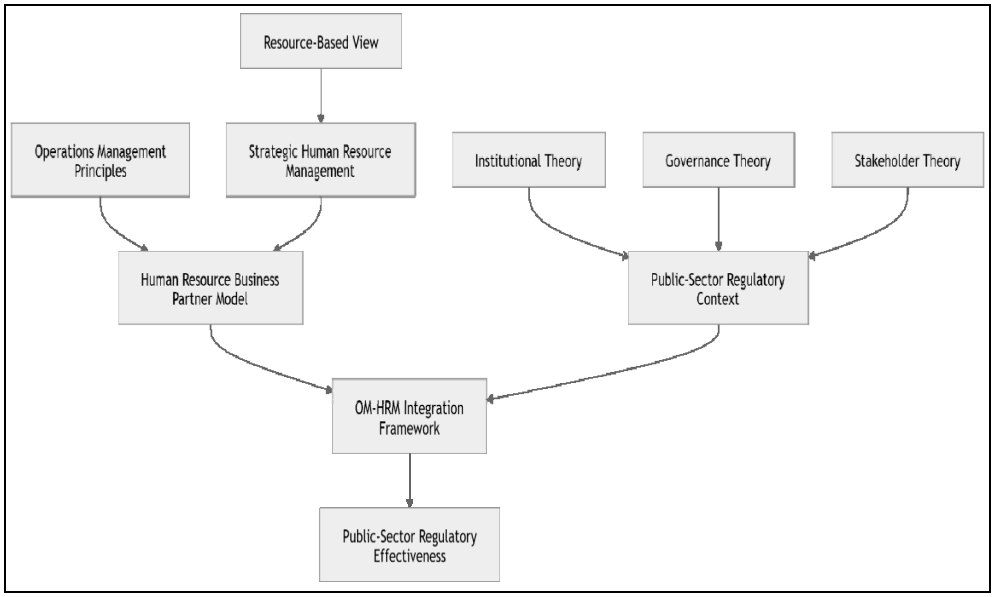


Figure nr.1. Theoretical Foundation of the Integration Framework

Source: Authors 2026

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Figure 1 illustrates how the theoretical perspectives combine to inform the proposed integration framework. The resource-based view, human capital theory and strategic human resource management theory constitute the workforce-capability dimension. Operations management theory provides the process-transformation and performance dimension. The human resource business partner model connects these dimensions by translating operational requirements into workforce responses and incorporating workforce evidence into operational decision-making. Institutional, governance and stakeholder theories contextualise the integration process, ensuring that improvements in organisational effectiveness remain consistent with statutory obligations, accountability, legitimacy, procedural fairness and public value. This theoretical synthesis provides the analytical foundation for the study. It enables the empirical findings to be interpreted not merely as separate workforce or operational concerns but as evidence of the relationships among human capital, HR alignment, process performance, institutional requirements and stakeholder expectations. The next section explains the methodology used to investigate these relationships and inform the development of the proposed framework.

Research design and philosophical orientation

The study employed an exploratory qualitative research design to examine how employees understood and experienced the relationship between operations management and human resource management within a public-sector regulatory organisation. A qualitative design was appropriate because the study sought detailed accounts of participants' experiences, interpretations and organisational realities rather than the measurement of predetermined variables or the testing of causal relationships. The study was informed by a constructivist epistemology, which assumes that knowledge and meaning are developed through individuals' experiences and interactions within particular social and organisational contexts. From this perspective, participants' accounts were not treated as objective representations of a single organisational reality but as situated interpretations shaped by their roles, experiences and relationships within the organisation. This position was consistent with the study's aim of understanding how employees occupying different operational and support roles experienced organisational fragmentation and the potential integration of people and operational processes.

The constructivist position also informed the researcher's role in the study. The researcher was understood as actively involved in interpreting the data rather than functioning as a neutral observer who could be separated entirely from the

analytical process. Reflexivity was therefore necessary to consider how the researcher's professional knowledge, assumptions and engagement with the data influenced the development and interpretation of themes. This philosophical orientation was compatible with reflexive thematic analysis, which recognises themes as interpretive outputs produced through sustained engagement between the researcher, the data and the research questions (Braun & Clarke, 2019, 2021).

Reseach setting

The study was conducted across several South African public-sector regulatory entities. Including participants from multiple entities enabled the study to examine the relationship between operations management and human resource management across different regulatory settings rather than limiting the findings to the experience of a single organisation. Although the participating entities operated within different regulatory domains, they shared common institutional characteristics, including statutory mandates, public-accountability requirements, specialist operational functions and organisational support functions.

A total of 41 employees participated in the study. Participants were drawn from operational, support and consulting functions and represented different occupational levels, educational backgrounds and levels of work experience. This diversity was important because the study concerned the organisational boundary between operational delivery and people management. Participants working within different functions and at different levels were able to provide varied perspectives on how workforce practices, operational processes and organisational fragmentation were experienced across the participating entities.

The participants represented varied demographic, educational and professional backgrounds. The sample included 20 women (48.8%), 19 men (46.3%) and two participants (4.9%) who preferred not to disclose their gender. Most participants were between 45 and 54 years old (53.7%). Sixteen participants (39.0%) worked in operational functions, 22 (53.7%) worked in support functions and three (7.3%) performed consulting functions. Most participants occupied professional or qualified middle-management positions, while the sample also included participants from senior-management, semi-skilled and C1–C5 occupational levels. Twenty-three participants (56.1%) had more than ten years of work experience, and 28 participants (68.3%) held at least a bachelor's degree. This demographic and professional diversity provided access to perspectives from employees with different levels of responsibility, experience and involvement in operational and support activities..

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Table 3: Professional profile of participants

Characteristic	Category	Frequency	Percentage
Educational background	Master's degree or higher	16	39.0
	Bachelor's degree	12	29.3
	Higher National Diploma	9	22.0
	National diploma	4	9.8
Working experience	1–5 years	4	9.8
	6–10 years	14	34.1
	11–15 years	12	29.3
	16–20 years	6	14.6
	More than 20 years	5	12.2
Occupational level	Professional/qualified middle management (D1–D5)	29	70.7
	Senior management (E1–E5)	4	9.8
	Semi-skilled (B1–B5)	4	9.8
	C1–C5 occupational level	4	9.8
Occupational category	Support functions	22	53.7
	Operations functions	16	39.0
	Consulting	3	7.3

Source: Authors, 2026

Sampling strategy and inclusion criteria

A purposive sampling strategy was used to identify participants who could provide relevant and experience-based perspectives on the relationship between operations management and human resource management. Purposive sampling was appropriate because the study did not seek statistical representation of the regulatory workforce. Instead, it required participants with sufficient knowledge of operational delivery, workforce practices and organisational processes to contribute meaningfully to the research questions (Campbell et al., 2020). Participants were selected from operational, support and consulting functions across the participating public-sector regulatory entities. The selection sought variation in organisational function, occupational level, educational background and work experience. This maximum-variation element enabled the study to capture both shared and contrasting experiences of operational and HR integration across different regulatory settings and organisational positions.

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To participate in the study, individuals were required to:

- be employed by, or provide relevant professional services to, one of the participating regulatory entities;
- work within an operational, support or consulting function;
- possess direct experience or knowledge of organisational operations, people-management practices or their interaction;
- be able to provide informed perspectives relevant to the study; and
- participate voluntarily and provide informed consent.

Employees or service providers who lacked relevant experience of the relationship between operational and people-management processes were excluded. Individuals who did not provide informed consent or were unavailable during the data-collection period were also excluded. The final sample consisted of 41 participants. Sample adequacy was assessed according to the relevance, depth and diversity of the information produced rather than through statistical criteria. The inclusion of participants across several entities, functions, occupational levels and experience categories provided a sufficiently varied dataset for examining patterns of fragmentation and integration in public-sector regulatory environments. Consistent with reflexive thematic analysis, the sample was not justified by claiming that themes objectively reached saturation; instead, adequacy was evaluated according to the study's scope, the richness of participants' accounts and the analytical contribution of the data.

Data collection

Data were generated through semi-structured individual interviews conducted with the 41 participants. Semi-structured interviews were appropriate because they provided consistency across interviews while allowing the researcher to explore participants' experiences in detail, seek clarification and pursue issues that emerged during the discussion. This flexibility supported the study's constructivist orientation by allowing participants to explain how they understood and experienced the relationship between operations management and human resource management within their respective regulatory environments (Kallio et al., 2016). An interview guide comprising open-ended questions was used to structure the discussions. The questions examined participants' understanding of operations and people management, experiences of organisational fragmentation, perceptions of cultural and organisational change, governance and ethical considerations, and

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opportunities for strategic collaboration between operational and HR functions. Follow-up prompts were used to obtain examples, clarify ambiguous responses and explore differences among participants' experiences. The interview guide provided direction without rigidly prescribing the order or wording of every question. Before each interview, participants completed a short background questionnaire covering gender, age, ethnicity, language proficiency, accessibility needs, educational background, work experience, occupational level and occupational category. This questionnaire was used only to describe the participant profile and contextualise the qualitative accounts. It did not constitute a separate quantitative component of the study.

The interviews were conducted using a hybrid approach that included both face-to-face and online interviews. Each interview lasted approximately 30–45 minutes and was conducted in English. With participants' permission, the interviews were audio-recorded and subsequently transcribed verbatim. The transcripts were checked against the recordings for accuracy and anonymised by removing participants' names, entity identifiers and other potentially identifying information. Each participant was assigned a code, ranging from P1 to P41, which was used throughout the analysis and reporting of the findings.

Data analysis

The interview data were analysed using reflexive thematic analysis. This approach was appropriate because it enabled the researcher to identify and interpret patterned meanings across participants' accounts while remaining consistent with the study's constructivist orientation. Reflexive thematic analysis recognises that themes do not simply emerge objectively from the data; they are developed through the researcher's sustained and reflective engagement with the dataset (Braun & Clarke, 2019, 2021).

The analysis followed Braun and Clarke's six recursive phases. First, the researcher became familiar with the data by reading and rereading the interview transcripts and recording preliminary analytical observations. Second, relevant sections of the data were systematically coded. Third, related codes were grouped to develop initial themes representing broader patterns across the participants' accounts. Fourth, the candidate themes were reviewed against both the coded extracts and the complete dataset to assess their coherence, relevance and distinctiveness. Fifth, the themes were refined, defined and named. Finally, the themes were organised into an analytical narrative addressing the research questions and informing the development of the proposed integration framework.

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The analytical process was iterative rather than strictly linear. The researcher moved repeatedly between transcripts, codes, candidate themes, research questions and theoretical concepts as interpretations were refined. Attention was given to both common patterns and differing perspectives across operational, support and consulting participants and across the participating regulatory entities. This allowed the analysis to reflect the complexity of participants' experiences rather than forcing all accounts into a single interpretation. The data were managed using ATLAS.ti qualitative data-analysis software. The software assisted with storing and organising transcripts, assigning and managing codes, retrieving coded extracts and mapping relationships among developing themes. ATLAS.ti did not analyse or interpret the data automatically; the researcher remained responsible for all coding decisions, theme development and interpretation. The final themes and supporting participant extracts are presented in the findings section.

Trustworthiness

Trustworthiness was addressed through the principles of credibility, dependability, confirmability and transferability (Lincoln & Guba, 1985). These principles were applied in a manner consistent with the study's constructivist orientation and reflexive thematic analysis. The purpose was not to claim that the findings represented a single objective reality but to demonstrate that the interpretations were systematically developed, grounded in participants' accounts and appropriate to the research context. Credibility was supported through the inclusion of 41 participants drawn from different regulatory entities, operational and support functions, occupational levels and experience categories. This range enabled the analysis to incorporate varied and, at times, contrasting perspectives. Verbatim transcription preserved the detail of participants' accounts, while repeated engagement with the transcripts allowed the researcher to develop a detailed understanding of the dataset. Participant extracts are presented in the findings section to demonstrate how the interpretations were grounded in the data.

Dependability was strengthened by documenting the analytical process, including the development of codes, categories, candidate themes and final themes. ATLAS.ti provided an organised record linking coded extracts to the themes developed from them. The researcher moved iteratively between the original transcripts, codes and emerging themes to ensure that interpretations remained coherent and responsive to the complete dataset rather than being fixed prematurely.

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Confirmability was supported through reflexive consideration of how the researcher's assumptions, professional knowledge and engagement with the research topic influenced the analytical process. Rather than claiming complete researcher neutrality, reflexivity was used to make the interpretive role of the researcher explicit. Transferability was supported by providing contextual information about the participating regulatory entities and aggregated descriptions of participants' demographic and professional characteristics. These descriptions enable readers to assess whether the findings may be relevant to other public-sector regulatory settings.

Findings

The reflexive thematic analysis undertaken for the broader study initially generated four themes concerning participants' understanding of operations management and human resource management, organisational culture and change, governance and ethics, and strategic collaboration. For the purposes of the present article, these findings were synthesised into two higher-order themes aligned with the study's focus on the integration of operations management and strategic human resource management.

The first theme addresses organisational fragmentation and its consequences for workforce capability, operational processes and regulatory performance. The second addresses the strategic integration of operations management and human resource management through reciprocal planning, cross-functional collaboration and shared accountability. The two themes are interconnected: the first identifies the organisational conditions creating the need for integration, while the second explains how participants believed such integration could be achieved. The findings are presented as an interpretive narrative supported by selected participant quotations. Quotations are identified using participant codes ranging from P1 to P41 to protect participants' identities. Where necessary, minor linguistic adjustments were made to improve readability without altering participants' intended meanings.

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Table 4: Higher-order themes reported in the article

Higher-order theme	Original evidence incorporated	Central focus
Organisational fragmentation and its consequences	Understanding of OM and HRM practices; cultural aspects; governance and ethical concerns	How communication failures, organisational silos, inconsistent processes, limited employee involvement and weak alignment affected workforce and operational effectiveness.
Strategic integration of operations management and human resource management	Effective OM and HRM practices; strategic collaboration; change management; transparency and accountability	How reciprocal planning, workforce alignment, cross-functional collaboration and the HR business partner role could improve regulatory performance and public accountability.

Source: Authors, 2026

Theme 1: Organisational fragmentation and its consequences

The first higher-order theme concerned fragmentation between operational processes, workforce practices and organisational functions. Participants described communication failures, inconsistent processes, technological limitations, organisational silos and centralised decision-making as interconnected constraints. These conditions affected not only operational efficiency but also workforce capability, employee engagement, organisational change and regulatory accountability.

Fragmented processes and communication

Participants frequently associated operational difficulties with ineffective communication. Information was not always communicated consistently across organisational levels and functions, resulting in misunderstandings, errors and missed deadlines. Participant 14 explained:

> "*Ineffective communication leads to misunderstandings, errors and missed deadlines*." (P14)

Communication weaknesses were reinforced by organisational silos. Participants reported that departments sometimes worked independently, with limited information-sharing or joint planning. This separation resulted in

duplication, delays and conflicting priorities. Participant 6 described the organisation as:

"*Siloed: departments and teams work in isolation, causing communication breakdowns, duplication of effort and a lack of collaboration.*" (P6)

Participants also identified manual processes, outdated technology and inconsistent procedures as sources of fragmentation. Reliance on paper-based processes increased processing time and the possibility of error:

"*Many processes are manual and paper-based, prone to errors, resulting in wasted time and resources.*" (P25)

The absence of standardised procedures meant that similar activities could be performed differently across departments. This created uncertainty about responsibilities and reduced the consistency of organisational outputs. Technological limitations further restricted employees' ability to access information, coordinate activities and monitor performance across functional boundaries. Although some participants identified streamlined processes and successful risk-management practices, these strengths were not experienced consistently. Participant 1 acknowledged the existence of "bright spots" but maintained that several operational practices still required improvement. The findings therefore indicated uneven organisational capability rather than complete operational failure.

Workforce capability and employee experience

Participants connected operational fragmentation with weaknesses in workforce development, deployment and employee empowerment. Insufficient training and development opportunities restricted employees' ability to improve their skills and adapt to changing operational requirements. Participant 5 stated:

"*Employees may not receive adequate training or development opportunities, hindering growth and improvement.*" (P5)

The findings also suggested that workforce development was not always derived from operational capability requirements. Where HR planning and operational needs were disconnected, employees could be expected to implement new processes or technologies without receiving sufficient preparation, guidance or resources. Centralised decision-making and micromanagement further restricted employee autonomy. Pa rticipants indicated that employees were not always

given opportunities to contribute their operational knowledge to decisions affecting their work. Participant 35 observed:

"*Decision-making is often centralised, leaving little room for employee input or empowerment*." (P35)

Participant 26 similarly explained that micromanagement and limited autonomy undermined motivation, innovation and employee growth. These findings indicated that operational fragmentation affected employee experience by weakening role ownership, engagement and willingness to propose improvements. The same pattern was evident in organisational change. Participants reported that employees were sometimes excluded from the design and implementation of change initiatives:

"*It does not involve employees in the change process, resulting in low engagement and ownership*." (P5)

Change initiatives were also described as frequent, insufficiently coordinated and inadequately supported. Participants referred to change fatigue, limited training and poor communication about the reasons for organisational changes. Participant 6 explained:

"*If we don't understand the purpose of the changes, it is difficult to support them*." (P6)

These accounts demonstrated that resistance to change could not be attributed only to employee attitudes. It was also influenced by limited involvement, insufficient communication and inadequate organisational preparation.

Cultural, governance and performance consequences

Fragmentation contributed to a reactive organisational culture. Participants indicated that immediate operational problems were often prioritised over proactive planning, long-term capability development and continuous improvement. Participant 35 described the operational approach as:

"*Primarily focused on responding to immediate issues rather than proactive planning."* (P35)

This reactive approach limited organisational adaptability and made it difficult to align changes with long-term strategic objectives. Participants also described the approach to change as rigid and slow to respond to evolving business and regulatory conditions. The combined effects of centralisation, functional silos and

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limited employee involvement consequently weakened organisational learning. Participants further connected fragmentation with transparency and accountability. Inconsistent application of policies, unclear responsibilities and inadequate documentation could make it difficult to determine how decisions were made and who was accountable for their implementation. Participants therefore emphasised the importance of:

"*Fair and consistent application of policies and procedures*." (P14)

Transparency was also associated with open communication, employee voice and accessible mechanisms for raising concerns. Participant 16 highlighted the need for communication channels that allowed employees to share feedback without fear. Where these mechanisms were weak, employees could perceive organisational decisions as unfair or disconnected from operational realities. The consequences extended to performance measurement. Participants reported insufficient monitoring and evaluation of organisational changes:

"*There is insufficient tracking and evaluation of change initiatives' success and impact."* (P6)

Without integrated workforce and operational information, the organisation could not consistently determine whether process changes improved efficiency, whether training addressed operational capability gaps or whether workforce interventions contributed to regulatory outcomes. Performance information remained divided across functional areas rather than being used to support collective organisational learning.

Overall, Theme 1 demonstrated that fragmentation was not simply a structural separation between HR and operations management. It was experienced through communication failures, inconsistent processes, limited technological support, insufficient employee development, centralised decision-making and weak evaluation. These conditions reduced the organisation's ability to convert workforce expertise into consistent regulatory performance. The findings therefore established the organisational need for a structured integration mechanism connecting workforce capability, operational processes, change management, governance and performance measurement.

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Theme 2: Strategic integration of operations management and human resource management

The second higher-order theme concerned how operations management and human resource management could be strategically integrated. Participants viewed the functions as distinct but mutually dependent. Operations management established the processes, targets, quality requirements and resources required to execute the regulatory mandate, while HR developed and supported the workforce responsible for implementing those processes. Integration therefore required reciprocal planning, cross-functional collaboration and shared accountability.

Reciprocal alignment of people and processes

Participants indicated that HR initiatives should be derived from organisational objectives and operational requirements. Workforce planning, recruitment, development and performance management were expected to support the capabilities required for regulatory delivery. Participant 14 described this contribution as:

"*Aligning HR initiatives with business objectives, driving organisational success.*" (P14)

The relationship was reciprocal rather than one-directional. Operational managers needed to provide HR with information about workloads, skills requirements, technological changes, process deficiencies and future priorities. HR, in turn, needed to translate these requirements into workforce plans, recruitment criteria, development interventions and performance expectations. Participants particularly emphasised the importance of education and awareness. HR was expected to ensure that employees understood relevant policies, processes and organisational expectations. Participant 23 explained:

"*HR can assist the business units with those functions, so that they can operate within their units, because we would provide that education and awareness about all the processes within the HR department*." (P23)

Training was also required when operational processes or technologies changed. Participants argued that technology should not be introduced without assessing employee capability and providing suitable development. Alignment therefore involved connecting process change with workforce preparation rather than treating them as separate organisational projects.Employee wellness and workplace safety were similarly linked to operational performance. Participant 26 stated that HR should:

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"*Ensure a safe working environment and support employee well-being initiatives.*" (P26)

These findings demonstrated that workforce considerations were not peripheral to operations. Employee capability, well-being, role clarity and access to resources directly influenced the quality and sustainability of regulatory outputs.

Cross-functional collaboration and the integrating role of HR

Participants viewed collaboration as essential to overcoming organisational silos. HR was expected to work directly with operations, executive leadership, line managers and other support functions rather than operating as an isolated administrative department. Participant 15 identified HR's contribution as:

"*Facilitating effective communication and collaboration between departments and teams.*" (P15)

The findings showed that OM–HRM integration also depended on a broader organisational network. Finance provided the resources required for operational delivery; legal services supported enforcement and compliance processes; information technology enabled automation and data management; quality assurance supported consistent standards; and strategy or corporate planning aligned activities with organisational objectives. Participant 12 explained:

"*From a Human Resources point of view, we have to ensure that they have the people. The Finance department has to ensure that they have the resources and the money they need to conduct their work. Legal will assist them in terms of dealing with penalties and certain processes that they implement.*" (P12)

Participants therefore rejected the idea that regulatory performance could be attributed to a single department. Operational delivery depended on coordinated contributions from core and support functions. As Participant 7 stated:

"*Human Resources must collaborate with various functions and departments within the organisation to ensure alignment with organisational objectives.*" (P7)

Although participants did not consistently use the formal title "human resource business partner," their accounts described an integrating role consistent with business partnering. HR was expected to understand operational requirements, participate in planning, communicate workforce evidence and coordinate responses across organisational functions. This role extended beyond processing HR

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transactions and required early involvement in operational and strategic decisions. Participants also indicated that line managers retained responsibility for managing employees and implementing operational processes. Integration did not transfer operational accountability to HR. Instead, HR provided specialised workforce advice and systems, while line and operational managers applied these within their functions. The findings therefore supported a shared-accountability model rather than HR ownership of all people-related matters.

Integrated performance, governance and public value

Participants indicated that integration should improve both organisational efficiency and regulatory accountability. HR's role in ensuring compliance with labour legislation was considered necessary for reducing operational and reputational risk. Participant 5 identified HR's contribution as:

"*Ensuring compliance with labour laws and regulations and mitigating operational risks.*" (P5)

Operational management was similarly expected to maintain compliance with statutory requirements, internal controls and quality standards. The effectiveness of integration therefore could not be assessed only through productivity. It also needed to consider whether regulatory processes were consistent, legally compliant, ethically defensible and aligned with the public mandate. Participants highlighted the importance of monitoring and internal controls. Participant 11 explained:

"*We need to ensure that our environment is monitored and our controls are implemented adequately to ensure that we are not found wanting*." (P11)

Integrated performance measurement would consequently require HR and operations to combine their information. Operational indicators such as output volume, timeliness, quality and compliance needed to be considered alongside workforce indicators such as vacancies, skills availability, development, employee performance, wellness and retention. This would enable the organisation to determine whether operational shortcomings arose from process deficiencies, workforce constraints or a combination of both.

Participants also connected integration with more efficient resource utilisation. Participant 15 proposed:

"*Ensuring efficient use of resources, reducing waste and optimising productivity*." (P15)

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In a public-sector regulatory context, however, efficient resource use was expected to support public value rather than profitability. Participants referred to safety, regulatory compliance, quality, accountability and responsible stewardship as important organisational outcomes. Integration was therefore considered successful when it strengthened the organisation's ability to fulfil its mandate while protecting employee well-being, procedural fairness and stakeholder confidence. Overall, Theme 2 demonstrated that strategic integration required more than occasional consultation between HR and operations. It involved a continuous exchange in which operational requirements informed workforce practices and workforce evidence informed operational decisions. Participants' accounts supported an integration mechanism based on shared planning, cross-functional collaboration, aligned performance measures and governance controls. These findings provided the empirical basis for positioning the HR business partner as the mechanism connecting the HR pillars with the operations management principles in the proposed framework.

Proposed operations management–human resource management integration framework

The theoretical foundations and empirical findings informed the development of a framework for integrating operations management and strategic human resource management in public-sector regulatory organisations. The framework responds to the fragmentation identified in Theme 1 and incorporates the reciprocal alignment, cross-functional collaboration and shared accountability identified in Theme 2. It is designed to connect workforce capability with operational requirements while recognising the statutory, governance and public-value conditions within which regulatory organisations operate. The framework consists of four interrelated components:

- ten strategic human resource management pillars;
- four operations management principles;
- the human resource business partner as the integrating mechanism; and
- institutional, governance and stakeholder requirements as the contextual boundaries.

The ten HR pillars are workforce planning, talent management, learning and development, performance management, reward and recognition, employee wellness, employment relations, organisation development, HR service delivery and HR technology. Collectively, these pillars represent the workforce system

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through which the organisation acquires, develops, deploys, supports and retains the capabilities required to execute its regulatory mandate.

The operations management dimension comprises transformation, quality, productivity and performance measurement. Transformation concerns how workforce, information, technology and financial resources are converted into regulatory outputs and public outcomes. Quality concerns the accuracy, consistency, reliability and legal defensibility of those outputs. Productivity addresses the effective use of organisational resources, while performance measurement determines whether operational activities contribute to strategic and regulatory outcomes. The human resource business partner occupies the central integrating position. The role translates operational requirements into workforce implications and introduces workforce evidence into operational planning and decision-making. Integration is therefore reciprocal: operational workloads, risks, technologies and quality requirements inform HR priorities, while workforce capacity, capability, performance and wellness information inform operational commitments.

Institutional, governance and stakeholder requirements surround the internal components of the framework. These contextual boundaries ensure that integration supports efficiency without compromising statutory compliance, procedural fairness, ethical conduct, employee interests or public accountability.

Figure 2 presents integration as a continuous rather than a once-off process. Operational requirements inform the ten HR pillars through the HR business partner, while workforce information is communicated back into operational planning, process design and performance management. Feedback from quality, productivity and performance measures enables the organisation to identify capability gaps, process deficiencies and emerging risks. The resulting adjustments allow the organisation to maintain alignment as regulatory priorities, technologies, workforce conditions and stakeholder expectations change.

Alignment of the HR pillars with operations management principles

The framework does not assign each HR pillar to only one operations management principle. Each pillar can influence transformation, quality, productivity and performance measurement in different but complementary ways. The alignment matrix in Table 5 illustrates these relationships.

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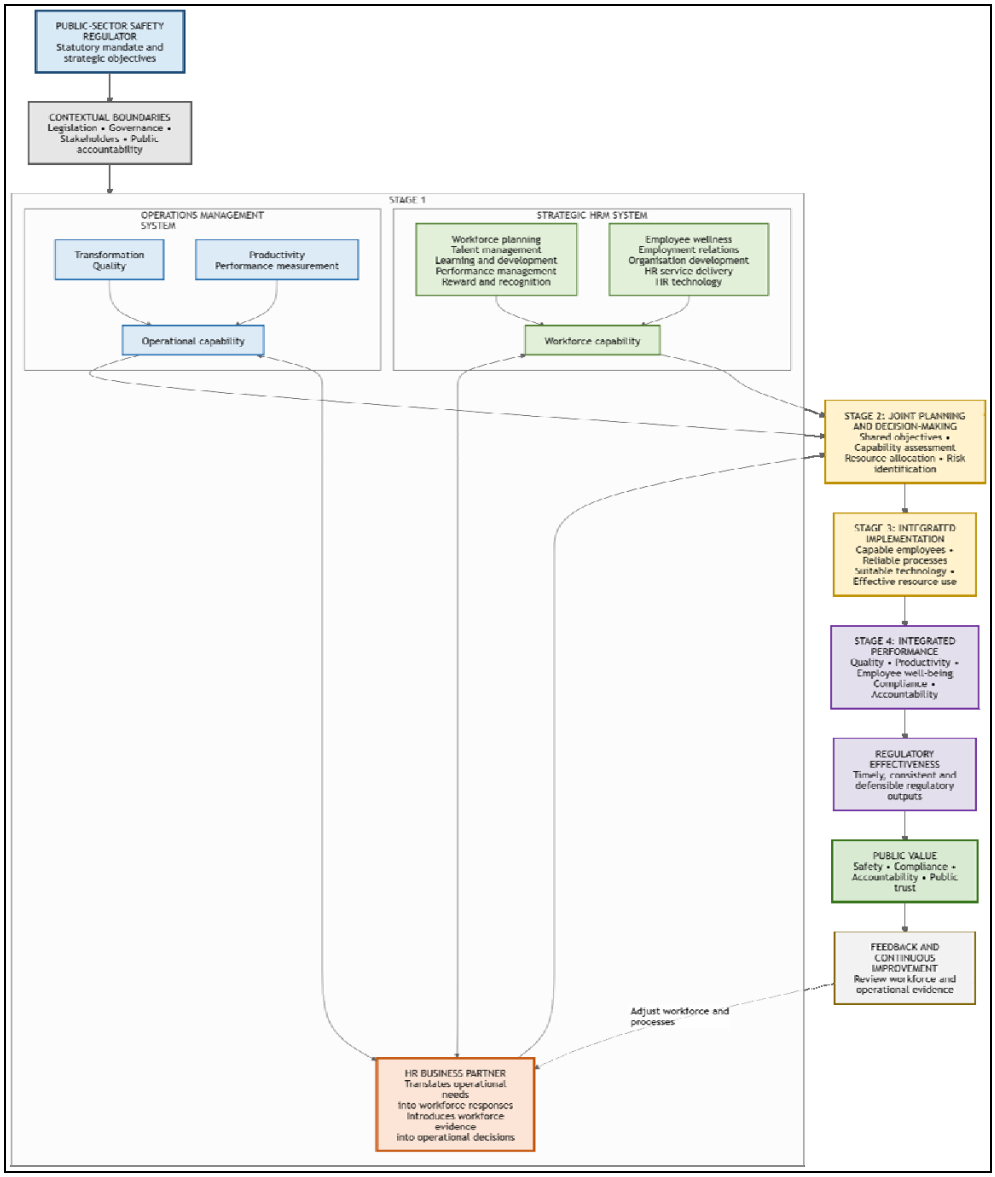


Figure nr.2. Proposed integrated operations management–human resource management framework for public-sector safety regulators

Source: Authors, 2026

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Table 5: Alignment of strategic HRM pillars with operations management principles

Strategic HRM pillar	Transformation	Quality	Productivity	Performance measurement
Workforce planning	Determines the number and type of employees required to execute regulatory processes.	Ensures that suitably qualified employees are available for quality-critical activities.	Aligns staffing capacity with workload and regulatory priorities.	Monitors vacancies, staffing levels, workload ratios and capability gaps.
Talent management	Identifies and deploys scarce and high-potential capabilities.	Protects specialist competence and institutional knowledge.	Places employees where their expertise can create the greatest operational value.	Tracks succession readiness, retention risks and internal mobility.
Learning and development	Prepares employees for new processes, technologies and regulatory requirements.	Strengthens technical competence, consistency and procedural compliance.	Reduces errors and improves employees' ability to complete work effectively.	Evaluates learning application, capability improvement and operational impact.
Performance management	Translates organisational objectives into individual and team responsibilities.	Incorporates accuracy, consistency, compliance and service standards into performance expectations.	Aligns employee contributions with operational targets and resource use.	Connects individual, team and organisational performance indicators.
Reward and recognition	Reinforces behaviours required during organisational and process change.	Recognises employees who demonstrate quality, ethical conduct and improvement.	Encourages innovation, collaboration and effective performance.	Links recognition to measurable contributions rather than activity alone.

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Strategic HRM pillar	Transformation	Quality	Productivity	Performance measurement
Employee wellness	Supports employees during operational and organisational change.	Reduces the risk that fatigue, stress or insufficient support will affect work quality.	Promotes sustainable performance, attendance and workforce availability.	Monitors wellness trends, absenteeism and associated operational risks.
Employment relations	Facilitates consultation concerning restructuring, job changes and new working arrangements.	Promotes fairness and consistent application of employment procedures.	Resolves workplace conflict that could disrupt operational delivery.	Tracks grievances, disputes, resolution time and recurring employee-relations risks.
Organisation development	Aligns structures, roles and culture with operational processes.	Clarifies accountability and supports consistent organisational behaviour.	Reduces duplication, silos and unnecessary organisational complexity.	Evaluates organisational readiness, change adoption and collaboration.
HR service delivery	Provides accessible and reliable HR services supporting employees and managers.	Establishes consistent HR processes and service standards.	Reduces administrative delays affecting appointments, deployment and employee support.	Measures response times, service quality, backlogs and stakeholder satisfaction.
HR technology	Digitises and integrates workforce information and HR processes.	Improves data accuracy, consistency and accessibility.	Automates repetitive activities and supports efficient workforce decisions.	Provides workforce analytics and integrated performance information.

Source: Authors, 2026

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The matrix demonstrates that the ten HR pillars operate as an interconnected workforce system. For example, workforce planning may identify a shortage of specialist regulatory capability, talent management may assess whether the capability can be developed or sourced, and learning and development may address the identified gap. Performance management then clarifies the expected standards, while reward and recognition reinforce the required behaviours. Employee wellness and employment relations ensure that performance remains sustainable and procedurally fair, while HR technology and service delivery provide the information and administrative support required to coordinate the system. The four operations management principles provide the operational tests against which the HR pillars are aligned. Each workforce intervention should therefore be assessed by asking:

- How does it support the transformation of organisational resources into regulatory outputs?
- How does it improve the quality and defensibility of regulatory work?
- How does it contribute to the effective and sustainable use of resources?
- How will its contribution to operational and regulatory performance be measured?

These questions prevent HR initiatives from being evaluated only through completion measures, such as the number of employees trained or positions filled. Instead, they connect HR activities to capability improvement, process performance, regulatory quality and public outcomes.

The human resource business partner as the integrating mechanism

The human resource business partner provides the mechanism through which the HR pillars and operations management principles are continuously connected. The framework does not position the HR business partner as an additional HR pillar or as the sole owner of workforce matters. Instead, the role facilitates the reciprocal exchange of operational and workforce information among HR specialists, operational managers, employees and other organisational functions.

Operational managers contribute information concerning workloads, regulatory priorities, process performance, quality problems, technology changes and resource constraints. The HR business partner interprets the workforce implications of these requirements and coordinates appropriate responses through the relevant HR

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pillars. These responses may include revising workforce plans, recruiting specialist employees, redesigning roles, developing new competencies, addressing performance constraints or strengthening employee support.

The exchange also operates in the opposite direction. The HR business partner provides operational leaders with information concerning vacancies, scarce skills, succession risks, employee performance, wellness, employment relations and organisational readiness. This information enables managers to develop operational plans that reflect the organisation's actual workforce capability rather than assuming that sufficient capacity and competence are available. The integration process consists of five recurring stages:

1. Identify operational requirements: Operational managers and the HR business partner assess strategic priorities, regulatory risks, workloads, process deficiencies and future capability needs.

2. Assess workforce implications: Existing staffing, skills, performance, wellness and organisational capacity are evaluated against operational requirements.

3. Coordinate the HR response: Relevant HR pillars are activated to address identified gaps through recruitment, development, deployment, performance management, organisation development or employee support.

4. Implement and monitor: Operational and HR managers jointly monitor implementation using workforce and operational performance measures.

5. Review and adjust: Evidence concerning quality, productivity, employee experience and regulatory outcomes is used to refine both operational processes and HR interventions.

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Table 6: Responsibilities within the integration process

Role player	Primary responsibility
Executive leadership	Establish strategic priorities, provide authority and hold functions accountable for integration.
Operational managers	Define operational requirements, manage processes and provide evidence concerning workloads, risks and performance.
HR business partner	Translate operational requirements into workforce implications and coordinate HR responses.
HR specialist functions	Design and deliver interventions through the relevant HR pillars.
Line managers	Implement workforce practices, manage employee performance and provide operational feedback.
Employees	Contribute practical knowledge, identify process constraints and participate in improvement initiatives.
Finance, legal, information technology, risk and strategy functions	Provide the financial, legal, technological, risk and planning support required for implementation.

Source: Authors, 2026

The effectiveness of the HR business partner role depends on operational knowledge, access to relevant information, professional credibility and early involvement in decision-making. The role will have limited integrating value when HR is consulted only after operational decisions have been finalised. Similarly, integration will remain weak if operational managers treat workforce planning, development and employee well-being as responsibilities belonging exclusively to HR. The framework therefore establishes shared accountability. Operational managers remain accountable for process execution and employee management, while HR remains accountable for the quality and coherence of workforce systems. The HR business partner connects these responsibilities and helps ensure that people-related and operational consequences are considered before decisions are implemented.

Institutional, governance and stakeholder boundaries

The framework is situated within the institutional and governance conditions of public-sector regulatory organisations. Integration between operations management and human resource management cannot be pursued solely to improve efficiency or productivity. It must remain consistent with statutory mandates, public-sector

employment requirements, procedural fairness, ethical standards and accountability obligations. Institutional requirements influence both operational and workforce decisions. Operational processes must comply with the legislation establishing the regulator's authority, while HR practices must comply with labour legislation, collective arrangements and public-sector governance requirements. The framework therefore requires the HR business partner and operational managers to assess the legal and institutional implications of proposed changes before implementation. Governance requirements establish how decisions should be authorised, implemented, monitored and reported. Integrated decision-making should include:

- clearly assigned responsibilities and decision-making authority;
- documented policies, procedures and standard operating processes;
- transparent and consistent application of workforce practices;
- appropriate internal controls and risk-management measures;
- mechanisms for reporting unethical conduct or non-compliance;
- regular monitoring and reporting to executive and governance structures; and
- accessible records supporting organisational accountability.

The empirical findings demonstrated the importance of these controls. Participants emphasised consistent policy application, transparent recruitment, employee voice, ethical awareness, internal auditing and the monitoring of operational processes. These requirements show that integration must improve the organisation's ability to explain and defend its decisions rather than merely accelerate their implementation. Stakeholder considerations provide an additional boundary. Decisions concerning workforce deployment, operational priorities and process redesign can affect employees, regulated entities, government, oversight institutions and the public. The framework therefore requires the organisation to evaluate how proposed changes affect the legitimate interests of these stakeholders.

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Table 7: Stakeholder expectations incorporated into the framework

Stakeholder	Primary expectations
Employees	Fair treatment, role clarity, development, well-being, consultation and safe working conditions.
Operational and line managers	Timely staffing, suitable skills, responsive HR services and reliable workforce information.
Regulated entities	Consistent, proportionate, professional and procedurally fair regulatory oversight.
Government and oversight institutions	Mandate achievement, statutory compliance, responsible resource use and accurate reporting.
The public	Effective regulation, improved safety, ethical conduct and protection of the public interest.
Organised labour	Meaningful consultation, lawful employment practices and protection of employee rights.

Source: Authors, 2026

The framework does not suggest that all stakeholder expectations should receive equal priority in every decision. Instead, relevant interests must be identified, evaluated and balanced within the regulator's statutory mandate. Where interests conflict, decisions should be supported by evidence, authorised through appropriate governance structures and communicated transparently. Institutional, governance and stakeholder requirements therefore surround and constrain the framework's internal integration process. They ensure that workforce capability and operational effectiveness are strengthened in a manner that remains lawful, ethical, accountable and directed towards public value.

Framework outcomes and feedback cycle

The framework is intended to strengthen the relationship between workforce capability, operational processes and regulatory outcomes. Its effectiveness should therefore be evaluated across multiple levels rather than through isolated HR or operational indicators. Immediate outputs may include improved workforce information, clearer roles, updated processes and targeted development interventions. These outputs should contribute to intermediate organisational outcomes and, ultimately, to improved regulatory and public outcomes.

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Table 8: Expected outcomes of the integration framework

Outcome level	Expected outcomes	Illustrative measures
Workforce outputs	Improved staffing, capability, role clarity, employee support and organisational readiness.	Vacancy rates, time to fill positions, capability gaps, training application, wellness trends and succession coverage.
Process outputs	More consistent, coordinated and technology-enabled workflows.	Processing time, backlogs, error rates, process compliance, duplication and system utilisation.
Organisational outcomes	Improved quality, productivity, collaboration, employee engagement and accountability.	Quality findings, productivity ratios, engagement results, audit findings, grievances and cross-functional performance.
Regulatory outcomes	More timely, consistent and defensible regulatory activities.	Inspection and investigation quality, decision turnaround times, compliance improvement and enforcement consistency.
Public-value outcomes	Improved safety, trust, accountability and responsible use of public resources.	Safety trends, stakeholder confidence, public reporting and mandate achievement.

Source: Authors, 2026

The appropriate measures should be adapted to the mandate, risks and reporting requirements of each regulatory organisation.

The framework operates through a continuous feedback cycle. Workforce and operational data are first reviewed jointly to identify capability constraints, process deficiencies and emerging regulatory risks. The HR business partner then coordinates the relevant workforce response with operational managers and HR specialists. Implementation results are monitored through integrated measures, and the evidence is used to adjust both HR interventions and operational processes.

The feedback cycle prevents integration from becoming a once-off structural exercise. Regulatory risks, legislation, technologies, workloads and workforce conditions change over time. The organisation must therefore review whether its staffing model, competencies, processes and performance measures remain appropriate. Where an operational target is not achieved, the analysis should determine whether the cause relates to workforce capacity, employee capability, process design, technology, resource allocation or a combination of these factors.

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The framework also distinguishes outputs from outcomes. Filling vacancies, completing training and conducting inspections are important outputs, but they do not independently demonstrate improved organisational performance. Their value depends on whether they strengthen operational quality, reduce risk, improve compliance and contribute to the statutory mandate. This outcome-oriented approach allows the organisation to assess the combined contribution of HR and operations management to regulatory effectiveness.

Overall, the proposed framework converts the theoretical and empirical findings into an integrated organisational system. It aligns ten HR pillars with four operations management principles, uses the HR business partner as the coordinating mechanism and locates decision-making within institutional, governance and stakeholder boundaries. The following section discusses the framework and findings in relation to the existing literature and theoretical foundations.

Discussion

The study examined how operations management and strategic human resource management can be integrated to strengthen organisational performance in public-sector regulatory organisations. The findings demonstrated that workforce and operational systems were mutually dependent but frequently fragmented in practice. Communication failures, organisational silos, inconsistent processes, technological limitations and restricted employee involvement weakened the conversion of workforce expertise into reliable regulatory outputs. Participants nevertheless identified reciprocal planning, cross-functional collaboration and shared accountability as mechanisms through which integration could be strengthened.

Organisational fragmentation as people–process misalignment

The first higher-order theme showed that organisational fragmentation extended beyond the formal separation of HR and operations management. It was reflected in communication failures, inconsistent workflows, manual processes, centralised decision-making and limited employee participation. These findings support Lawrence and Lorsch's (1967) argument that organisational differentiation creates a corresponding need for integration. Specialisation allows departments to develop distinct expertise, but it can also produce competing priorities, separate information systems and weak coordination when appropriate integrating mechanisms are absent.

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The findings further showed that operational inefficiency could not be attributed exclusively to process design. Manual systems, inadequate technology and inconsistent procedures affected employees' ability to apply their knowledge effectively. Conversely, insufficient development, unclear responsibilities and limited empowerment reduced the reliability of operational processes. This reinforces the principle that organisational capability results from the combination of human capital and complementary organisational systems rather than from employee expertise alone (Wright et al., 2001).

Participants' accounts also demonstrated that fragmentation had consequences for employee experience. Centralised decision-making and limited involvement weakened ownership, while insufficient training reduced employees' readiness to implement organisational and technological change. Guest (2017) argues that organisational performance should not be pursued without considering employee well-being and the quality of the employment relationship. The present findings extend this argument by showing that employee capability, autonomy and well-being are also operational concerns because they influence the sustainability and quality of regulatory delivery.

The findings additionally revealed that fragmentation limited organisational learning. HR information concerning vacancies, capability gaps, wellness and employee performance was not always connected with operational data concerning workload, quality, delays and regulatory risk. Consequently, the organisation could struggle to determine whether a performance problem resulted from inadequate skills, insufficient staffing, process deficiencies, technology limitations or several interacting factors. Relational coordination scholarship similarly demonstrates that complex and interdependent work requires shared goals, shared knowledge and timely communication across functional boundaries (Gittell, 2002).In a public-sector regulatory environment, fragmentation also creates governance implications. Unclear responsibilities, inconsistent procedures and weak information-sharing can affect the transparency, consistency and defensibility of regulatory decisions. The significance of integration therefore extends beyond internal efficiency. It contributes to the organisation's ability to demonstrate procedural fairness, comply with statutory requirements and account for the use of public resources.

The study consequently interprets fragmentation as a form of people–process misalignment. Similarly, well-designed processes cannot produce reliable outcomes when staffing, competence, engagement and organisational support are inadequate. This finding provides the central justification for integrating the HR pillars with the operations management principles.

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Conclusion

This study examined how operations management and strategic human resource management can be integrated to strengthen organisational performance in public-sector regulatory organisations. Drawing on qualitative interviews with 41 participants from operational, support and consulting functions across several regulatory entities, the study identified two higher-order themes: organisational fragmentation and its consequences, and the strategic integration of operations management and human resource management.

The findings demonstrated that the separation of people-management and operational processes contributed to communication failures, organisational silos, inconsistent procedures, limited employee development and weak performance monitoring. These challenges affected more than internal efficiency. They constrained workforce capability, organisational learning, employee engagement and the consistency and defensibility of regulatory outputs. Fragmentation was therefore understood as a form of people–process misalignment in which capable employees could not perform optimally without suitable processes, technologies and organisational support, while operational systems could not function effectively without appropriately developed and deployed employees.

The study also established that integration requires a reciprocal relationship. Operational priorities, workloads, regulatory risks and technological changes must inform workforce planning and HR practices. In turn, workforce information concerning staffing capacity, skills, performance, wellness and succession risks must inform operational planning and resource allocation. Cross-functional collaboration and shared accountability are therefore necessary to ensure that workforce and operational decisions support the same organisational objectives.

In response, the study proposed an integration framework that aligns ten strategic HRM pillars with four operations management principles: transformation, quality, productivity and performance measurement. The human resource business partner serves as the connecting mechanism through which operational requirements are translated into workforce responses and workforce evidence is incorporated into operational decision-making. Institutional, governance and stakeholder perspectives ensure that this integration remains consistent with statutory obligations, procedural fairness, ethical conduct, public accountability and public value. The study contributes by extending OM–HRM integration beyond its dominant commercial and manufacturing applications into the public-sector regulatory environment. Its central conclusion is that regulatory performance

cannot be sustained through process improvement or workforce initiatives implemented independently. Effective regulation requires the continuous alignment of people, processes, technology, governance and performance information. The proposed framework provides a structured foundation for achieving this alignment, although its application and effectiveness should be tested through future research across different regulatory settings.

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MANAGING WORKPLACE HEALTH PROMOTION AND HEALTH LITERACY FOR OCCUPATIONAL SAFETY COMPLIANCE: AN ECONOMIC AND ORGANISATIONAL PERSPECTIVE

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Abstract

This study examined the relationship between workplace health promotion, health literacy, and occupational safety compliance among employees. The study adopted quantitative research design using a descriptive survey approach. The population comprised 2,999 employees from two selected organizations, while a sample size of 341 respondents was determined using Cochran's sample size formula. A simple random sampling technique was used to select the respondents proportionately from the two organizations. Data were collected using a researcher-developed instrument titled "Workplace Health Promotion, Health Literacy and Occupational Safety Compliance

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Questionnaire (WHPHLOSCQ).” The instrument was validated by experts in public health and health education, while Cronbach’s Alpha reliability coefficient of 0.91 confirmed its reliability. Data were analysed using descriptive statistics, Pearson Product Moment Correlation (PPMC), and multiple regression at the 0.05 level of significance. The findings revealed low levels of workplace health promotion (Mean = 78.25, SD = 14.23), health literacy (Mean = 81.05, SD = 13.16), and occupational safety compliance (Mean = 78.94, SD = 13.74). The study further showed a significant positive relationship between workplace health promotion and occupational safety compliance, with correlation coefficients ranging from r = .251 to r = .427 (p < .05). Similarly, health literacy had a significant positive relationship with occupational safety compliance, with correlation coefficients ranging from r = .229 to r = .441 (p < .05). Multiple regression analysis indicated that workplace health promotion and health literacy jointly had a significant effect on occupational safety compliance (R = .586, R^2 = .343, F(2,338) = 88.647, p < .001). The study concluded that improving workplace health promotion and employees’ health literacy would enhance occupational safety compliance. It therefore recommended strengthening workplace health programmes, health literacy initiatives, and continuous safety education to improve employees’ compliance with workplace safety regulations.

Keywords: *workplace health promotion, health literacy, occupational safety compliance, employees, workplace safety.*

JEL Classification: I120; I130.

1. Introduction

Occupational safety compliance has become an essential component of organizational sustainability because it focuses on ensuring that employees consistently adhere to established safety rules, procedures, and standards during the performance of their duties. A safe workplace not only protects employees from injuries and occupational diseases but also contributes to improved productivity, reduced operational disruptions, and enhanced organizational reputation. As industries continue to adopt modern technologies and more complex work processes, the need for strict compliance with occupational safety requirements has become even more important. Despite this growing recognition, many organizations, particularly in developing economies, continue to experience challenges in achieving consistent safety compliance due to inadequate monitoring, poor safety culture, and limited investment in occupational health programmes

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(Oluwaniyi & Duruobioma, 2026). Similarly, occupational safety compliance has been recognized as an essential requirement for reducing workplace risks while supporting sustainable organizational development and protecting workers' wellbeing (Ebikake-Nwanyanwu & Woripre, 2025).

Furthermore, workplace accidents, occupational injuries, and unsafe behaviours remain significant concerns across many sectors, particularly in countries where occupational health regulations are weakly enforced. Employees who neglect safety procedures or fail to report workplace hazards increase the likelihood of accidents that may result in financial losses, reduced productivity, disability, or even death. Effective occupational safety compliance therefore extends beyond obeying regulations to include compliance with safety procedures, proper use of personal protective equipment (PPE), timely hazard reporting, active participation in safety training, and the demonstration of safe work behaviour during daily activities. Evidence from Nigeria indicates that compliance with occupational safety management systems remains relatively low in many construction firms, thereby exposing workers to preventable occupational hazards (Mgbeahuru et al., 2022).

Workplace health promotion has evolved into a strategic organizational approach that seeks to improve employees' physical, mental, and social wellbeing while creating healthier and more productive work environments. Rather than focusing solely on disease prevention, workplace health promotion encourages organizations to establish supportive systems that enable workers to maintain healthy lifestyles and reduce occupational health risks. Organizations increasingly recognize that healthy employees are more productive, experience fewer work-related illnesses, and demonstrate stronger commitment to organizational goals. Consequently, workplace health promotion has become an important component of modern occupational health management, especially in industries where employees are regularly exposed to physical, chemical, biological, and psychosocial hazards (Dzwafu et al., 2025). Similarly, organizations that strengthen occupational health and safety practices through effective hazard identification and risk control mechanisms are more likely to improve operational performance and protect their workforce. Workplace health promotion is achieved through several coordinated organizational initiatives that encourage healthy behaviours and strengthen employees' ability to cope with workplace demands (Okoro et al., 2026). Occupational health policies and environmental safety standards have been shown to significantly improve employee performance by creating safer and healthier working conditions within Nigerian manufacturing organizations (Olanipekun, 2022).

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Health literacy has emerged as a critical factor in promoting healthy workplaces because it determines employees' ability to obtain, understand, evaluate, and use health-related information to make appropriate decisions concerning their wellbeing and safety. In occupational settings, health literacy goes beyond the ability to read health materials; it includes the capacity to recognize workplace hazards, understand safety instructions, interpret warning signs, and adopt behaviours that reduce exposure to occupational risks. Employees with adequate health literacy are more likely to participate actively in workplace health programmes, comply with organizational safety requirements, and respond appropriately during emergencies (Essay et al., 2026). Effective health literacy is reflected in employees' ability to access reliable health information, maintain awareness of occupational health issues, make informed health decisions, communicate health concerns appropriately, and apply acquired health knowledge during routine work activities. Employees who possess strong health literacy are generally more confident in participating in safety discussions, reporting unsafe conditions, and adopting preventive health behaviours that minimize workplace accidents and illnesses (Coca et al., 2025). In the same vein, employee participation in workplace safety activities has been found to positively influence health-seeking behaviour, suggesting that informed and engaged workers are more likely to adopt behaviours that protect both their health and workplace safety (Obeten & Ikpi, 2026).

Consequently, workplace health promotion and health literacy are increasingly recognized as complementary factors that can improve occupational safety compliance within organizations. While workplace health promotion creates supportive organizational structures through health education, wellbeing programmes, management commitment, workplace health services, and health-friendly policies, health literacy equips employees with the knowledge and skills needed to understand and apply these initiatives effectively. When both organizational support and individual capability are present, employees are more likely to comply with safety procedures, use personal protective equipment correctly, report hazards promptly, participate in safety training, and consistently demonstrate safe work behaviour. Previous studies have independently reported positive relationships between occupational health interventions, safety management practices, employee knowledge, and safety outcomes across different organizational settings (Chinweze et al., 2024). However, despite these contributions, limited empirical evidence has simultaneously examined the combined influence of workplace health promotion and health literacy on

occupational safety compliance, particularly within developing countries such as Nigeria where occupational health challenges remain substantial. This identified gap therefore provides the justification for the present study, which seeks to examine how workplace health promotion and health literacy jointly influence occupational safety compliance among employees.

Research questions

i. What is the level of workplace health promotion among employees?
ii. What is the level of health literacy among employees?
iii. What is the level of occupational safety compliance among employees?

Research Hypotheses

$H0_1$: There is no significant relationship between workplace health promotion and occupational safety compliance

$H0_2$: There is no significant relationship between health literacy and occupational safety compliance

$H0_3$: There is no significant joint effect of workplace health promotion and health literacy on occupational safety compliance

Literature Review

Conceptual Review

Workplace health promotion has become a strategic organizational approach for improving employees' physical, mental, and social wellbeing while creating a healthier and more productive work environment. Modern organizations increasingly recognize that employees' health is closely linked to organizational performance, job satisfaction, productivity, and long-term sustainability. Consequently, workplace health promotion extends beyond preventing occupational diseases to providing supportive programmes, policies, and services that encourage healthy behaviours among employees (Cheng et al., 2022). This approach encourages employers to integrate health improvement into everyday organizational practices by creating environments that enable workers to perform their duties safely while maintaining their overall wellbeing. Workplace health promotion commonly includes health education and awareness programmes, employee wellbeing initiatives, workplace health services, management support for employee health, and healthy workplace policies and practices. These interventions collectively help reduce workplace stress, improve employees' quality of life, and

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strengthen organizational commitment toward employee welfare. Leadership also plays a significant role in ensuring that health promotion programmes are successfully implemented and sustained within organizations. Effective leaders establish a positive health and safety culture by encouraging employee participation, providing adequate resources, and demonstrating commitment to workers' wellbeing (Ali & Nouban, 2024).

Health literacy has gained increasing attention as an important determinant of employees' ability to make informed decisions concerning their health and safety within the workplace. In occupational settings, health literacy refers to the knowledge, skills, and confidence that enable employees to obtain, understand, evaluate, communicate, and appropriately apply health-related information when performing their work responsibilities. Employees with adequate health literacy are more capable of identifying workplace hazards, understanding safety instructions, interpreting health information, and adopting behaviours that minimize occupational risks (Adei et al., 2022). Health literacy therefore extends beyond the ability to read health information; it involves accessing reliable health information, maintaining awareness of occupational health issues, making appropriate health decisions, communicating health concerns effectively, and applying acquired knowledge to everyday work situations. Workers with higher health literacy are more likely to seek timely medical attention, participate in workplace health programmes, and comply with organizational safety regulations. Conversely, limited health literacy may contribute to poor health-seeking behaviour, delayed reporting of workplace illnesses, misunderstanding of safety procedures, and increased vulnerability to occupational injuries. Agarwalla et al. (2024) emphasized that individuals with better access to health information and stronger decision-making abilities demonstrate healthier behaviours and are more likely to utilize available healthcare services appropriately. Consequently, improving employees' health literacy strengthens workplace health promotion efforts and contributes significantly to achieving safer and healthier working environments.

Occupational safety compliance represents employees' willingness and commitment to consistently follow established workplace safety rules, regulations, procedures, and standards designed to prevent occupational accidents, injuries, and illnesses. It is an essential component of occupational health management because compliance ensures that workers perform their duties in ways that minimize exposure to workplace hazards while protecting both themselves and their colleagues. Occupational safety compliance encompasses several important behaviours, including compliance with safety procedures, proper use of personal

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protective equipment, hazard reporting, participation in safety training, and demonstration of safe work behaviour during routine organizational activities. These behaviours collectively contribute to the development of a strong safety culture and improved organizational performance (Claxton et al., 2022). In Nigeria, however, occupational safety compliance continues to face significant challenges due to weak regulatory enforcement, inadequate awareness, poor organizational commitment, and limited investment in occupational health programmes. These concerns have generated increased attention from policymakers, employers, and occupational health professionals seeking to strengthen workplace safety across different sectors (Onyejeocha, 2024). In addition, occupational safety has increasingly been recognized as a fundamental human right that every worker should enjoy regardless of occupation or industry, requiring employers to provide safe working conditions and ensure compliance with established health and safety standards (Orikpete & Ewim, 2023)

From an economic and management perspective, workplace health promotion and occupational safety are investments in human capital and operational resilience rather than discretionary welfare costs. Recent evidence supports an integrated approach. Lu, Karanikas, and Carroll (2024) found that occupational health and safety interventions are more effective when coordinated with workplace health promotion and tailored to workers' needs, while Javanmardi et al. (2025) reported generally positive, though heterogeneous, effects of workplace health-promotion programmes among industrial workers. Vitrano and Micheli (2024) further argued that effective occupational safety and health interventions require proactive management, stakeholder coordination, shared knowledge, and open communication. These findings position management commitment, programme design, and implementation quality as mechanisms through which employee health can reduce disruption, absenteeism, accidents, and associated organisational costs.

Recent indexed studies also clarify the interaction between employees' capabilities and organisational management. Friedrich et al. (2024) found that occupational health literacy, health-oriented leadership, opportunities for participation, and organisational health values were positively associated with work ability. Omidi et al. (2023) similarly showed that safety leadership and safety climate predict both deep and surface safety compliance, with deeper compliance more strongly associated with fewer adverse outcomes. A 2024 meta-analysis by Sankar and Anandh identified safety-specific transformational leadership as especially influential for safety performance. Collectively, this evidence supports the manuscript's argument that health literacy is most productive when

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management supplies credible communication, participatory structures, resources, and a visible safety commitment.

Relevant research in *Annals of Spiru Haret University. Economic Series* provides a particularly close foundation for the present study. Adagbor et al. (2023) demonstrated the effectiveness of health and safety programmes in addressing occupational diseases and injuries in Nigerian manufacturing facilities and recommended continuous health education. Monyei, Arachie, and Ukpere (2023) applied systems thinking to workplace health and safety, arguing that safety must be managed holistically because organisational subsystems and employee behaviour are interdependent. In the maritime sector in Lagos State, Adagbor, Ukpere, and Adekanmbi (2024) found that trade-union presence strengthened adherence to safety standards, safety knowledge, equipment provision, hazard control, and support following injury. Together, these ASHUES studies show that safety outcomes are shaped by coordinated management systems, worker representation, education, and resource allocation—dimensions that the present study extends by testing workplace health promotion and health literacy jointly as predictors of employee safety compliance.

Theoretical Review

The Health Belief Model (HBM) is one of the most widely used behavioural theories in health promotion, public health, and occupational health research. The theory was originally developed by Irwin M. Rosenstock (1966) to explain why individuals choose to engage or fail to engage in behaviours that prevent diseases and promote health. Rosenstock developed the model while working with the United States Public Health Service to understand why many people were not participating in disease prevention and health screening programmes despite the availability of these services. The model proposes that an individual's health-related behaviour is largely influenced by personal beliefs and perceptions about health risks, the seriousness of health conditions, the benefits of preventive actions, and the barriers that may discourage such actions. Over the years, the Health Belief Model has been applied to several areas of health behaviour, including disease prevention, vaccination, health education, workplace health promotion, occupational safety, and compliance with health regulations. Its broad application demonstrates its usefulness in explaining why individuals decide to adopt healthy and safe behaviours in different settings.

The Health Belief Model is built on several key assumptions regarding human behaviour. The first assumption is **perceived susceptibility**, which suggests that

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individuals are more likely to engage in preventive behaviour when they believe they are personally at risk of experiencing a health problem or occupational hazard. In a workplace setting, employees who recognize that they are exposed to hazards such as chemical substances, machinery, excessive noise, or infectious diseases are more likely to comply with safety measures. The second assumption is **perceived severity**, which states that individuals consider the seriousness of the possible consequences before deciding whether to adopt protective behaviour. Employees who understand that workplace injuries may lead to disability, financial hardship, reduced productivity, or even death are more likely to follow occupational safety regulations.

Another important assumption of the model is perceived benefits, which explains that individuals are motivated to adopt healthy behaviour when they believe that the recommended action will reduce their risk or improve their wellbeing. Employees are therefore more willing to participate in workplace health education programmes, use personal protective equipment, attend safety training, and report workplace hazards when they believe these actions will effectively protect them from injury or illness. Closely related to this is perceived barriers, which refers to factors that discourage individuals from taking preventive action. Such barriers may include inadequate safety equipment, insufficient management support, lack of workplace health services, poor communication, or the belief that compliance requires too much effort. The model also recognizes the importance of cues to action, which are internal or external factors that stimulate individuals to adopt healthy behaviour. Workplace safety reminders, health campaigns, management directives, warning signs, and safety training programmes often serve as cues that encourage employees to comply with occupational safety requirements. Finally, self-efficacy emphasizes employees' confidence in their ability to successfully perform recommended health and safety behaviours. Workers who believe they possess the necessary knowledge and skills are more likely to practise safe work behaviours consistently.

Despite these criticisms, the Health Belief Model remains highly relevant to the present study because it provides a useful theoretical explanation for the relationships among workplace health promotion, health literacy, and occupational safety compliance. Workplace health promotion initiatives such as health education and awareness programmes, employee wellbeing programmes, workplace health services, management support for employee health, and healthy workplace policies serve as important cues that encourage employees to adopt healthier and safer behaviours. At the same time, health literacy enables employees to access health information, understand workplace risks, make informed health decisions,

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communicate health concerns, and apply health knowledge appropriately during work activities. Employees who possess adequate health literacy are more likely to perceive workplace hazards correctly, appreciate the benefits of complying with safety procedures, and overcome barriers that may discourage safe behaviour. Consequently, they are more likely to comply with safety procedures, use personal protective equipment correctly, report hazards promptly, participate actively in safety training, and demonstrate safe work behaviour. The Health Belief Model therefore provides a strong theoretical foundation for explaining how workplace health promotion and health literacy can jointly influence occupational safety compliance among employees. Its emphasis on individual perceptions, organizational support, and preventive behaviour makes it highly suitable for achieving the objectives of the present study.

Empirical Review

Okoro et al. (2026) examined the effect of occupational health and safety practices on the performance of the building construction industry in Nigeria. Using a descriptive survey design, data were collected from employees of selected construction firms through structured questionnaires. The study established that hazard identification and risk control contributed positively to organizational performance and recommended adequate provision of personal protective equipment for workers. Although the study demonstrated the importance of occupational safety practices, it focused on organizational performance rather than employees' occupational safety compliance. It also did not examine workplace health promotion or health literacy as determinants of safety compliance, leaving an important conceptual gap that the present study addresses. Essay et al. (2026) investigated occupational safety and health knowledge, attitudes, and practices among formal and informal sector workers in Freetown, Sierra Leone. A cross-sectional survey design was adopted using a structured questionnaire administered to workers from both employment sectors. The findings indicated that workers in the formal sector demonstrated better occupational safety knowledge and safer practices than those in the informal sector. However, the study concentrated mainly on differences between employment sectors without considering workplace health promotion initiatives or employees' health literacy. In addition, the study was conducted outside Nigeria, making it necessary to investigate these variables within the Nigerian workplace context.

Egwanwor et al. (2025) investigated the effect of health education on safety practices among cement factory workers in Port Harcourt, Nigeria. The study

adopted a quasi-experimental design to assess whether health education interventions improved workers' safety practices. The findings showed that health education contributed to improved safety practices and recommended regular safety training across high-risk industries. Although the study established the importance of health education, it focused on only one aspect of workplace health promotion. It overlooked broader dimensions such as employee wellbeing programmes, workplace health services, management support, healthy workplace policies, and employees' health literacy, which are examined comprehensively in the present study. Oluwaniyi and Duruobioma (2026) reviewed occupational health and safety challenges facing developing countries by discussing existing gaps, opportunities, and policy implications. Using documentary evidence, the study highlighted inadequate occupational safety systems, weak enforcement, technological inequalities, and the need for digital innovations in improving workplace safety. While the article provides valuable policy recommendations, it is purely conceptual and lacks empirical evidence based on employees' experiences. Furthermore, it does not investigate the influence of workplace health promotion or health literacy on occupational safety compliance. These limitations create the need for an empirical investigation that examines these relationships among employees.

Onuoha et al. (2025) assessed workers' knowledge of occupational safety in selected quarry industries in Ebonyi State, Nigeria, using a descriptive cross-sectional survey. The findings revealed generally poor occupational safety knowledge among workers and suggested that increasing safety knowledge could improve workplace safety practices. Despite providing useful evidence regarding occupational safety awareness, the study focused primarily on knowledge and did not evaluate employees' ability to obtain, interpret, communicate, and apply health information as represented by health literacy. It also ignored workplace health promotion programmes as organizational strategies capable of improving occupational safety compliance. Coca et al. (2025) examined employees' awareness and compliance with occupational health and work safety practices in a private company using descriptive and correlational research designs. The study established that awareness positively influenced occupational safety compliance, although compliance varied across different safety activities. While awareness was considered an important predictor of compliance, the study narrowly measured occupational health awareness without examining broader health literacy dimensions or organizational health promotion initiatives. Moreover, the study did not investigate the combined contribution of these variables to occupational safety

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compliance, which forms the focus of the present study.

Mgbeahuru et al. (2022) assessed compliance with the International Labour Organization occupational safety and health management system among construction companies in Ebonyi State, Nigeria. The descriptive survey revealed a generally low level of compliance with recommended occupational safety standards and emphasized stricter enforcement by regulatory authorities. Although the study contributed to understanding compliance with international safety standards, it concentrated on organizational compliance rather than employees' behavioural compliance. It equally failed to examine whether workplace health promotion programmes and employees' health literacy could influence occupational safety compliance, leaving an important research gap. Olanipekun (2022) investigated occupational health policies and environmental safety standards as predictors of employee performance in selected manufacturing firms in Ogun State, Nigeria. Using descriptive and inferential statistical techniques, the study found that workplace health policies and environmental safety standards positively influenced employee performance. However, employee performance rather than occupational safety compliance served as the dependent variable. In addition, the study did not consider employees' health literacy or workplace health promotion as integrated constructs influencing compliance with workplace safety regulations, thereby limiting its applicability to the current research focus.

Dzwafu et al. (2025) reviewed occupational health and safety practices and workers' performance in Nigeria through secondary data analysis. The review emphasized inadequate implementation of occupational health and safety practices across sectors and recommended stronger regulatory enforcement, awareness programmes, and sector-specific interventions. Although the review provides broad insight into occupational safety issues in Nigeria, it is not supported by primary empirical evidence collected from workers. Furthermore, the study did not empirically investigate workplace health promotion, health literacy, or occupational safety compliance simultaneously. These gaps justify the need for the current empirical investigation. Obeten and Ikpi (2026) examined employee involvement in workplace safety and its relationship with health-seeking behaviour among oil and gas workers in Calabar, Nigeria. Using a mixed-method approach, the study established that employee participation in safety activities positively influenced health-seeking behaviour and recommended stronger participatory safety policies. Although the study linked safety participation with health behaviour, it did not investigate occupational safety compliance as the outcome variable. Likewise, broader workplace health promotion initiatives and employees'

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health literacy were not examined as predictors, making the present study more comprehensive in scope.

Hence, the reviewed studies demonstrate that occupational safety remains an important concern across different industries and countries. Existing studies have examined occupational safety practices, legal frameworks, employee awareness, safety knowledge, organizational policies, employee involvement, and workplace performance. However, most concentrated on single variables, organizational outcomes, legal compliance, or literature reviews rather than examining employees' occupational safety compliance from both organizational and individual perspectives. Very few studies integrated workplace health promotion and health literacy within one conceptual framework, while none comprehensively investigated their joint influence on occupational safety compliance. Methodological differences, geographical limitations, and fragmented treatment of the variables create a significant knowledge gap.

The economic implication of this gap is important: weak health communication, fragmented programmes, and limited managerial support can convert preventable hazards into injury costs, lost workdays, lower productivity, compensation exposure, and reputational damage. The present model therefore treats workplace health promotion as a management system and health literacy as an employee capability that jointly influence compliance. This framing responds to recent calls for integrated, human-centred, and participatory occupational-health interventions and gives the study direct relevance to managerial decision-making and organisational performance.

Methodology

Study Design

This study adopted quantitative research design using a descriptive survey approach. The design was considered appropriate because it enabled the researcher to collect data from employees on workplace health promotion, health literacy, and occupational safety compliance and to examine the relationships among these variables.

Study Population

The population of the study comprised employees from two selected organizations. According to available staff records, Organization A (Tin Can Port) has 1,988 employees, while Organization B (Rivers Port) has 1,011 employees, making a total population of 2,999 employees.

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Sample Size and Sampling Technique

Using Cochran's sample size formula at a 95% confidence level and a 5% margin of error, a sample size of 341 respondents was determined for the study. A simple random sampling technique was used to select the respondents. To ensure fair representation, the sample was proportionately distributed according to the population of each organization. Consequently, 226 respondents were selected from Organization A (Tin Can Port) and 115 respondents from Organization B (Rivers Port).

Table 1: Sample Distribution

Organizations	**Population**	**Sample size**
Organization A: Tin Can Port	1,988	226
Organization B: Rivers Port	1,011	115
Total	2,999	341

Research Instrument

Data were collected using a structured questionnaire titled “Workplace Health Promotion, Health Literacy and Occupational Safety Compliance Questionnaire (WHPHLOSCQ)” developed by the researcher. The questionnaire was designed to obtain information on workplace health promotion practices, employees' health literacy, and occupational safety compliance.

Validation and Reliability of Instrument

The questionnaire was subjected to face and content validity by experts in public health and health education to ensure that the items adequately measured the objectives of the study. Corrections and suggestions provided by the experts were incorporated into the final version of the instrument. To determine the reliability of the instrument, the test-retest method was used. The responses obtained were analyzed using Cronbach’s Alpha reliability test, and a reliability coefficient of 0.91 was obtained, indicating that the instrument was reliable and suitable for the study.

Procedure for Data Collection

The researcher administered the questionnaire directly to the selected respondents with the assistance of trained research assistants where necessary. Respondents were informed about the purpose of the study, and confidentiality of the information provided was assured.

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Method of Data Analysis

Data collected from the respondents were coded, collated, and analyzed using descriptive statistics (minimum, maximum, mean, standard deviation), inferential statistics of Pearson Product Moment Correlation (PPMC) and multiple regression, which was used to test the hypotheses at a 0.05 level of significance.

Results

Research Question One: What is the level of workplace health promotion among employees?

Table 1: Descriptive Analysis of Workplace Health Promotion

Sub-scales	Min.	Max.	Midpoint	Mean	Std. Dev.	Remark
Health Education and Awareness Programmes	7	25	16.0	17.84	3.56	High
Employee Wellbeing Programmes	5	25	15.0	14.62	4.01	Low
Workplace Health Services	5	25	15.0	13.48	4.28	Low
Management Support for Employee Health	6	25	15.5	15.21	3.74	Low
Healthy Workplace Policies and Practices	7	25	16.0	17.10	3.36	High
Total	**38**	**122**	**80.0**	**78.25**	**14.23**	**Low**

Decision Rule: Mean scores below the midpoint value = Low; above the midpoint value = High.

Table 1 shows the level of workplace health promotion among employees. The findings revealed that health education and awareness programmes as well as healthy workplace policies and practices recorded mean scores above their respective midpoint values, indicating a high level. However, employee wellbeing programmes, workplace health services, and management support for employee health recorded mean scores below their midpoint values. The overall workplace health promotion score was also below the midpoint value, indicating that workplace health promotion among employees was generally low.

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Research Question Two: What is the level of health literacy among employees?

Table 2: Descriptive Analysis of Health Literacy

Sub-scales	Min.	Max.	Midpoint	Mean	Std. Dev.	Remark
Access to Health Information	7	25	16.0	17.62	3.43	High
Awareness of Health Information	8	25	16.5	18.11	3.20	High
Health Decision-Making Ability	6	25	15.5	16.82	3.67	High
Communication about Health Issues	5	25	15.0	13.96	4.14	Low
Application of Health Knowledge	5	25	15.0	14.54	3.98	Low
Total	**40**	**123**	**81.5**	**81.05**	**13.16**	**Low**

Table 2 indicates that employees demonstrated high levels of access to health information, awareness of health information, and health decision-making ability. However, communication about health issues and the application of health knowledge recorded mean scores below their midpoint values. Consequently, the overall health literacy score fell slightly below the midpoint value, suggesting that employees generally exhibited a low level of health literacy.

Research Question Three: What is the level of occupational safety compliance among employees?

Table 3: Descriptive Analysis of Occupational Safety Compliance

Sub-scales	Min.	Max.	Mid point	Mean	Std. Dev.	Remark
Compliance with Safety Procedures	8	25	16.5	18.32	3.22	High
Proper Use of Personal Protective Equipment	6	25	15.5	15.08	3.95	Low
Hazard Reporting	5	25	15.0	13.41	4.37	Low
Participation in Safety Training	5	25	15.0	14.28	4.08	Low
Safe Work Behaviour	8	25	16.5	17.85	3.18	High
Total	**39**	**121**	**80.0**	**78.94**	**13.74**	**Low**

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Table 3 presents the level of occupational safety compliance among employees. The findings revealed that employees showed high compliance with safety procedures and safe work behaviour. However, proper use of personal protective equipment, hazard reporting, and participation in safety training recorded mean scores below their midpoint values. The overall occupational safety compliance score was below the midpoint value, indicating that employees generally exhibited a low level of occupational safety compliance.

$H0_1$: There is no significant relationship between workplace health promotion and occupational safety compliance.

Table 4: Correlation Matrix Analysis of Hypothesis 1

Variables	1	2	3	4	5	6
1. Health Education and Awareness Programmes	1					
2. Employee Wellbeing Programmes	.392**	1				
3. Workplace Health Services	.314**	.448**	1			
4. Management Support for Employee Health	.521**	.406**	.463**	1		
5. Healthy Workplace Policies and Practices	.438**	.352**	.411**	.496**	1	
6. Occupational Safety Compliance	.401**	.284*	.251*	.338**	.427**	1

Correlation is significant at the 0.05 level (2-tailed).
Correlation is significant at the 0.01 level (2-tailed).

Presented in Table 4 is the relationship between workplace health promotion and occupational safety compliance among employees. The findings revealed that health education and awareness programmes ($r = .401$, $p < .01$), employee wellbeing programmes ($r = .284$, $p < .05$), workplace health services ($r = .251$, $p < .05$), management support for employee health ($r = .338$, $p < .01$), and healthy workplace policies and practices ($r = .427$, $p < .01$) all had significant positive relationships with occupational safety compliance. This implies that improvements in workplace health promotion are associated with better occupational safety compliance among employees. Therefore, the null hypothesis was rejected. Hence, there is a significant positive relationship between workplace health promotion and occupational safety compliance.

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$H0_2$: There is no significant relationship between health literacy and occupational safety compliance.

Table 5: Correlation Matrix Analysis of Hypothesis 2

Variables	1	2	3	4	5	6
1. Access to Health Information	1					
2. Awareness of Health Information	.432**	1				
3. Health Decision-Making Ability	.381**	.447**	1			
4. Communication about Health Issues	.298*	.321*	.416**	1		
5. Application of Health Knowledge	.405**	.392**	.518**	.472**	1	
6. Occupational Safety Compliance	.366**	.389**	.441**	.229*	.267*	1

Correlation is significant at the 0.05 level (2-tailed).
Correlation is significant at the 0.01 level (2-tailed).

Presented in Table 5 is the relationship between health literacy and occupational safety compliance among employees. The findings revealed that access to health information ($r = .366$, $p < .01$), awareness of health information ($r = .389$, $p < .01$), health decision-making ability ($r = .441$, $p < .01$), communication about health issues ($r = .229$, $p < .05$), and application of health knowledge ($r = .267$, $p < .05$) all had significant positive relationships with occupational safety compliance. Among the dimensions, health decision-making ability showed the strongest relationship with occupational safety compliance. Therefore, the null hypothesis was rejected. Hence, there is a significant positive relationship between health literacy and occupational safety compliance.

$H0_3$: There is no significant joint effect of workplace health promotion and health literacy on occupational safety compliance

Table 6: Multiple Regression Analysis of Hypothesis 3

Model Summary **R = 0.586** **R^2 = 0.343** **Adj. R^2 = 0.339** **Std. Error of Estimate: 7.624**					
Source	**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
Regression	10084.212	2	5042.106	88.647	0.000
Residual	19224.538	338	56.878		
Total	29308.750	340			

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Table 6 presents the joint effect of workplace health promotion and health literacy on occupational safety compliance among employees. The findings revealed a multiple correlation coefficient of R = 0.586, indicating a moderate positive relationship between the independent variables and occupational safety compliance. The coefficient of determination ($R^2 = 0.343$) showed that workplace health promotion and health literacy jointly explained 34.3% of the variation in occupational safety compliance, while the remaining 65.7% was explained by other factors outside the model. The ANOVA result further indicated that the regression model was statistically significant ($F_{(2,338)} = 88.647$, $p < 0.001$). Therefore, workplace health promotion and health literacy jointly had a significant effect on occupational safety compliance among employees. Hence, the null hypothesis was rejected.

Discussion of findings

The results of this study showed that there were low level of workplace health promotion, health literacy and occupational safety compliance. This finding aligns with the study of Mgbeahuru et al. (2022), who asserted that compliance with occupational safety and health management systems among construction companies in Nigeria was generally low due to weak implementation of safety standards. It also agrees with Onuoha et al. (2025), who reported that workers possessed poor knowledge of occupational safety, thereby limiting their ability to practice safe workplace behaviours. Similarly, Dzwafu et al. (2025) maintained that occupational health and safety practices remain inadequately implemented across many Nigerian workplaces despite existing regulations.

The study showed that, Hence, there is a significant positive relationship between workplace health promotion and occupational safety compliance. This finding is in agreement with the study of Egwanwor et al. (2025), who asserted that health education interventions significantly improved workers' safety practices by increasing awareness of workplace hazards and preventive measures. It also supports the findings of Okoro et al. (2026), who observed that effective occupational health and safety practices, particularly hazard identification and risk control, enhanced workplace outcomes and encouraged the provision of appropriate protective equipment. Likewise, Olanipekun (2022) found that occupational health policies and environmental safety standards contributed positively to improved workplace outcomes through stronger safety management systems.

The study showed that, there is a significant positive relationship between health literacy and occupational safety compliance. This finding is consistent with

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the study of Coca et al. (2025), who asserted that employees with higher awareness of occupational health and work safety demonstrated better compliance with workplace safety practices. It also agrees with Essay et al. (2026), who reported that workers with better occupational safety knowledge and attitudes, particularly in the formal sector, exhibited safer workplace practices than those in the informal sector. Furthermore, the finding is consistent with Onuoha et al. (2025), who emphasized that improving workers' knowledge of occupational safety is an important strategy for strengthening safe work practices.

The study revealed that, workplace health promotion and health literacy jointly had a significant effect on occupational safety compliance among employees. This finding is consistent with the study of Obeten and Ikpi (2026), who asserted that employee participation in workplace safety activities positively influenced health-related behaviours, demonstrating the importance of supportive organizational environments. It also aligns with Akpan et al. (2025), who maintained that effective occupational safety and health management systems, combined with continuous safety training and employee engagement, contribute substantially to reducing workplace accidents and improving safety outcomes. However, this finding extends beyond the conclusions of Oluwaniyi and Duruobioma (2026), whose conceptual review emphasized policy reforms and technological innovations without empirically examining the combined influence of organizational health promotion and employees' health literacy.

Conclusion and Recommendations

This study concluded that, employees generally experienced low levels of workplace health promotion, health literacy, and occupational safety compliance, despite recording high scores in a few specific dimensions, which This means that many organizations have not adequately invested in employee wellbeing programmes, workplace health services, management support, effective communication of health information, practical application of health knowledge, hazard reporting, proper use of personal protective equipment, and participation in safety training. Workplace health promotion had a significant positive relationship with occupational safety compliance, implying that organizations that actively promote employees' health are more likely to achieve better compliance with workplace safety regulations. In addition, health literacy was found to have a significant positive relationship with occupational safety compliance, suggesting that employees who can access, understand, communicate, and apply health information are more likely to demonstrate safe work behaviours. Therefore, the

following recommendations are suggested:

(i) Organizations should strengthen employee wellbeing programmes, workplace health services, management support, health communication, and regular safety training to improve the overall levels of workplace health promotion, health literacy, and occupational safety compliance among employees. Management should establish continuous monitoring and evaluation systems that identify weak areas in workplace health promotion and occupational safety practices and implement timely corrective measures to improve employees' safety behaviours.

(ii) Employers should institutionalize comprehensive workplace health promotion programmes, including regular health education, wellness initiatives, and supportive workplace policies, to strengthen employees' compliance with occupational safety regulations. Organizational leaders should provide adequate resources, visible management support, and accessible workplace health services that encourage employees to actively participate in workplace safety programmes.

(iii) Organizations should organize regular health literacy programmes that improve employees' ability to access, understand, communicate, evaluate, and apply health information relevant to occupational safety. Employers should integrate practical health literacy education into workplace orientation, refresher courses, and safety training to enhance employees' decision-making abilities and compliance with workplace safety procedures.

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STRUCTURAL EQUATION MODELLING IN EMERGING MARKET SUPPLY CHAIN RESEARCH: METHODOLOGICAL INSIGHTS AND BEST PRACTICES

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Abstract

Structural Equation Modelling (SEM) has become a dominant analytical technique in supply chain management research, enabling the simultaneous testing of complex relationships involving mediation, moderation, and indirect effects. Nevertheless, the application of SEM in emerging market contexts introduces methodological challenges that are often underappreciated in the literature. Issues such as data quality, construct conceptualization, context-specific measurement, and institutional complexities can compromise model validity and the credibility of research findings. This methodological paper provides comprehensive guidance on the application of SEM in emerging market supply chain research, drawing on insights from an empirical study of

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Nigeria's lubricant oil industry. Key methodological considerations are examined, including sample size determination, construct operationalization, validity and reliability assessment, model fit evaluation, and the management of poorly performing constructs. Utilizing a dataset of 562 respondents from Conoil Plc's distribution network, the study demonstrates robust validation procedures, including reliability testing (Cronbach's Alpha, Composite Reliability), convergent validity (Average Variance Extracted), discriminant validity (Fornell-Larcker criterion), and model fit assessment (χ^2/df, CFI, TLI, RMSEA, SRMR). The Institutional Context construct is identified as a cautionary example of poor measurement ($\alpha = 0.033$, CR = 0.004, AVE = 0.016), underscoring the importance of construct disaggregation, item purification, and careful operationalization in complex institutional environments. The paper offers practical recommendations for researchers applying SEM in developing economy contexts, including multi-source data triangulation, mixed-methods integration, careful construct operationalization, and transparent reporting of limitations. Adhering to these guidelines can enhance the rigour, validity, and credibility of SEM studies in emerging market supply chain research.

Keywords: *structural equation modelling- SEM, methodology, construct validation, emerging markets, supply chain research, Nigeria, measurement model, model fit.*

JEL Classification: M110; M160.

1. INTRODUCTION

Structural Equation Modelling (SEM) is recognized as one of the most powerful and widely utilized analytical techniques in supply chain management research. Its capacity to model latent constructs, test complex causal pathways involving mediation and moderation, and assess overall model fit renders it indispensable for theory development and empirical validation (Hair et al., 2019; Kline, 2016). SEM allows researchers to move beyond simple correlation and regression analyses by examining structural relationships among multiple constructs simultaneously, accounting for measurement error, and providing more accurate parameter estimates (Flynn et al., 2010; Dubey et al., 2021).

The application of SEM in supply chain research has grown substantially over the past two decades. Studies have employed SEM to examine relationships between supply chain integration and firm performance (Flynn et al., 2010), collaboration and innovation outcomes (Cao & Zhang, 2011), digital

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transformation and supply chain resilience (Dubey et al., 2021), and institutional factors and supply chain performance (Peng et al., 2008). The technique's flexibility in handling both covariance-based SEM (CB-SEM) and variance-based partial least squares SEM (PLS-SEM) has further expanded its applicability across different research contexts and sample sizes (Hair et al., 2022; Sarstedt et al., 2022).

Despite its advantages, the application of SEM in emerging market contexts presents unique methodological challenges that are often underappreciated in literature. Emerging economies are characterized by institutional voids, infrastructural deficiencies, fragmented market structures, and data quality issues, all of which can compromise construct validity and model fit (Khanna & Palepu, 2010; Peng et al., 2008). Researchers frequently encounter difficulties in accessing reliable data, achieving adequate sample sizes, operationalizing constructs in culturally appropriate ways, and addressing response biases (Oladipo & Ojo, 2022). Despite these challenges, there is limited methodological guidance for researchers applying SEM in developing economy contexts, particularly within Sub-Saharan Africa.

This methodological paper addresses this gap by providing comprehensive guidance on SEM application in emerging market supply chain research. Drawing on lessons from an empirical study of Nigeria's lubricant oil industry, the paper examines relationships between strategic distribution partnerships, value chain innovation, institutional conditions, and performance outcomes. The study utilized a mixed-methods explanatory sequential design, combining quantitative SEM with qualitative thematic analysis, and collected data from 562 stakeholders within Conoil Plc.'s distribution network.

This paper makes several contributions. First, it provides practical guidance on key methodological considerations, including sample size determination, construct operationalization, validity and reliability assessment, and model fit evaluation. Second, it identifies the Institutional Context construct as a cautionary example of poor measurement ($\alpha = 0.033$, CR = 0.004, AVE = 0.016), emphasizing the importance of disaggregating constructs, purifying items, and careful operationalization in complex institutional environments. Third, it offers recommendations for researchers applying SEM in developing economy contexts, such as multi-source data triangulation, mixed-methods integration, and transparent reporting of limitations. Fourth, it contributes to the broader methodological literature by demonstrating effective SEM application in challenging research contexts.

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The structure of the paper is as follows: Section 2 provides an overview of SEM and its application in supply chain research. Section 3 examines key methodological considerations for SEM in emerging markets. Section 4 presents a case study from Nigeria's lubricant oil industry, demonstrating SEM application and validation procedures. Section 5 discusses best practices and recommendations. Section 6 concludes with implications for researchers and future research directions.

2. STRUCTURAL EQUATION MODELLING IN SUPPLY CHAIN RESEARCH

2.1 Overview of SEM

Structural Equation Modelling is a multivariate statistical technique that combines factor analysis and multiple regression to examine relationships among observed and latent variables (Hair et al., 2019; Kline, 2016). SEM enables researchers to test complex theoretical models involving multiple dependent and independent variables, mediation and moderation effects, and reciprocal relationships. The technique has two components: the measurement model, which specifies relationships between latent constructs and their observed indicators, and the structural model, which specifies relationships among latent constructs (Anderson & Gerbing, 1988).

SEM offers several advantages over traditional analytical techniques. First, it accounts for measurement error, providing more accurate parameter estimates than regression analysis (Hair et al., 2019). Second, it enables the simultaneous testing of multiple relationships, reducing the risk of Type I errors associated with separate regression analyses (Kline, 2016). Third, it allows for the testing of complex theoretical models involving mediation, moderation, and indirect effects (Hayes, 2018). Fourth, it provides overall model fit statistics that assess how well the proposed model reproduces the observed data (Hu & Bentler, 1999).

Two main approaches to SEM exist: covariance-based SEM (CB-SEM) and variance-based partial least squares SEM (PLS-SEM) (Hair et al., 2022). CB-SEM, implemented in software such as AMOS, LISREL, and Mplus, estimates model parameters by minimizing the discrepancy between the sample covariance matrix and the model-implied covariance matrix. It is appropriate for theory testing and confirmation, requires relatively large sample sizes, and assumes multivariate normality (Kline, 2016). PLS-SEM, implemented in software such as SmartPLS and WarpPLS, estimates model parameters by maximizing the explained variance of endogenous constructs. It is appropriate for prediction and theory development,

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requires smaller sample sizes, and does not assume normality (Hair et al., 2022; Sarstedt et al., 2022).

2.2 SEM in Supply Chain Management Research

SEM has been extensively applied in supply chain management research across diverse topics. Flynn et al. (2010) used SEM to examine the impact of supply chain integration on operational and business performance, demonstrating that integration significantly enhances performance outcomes. Cao and Zhang (2011) employed SEM to investigate the relationship between supply chain collaboration and firm performance, finding that collaboration leads to collaborative advantage and improved performance. Dubey et al. (2021) used SEM to examine the role of big data analytics capability in supply chain resilience, demonstrating that analytics capability enhances resilience through improved decision-making.

In emerging market contexts, SEM has been used to examine relationships between institutional factors and supply chain performance (Peng et al., 2008), sustainable supply chain management and organisational performance (Agyabeng-Mensah et al., 2020), and digital transformation and supply chain agility. Studies in African contexts have employed SEM to examine supply chain performance in Tanzanian public procuring entities, supplier commitment in Ghanaian manufacturing firms, and road transport infrastructure in Sub-Saharan African markets (Osei & Zhang, 2023; Akinboade et al., 2021).

Despite its widespread application, SEM in supply chain research faces several challenges. These include sample size limitations, measurement issues, model complexity, and the need for rigorous validation procedures (Hair et al., 2019; Kline, 2016). In emerging market contexts, these challenges are amplified by data quality issues, institutional complexities, and cultural factors that affect construct operationalization and respondent behaviour (Oladipo & Ojo, 2022).

2.3 Methodological Challenges in Emerging Markets

Emerging markets present unique methodological challenges for SEM application. First, data quality issues are prevalent, including missing data, response biases, and measurement errors. Researchers may struggle to access reliable data from firms and respondents, particularly in contexts where formal data collection systems are underdeveloped. Second, cultural and contextual factors complicate construct operationalization by shaping how constructs are understood and interpreted (Peng et al., 2008). Scales developed in Western contexts may not be directly applicable in emerging markets without adaptation and validation.

Third, institutional complexities make it challenging to measure constructs such as institutional quality, regulatory enforcement, and market formalization (Khanna

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& Palepu, 2010). These constructs are often multidimensional and context-specific, requiring careful operationalization and disaggregation (Scott, 2014). Fourth, sample size and access issues constrain the ability to achieve adequate sample sizes for SEM, particularly in complex models with many parameters (Hair et al., 2019). Researchers may need to adopt innovative sampling strategies, including multi-stakeholder sampling and collaboration with industry associations.

Fifth, response biases are prevalent in emerging market research, including social desirability bias, acquiescence bias, and common method bias (Podsakoff et al., 2012). These biases can inflate relationships among constructs and compromise validity. Sixth, language and translation issues affect measurement accuracy and consistency, particularly when using scales developed in different cultural contexts (Brislin, 1986). Finally, infrastructural challenges, including limited internet connectivity and unreliable electricity supply, can constrain data collection and analysis.

3. KEY METHODOLOGICAL CONSIDERATIONS FOR SEM IN EMERGING MARKETS

3.1 Sample Size Determination

Sample size is a critical consideration in SEM and affects model identification, parameter estimation, and statistical power (Hair et al., 2019; Kline, 2016). Recommended guidelines suggest a minimum of 10-15 observations per estimated parameter, with minimum thresholds of 200-300 for complex models (Hair et al., 2019). However, sample size requirements depend on several factors, including model complexity, number of indicators, and estimation method (Kline, 2016).

In emerging market research, achieving an adequate sample size can be challenging because of access constraints, response issues, and resource limitations. Researchers should adopt strategies to address these challenges, including:

Multi-stakeholder sampling: Collecting data from multiple stakeholder groups (e.g., managers, suppliers, customers) can increase sample size and provide diverse perspectives (Flynn et al., 2010).

Collaboration with industry associations: Partnering with industry associations, professional bodies, and trade organizations can facilitate access to respondents and improve response rates.

Multiple data collection waves: Conducting data collection in multiple waves can increase response rates and reduce non-response bias (Podsakoff et al., 2012).

Incentives and follow-up: Providing incentives and conducting follow-up

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reminders can improve response rates and sample size (Dillman et al., 2014).

Power analysis: Conducting a power analysis before data collection can determine the minimum sample size needed to detect expected effects (Cohen, 1992).

In this case study, the study achieved a sample of 562 respondents by purposively sampling across four stakeholder groups: senior/middle managers (29), large-volume distributors (246), logistics/transport partners (109), and large-volume customers (217). This multi-stakeholder approach enhanced sample size and provided diverse perspectives on the research questions.

3.2 Construct Operationalization

Construct operationalization is a fundamental step in SEM that specifies how latent constructs are measured through observed indicators (Hair et al., 2019). In emerging market contexts, construct operationalization requires careful attention to cultural appropriateness, contextual relevance, and measurement equivalence (Peng et al., 2008).

Scale Development and Adaptation: Researchers should develop or adapt scales appropriate to the research context. This may involve translating existing scales, conducting pilot testing, and using cognitive interviewing to assess item clarity and relevance (Brislin, 1986). In emerging markets, scales developed in Western contexts may require adaptation to account for cultural differences, language nuances, and contextual factors.

Content Validity: Content validity ensures that measurement items adequately cover the construct domain (Hair et al., 2019). Researchers should conduct expert reviews, literature reviews, and qualitative research to ensure comprehensive construct coverage. In emerging markets, content validity may require incorporating context-specific dimensions and indicators (Peng et al., 2008).

Dimensionality: Constructs in emerging markets are often multidimensional and require disaggregation (Khanna & Palepu, 2010). For example, institutional quality encompasses regulatory enforcement, infrastructure quality, and market formalization, which may operate independently and require separate measurement (Scott, 2014). Researchers should conduct exploratory and confirmatory factor analyses to assess dimensionality and determine appropriate sub-constructs.

Measurement Invariance: In cross-cultural or cross-country research, measurement invariance ensures constructs are measured equivalently across groups (Vandenberg & Lance, 2000). Researchers should test for configural, metric, and scalar invariance to ensure meaningful comparisons.

In the case study, constructs were operationalized using multi-item Likert scales

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(1 = strongly disagree, 5 = strongly agree) adapted from established literature. Strategic Distribution Partnerships (12 items) measured partnership structure, governance mechanisms, trust/commitment, and information sharing. Value Chain Innovation (12 items) measured logistics digitization, inventory innovation, process integration, and traceability systems. Performance Outcomes (9 items) measured operational efficiency, market reach, and customer satisfaction. Institutional Conditions (9 items) measured regulatory enforcement, infrastructure quality, and market formalization.

3.3 Validity and Reliability Assessment

Validity and reliability assessment is essential for ensuring measurement quality in SEM (Hair et al., 2019). Researchers should assess reliability, convergent validity, and discriminant validity to establish the psychometric properties of their measurement model.

Reliability: Reliability refers to the consistency and stability of measurement (Hair et al., 2019). Two commonly used reliability measures are Cronbach's Alpha and Composite Reliability (CR). Cronbach's Alpha measures internal consistency based on inter-item correlations, with values of 0.70 or higher considered acceptable (Nunnally, 1978). Composite Reliability (CR) is a more robust measure that accounts for different loadings, with values of 0.70 or higher considered acceptable (Fornell & Larcker, 1981). In the case study, core constructs demonstrated excellent reliability: SDP ($\alpha = 0.980$, CR = 0.994), VCI ($\alpha = 0.982$, CR = 1.001), and PO ($\alpha = 0.976$, CR = 1.003).

Convergent Validity: Convergent validity refers to the extent to which indicators of a construct share a high proportion of variance (Hair et al., 2019). Convergent validity is assessed using Average Variance Extracted (AVE), with values of 0.50 or higher considered acceptable (Fornell & Larcker, 1981). In the case study, core constructs demonstrated strong convergent validity: SDP (AVE = 0.930), VCI (AVE = 1.009), and PO (AVE = 1.028). However, the Institutional Context construct exhibited poor convergent validity (AVE = 0.016), indicating that the items did not converge to measure a single latent construct.

Discriminant Validity: Discriminant Validity refers to the extent to which constructs are empirically distinct from one another (Hair et al., 2019). Discriminant Validity is assessed using the Fornell-Larcker criterion, which requires that the square root of AVE for each construct exceeds its correlations with other constructs (Fornell & Larcker, 1981). In the case study, core constructs demonstrated strong discriminant validity: SDP ($\sqrt{AVE} = 0.964$), VCI ($\sqrt{AVE} = 1.004$), and PO ($\sqrt{AVE} = 1.014$). However, the Institutional Context construct

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exhibited poor discriminant validity (√AVE = 0.127), indicating that it was not empirically distinct from other constructs.

HTMT Ratio: The heterotrait-monotrait (HTMT) ratio of correlations is an alternative method for assessing discriminant validity, with values below 0.90 considered acceptable (Henseler et al., 2015). HTMT is particularly appropriate when constructs are conceptually similar or when sample sizes are small.

3.4 Model Fit Assessment

Model fit assessment evaluates how well the proposed model reproduces the observed data (Hu & Bentler, 1999). Common fit indices include the chi-square test, comparative fit index (CFI), Tucker-Lewis's index (TLI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR) (Hair et al., 2019; Kline, 2016).

Chi-Square Test: The chi-square test assesses the discrepancy between the sample covariance matrix and the model-implied covariance matrix. A non-significant chi-square ($p > 0.05$) indicates good fit, but the test is sensitive to sample size and often significant in large samples (Kline, 2016). The chi-square/degree of freedom ratio (χ^2/df) is often used as an alternative, with values below 3.0 considered acceptable (Hair et al., 2019).

Comparative Fit Index (CFI): CFI compares the proposed model to a baseline (null) model, with values above 0.90 considered acceptable and above 0.95 considered excellent (Hu & Bentler, 1999). CFI is relatively insensitive to sample size and is widely recommended.

Tucker-Lewis Index (TLI): TLI is an incremental fit index that adjusts for model complexity, with values above 0.90 considered acceptable (Hu & Bentler, 1999). TLI penalizes over-parameterization, making it useful for comparing models with different complexities.

Root Mean Square Error of Approximation (RMSEA): RMSEA assesses the discrepancy per degree of freedom, with values below 0.08 considered acceptable and below 0.05 considered excellent (Browne & Cudeck, 1993). RMSEA is sensitive to model complexity and provides a parsimony-adjusted fit measure.

Standardized Root Mean Square Residual (SRMR): SRMR assesses the average discrepancy between observed and predicted correlations, with values below 0.08 considered acceptable (Hu & Bentler, 1999). SRMR is an absolute fit index that is not sensitive to model complexity.

In the case study, the full model exhibited good fit across all indices: $\chi^2/df = 2.31$ (below 3.0), CFI = 0.94 (above 0.90), TLI = 0.92 (above 0.90), RMSEA =

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0.058 (below 0.08), and SRMR = 0.045 (below 0.08). These results indicate that the proposed model adequately reproduces the observed data and supports the validity of the hypothesized relationships.

3.5 Handling Poorly Performing Constructs

Despite careful measurement, constructs may exhibit poor psychometric properties. In the case study, the Institutional Context construct demonstrated poor reliability (α = 0.033, CR = 0.004, AVE = 0.016), indicating that the items did not converge to measure a single latent construct. This poor performance reflects the multidimensionality and complexity of institutional factors in emerging markets.

Causes of Poor Performance: Several factors may contribute to poor construct performance in emerging markets:

1. **Multidimensionality:** Institutional factors such as regulatory enforcement, infrastructure quality, and market formalization may operate independently and require separate measurement (Scott, 2014; Khanna & Palepu, 2010).
2. **Contextual Complexity:** Institutional constructs are often context-specific and may not be adequately captured by generic scales (Peng et al., 2008).
3. **Measurement Issues:** Poorly worded items, ambiguous response formats, and translation problems can compromise reliability and validity (Brislin, 1986).
4. **Respondent Factors:** Respondent misunderstanding, social desirability bias, and acquiescence bias can affect responses and construct performance (Podsakoff et al., 2012).

Strategies for Handling Poor Performance: Researchers encountering poor construct performance should consider several strategies:

- **Construct Disaggregation:** Disaggregate multidimensional constructs into distinct sub-constructs that can be measured separately (Khanna & Palepu, 2010). For example, disaggregate institutional quality into regulatory enforcement, infrastructure quality, and market formalization.
- **Item Purification:** Remove items with low factor loadings, high cross-loadings, or poor reliability (Hair et al., 2019). Conduct exploratory and confirmatory factor analyses to identify and remove problematic items.
- **Alternative Operationalization:** Consider alternative operationalizations, including objective indicators, secondary data, and qualitative measures (Scott, 2014). For example, institutional quality could be measured using objective indicators such as regulatory indices, infrastructure rankings, and market formalization statistics.
- **Qualitative Data Integration:** Use qualitative data to inform construct

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operationalization and refinement (Creswell & Plano Clark, 2018). Interviews, focus groups, and observations can provide insights into construct meaning and context-specific dimensions.

- **Transparent Reporting:** Acknowledge limitations and discuss implications for findings and interpretation (Hair et al., 2019). Transparent reporting enhances the credibility and trustworthiness of the research.

In the case study, the poor performance of the Institutional Context construct was acknowledged and discussed as a limitation. The findings suggested that institutional factors are multidimensional and require disaggregation, with implications for future research.

4. CASE STUDY: SEM APPLICATION IN NIGERIA'S LUBRICANT OIL INDUSTRY

4.1 Research Context and Design

This section presents a case study demonstrating SEM application in emerging market supply chain research. The study examined the relationships between strategic distribution partnerships, value chain innovation, institutional conditions, and performance outcomes in Nigeria's lubricant oil industry. Nigeria's lubricant oil industry provides an appropriate empirical setting because of its strategic economic importance, complex distribution structure, and exposure to significant operational challenges, including infrastructural deficiencies, fragmented supply networks, regulatory inefficiencies, and widespread counterfeit products (Bello et al., 2021).

The study adopted an explanatory sequential mixed-methods design, combining quantitative SEM with qualitative thematic analysis (Creswell & Plano Clark, 2018). The quantitative phase tested hypothesized relationships, while the qualitative phase provided contextual interpretation of findings. This design enabled triangulation and enhanced the validity and credibility of the research (Jick, 1979).

4.2 Sample and Data Collection

Population and Sampling: The population comprised key stakeholders in Conoil Plc. 's lubricant distribution network: senior/middle managers (29), large-volume distributors (246), logistics/transport partners (109), and large-volume customers (217). Using stratified purposive sampling, the study collected data from 562 respondents (94% response rate). Stratified purposive sampling ensured representation across stakeholder groups and enabled multi-perspective analysis of the research questions.

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Data Collection: Data was collected through structured questionnaires administered in person and electronically. The questionnaire consisted of five sections: respondent profile (control variables), Strategic Distribution Partnerships (12 items), Value Chain Innovation (12 items), Performance Outcomes (9 items), and Institutional Conditions (9 items). All items were measured on a five-point Likert scale (1 = strongly disagree, 5 = strongly agree). The study used secondary data from company records and industry reports to triangulate findings and support validation.

Ethical Considerations: The study followed ethical protocols, including informed consent, confidentiality, and voluntary participation. Respondents were assured of anonymity and the right to withdraw at any time. Ethical approval was obtained from the university ethics review board.

4.3 Measurement Model Validation

Reliability: Reliability was assessed using Cronbach's Alpha and Composite Reliability (CR). Core constructs demonstrated excellent reliability: SDP (α = 0.980, CR = 0.994), VCI (α = 0.982, CR = 1.001), and PO (α = 0.976, CR = 1.003). These values significantly exceed the recommended threshold of 0.70, indicating strong internal consistency (Nunnally, 1978; Fornell & Larcker, 1981). However, the Institutional Context construct exhibited poor reliability (α = 0.033, CR = 0.004), indicating that the items did not consistently measure a single latent construct.

Convergent Validity: Convergent Validity was assessed using Average Variance Extracted (AVE). Core constructs demonstrated strong convergent validity: SDP (AVE = 0.930), VCI (AVE = 1.009), and PO (AVE = 1.028). These values significantly exceed the recommended threshold of 0.50, indicating that the items share a high proportion of variance (Fornell & Larcker, 1981). However, the Institutional Context construct exhibited poor convergent validity (AVE = 0.016), indicating that the items did not converge to measure a single latent construct.

Discriminant Validity: Discriminant Validity was assessed using the Fornell-Larcker criterion. Core constructs demonstrated strong discriminant validity: SDP ($\sqrt{AVE}$ = 0.964), VCI ($\sqrt{AVE}$ = 1.004), and PO ($\sqrt{AVE}$ = 1.014). These values exceed inter-construct correlations, confirming that the constructs are empirically distinct (Fornell & Larcker, 1981). However, the Institutional Context construct exhibited poor discriminant validity ($\sqrt{AVE}$ = 0.127), indicating that it was not empirically distinct from other constructs.

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4.4 Structural Model Results

Model Fit: The full model exhibited good fit across all indices: $\chi^2/df = 2.31$ (below 3.0), CFI = 0.94 (above 0.90), TLI = 0.92 (above 0.90), RMSEA = 0.058 (below 0.08), and SRMR = 0.045 (below 0.08). These results indicate that the proposed model adequately reproduces the observed data and supports the validity of the hypothesized relationships (Hu & Bentler, 1999; Hair et al., 2019).

Path Coefficients: The structural model revealed significant relationships among constructs:

Path	Coefficient (β)	t-value	p-value
SDP → VCI	0.63	10.21	<0.001
VCI → PO	0.57	9.34	<0.001
SDP → PO (Direct)	0.29	3.10	0.002
SDP × IC → VCI	0.21	2.37	0.018

Mediation Analysis: Mediation analysis revealed significant indirect effects (SDP → VCI → PO: β = 0.36, p = 0.004), with the indirect effect (0.35) exceeding the direct effect (0.28). This indicates that value chain innovation partially mediates the partnership-performance relationship, with innovation serving as the primary transmission mechanism for performance gains.

Moderation Analysis: The interaction term (SDP × IC) was positive and significant (β = 0.21, p = 0.018), confirming that institutional conditions strengthen the partnership-innovation relationship. This indicates that partnership effectiveness in driving innovation depends on institutional quality.

4.5 Lessons Learned

Construct Multidimensionality: The poor performance of the Institutional Context construct highlights the importance of recognizing and addressing construct multidimensionality in emerging market research. Institutional factors such as regulatory enforcement, infrastructure quality, and market formalization may operate independently and require separate measurements.

Importance of Disaggregation: Aggregating multidimensional constructs into a single latent variable can reduce reliability and validity. Researchers should consider disaggregating complex constructs into distinct sub-constructs that can be measured separately.

Value of Mixed-Methods: The mixed-methods design enabled triangulation and enhanced the validity of the findings. Qualitative data provided insights into constructs meaning and context-specific dimensions that informed interpretation of

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quantitative results.

Need for Transparent Reporting: Acknowledging limitations and discussing implications for findings and interpretation enhances the research's credibility and trustworthiness. The poor performance of the Institutional Context construct was acknowledged and discussed as a limitation, with implications for future research.

5. BEST PRACTICES AND RECOMMENDATIONS

Based on the methodological insights from the case study and broader literature, this section provides best practices and recommendations for researchers applying SEM in emerging market supply chain research.

5.1 Before Data Collection

1. Conduct Thorough Literature Review: Review existing literature to identify established scales and measurement approaches relevant to the research context. Assess the applicability of scales developed in Western contexts and identify potential adaptation needs.

2. Conduct Qualitative Research: Conduct interviews, focus groups, or observations to understand the research context and inform construct operationalization. Qualitative research can identify context-specific dimensions and indicators that existing scales may not capture (Creswell & Plano Clark, 2018).

3. Pilot Test Instruments: Conduct pilot testing to assess item clarity, relevance, and appropriateness. Use cognitive interviewing to identify potential misunderstandings and refine items. Pilot testing can also provide preliminary evidence of reliability and validity.

4. Consider Cultural and Contextual Factors: Adapt scales to account for cultural differences, language nuances, and contextual factors. Use translation and back-translation procedures to ensure accuracy and consistency (Brislin, 1986).

5. Plan for Adequate Sample Size: Conduct power analysis to determine the minimum sample size required to detect expected effects. Consider strategies to achieve an adequate sample size, including multi-stakeholder sampling, collaboration with industry associations, and multiple data collection waves (Hair et al., 2019).

5.2 During Data Collection

1. Use Multi-Source Data: Collect data from multiple sources to reduce common method bias and enhance validity. Combine primary survey data with secondary data from company records, industry reports, and official statistics (Podsakoff et al., 2012).

2. Implement Quality Control Procedures: Implement quality control

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procedures to identify and address data quality issues. Check for missing data, outliers, and response patterns that may indicate respondent fatigue or inattention.

3. Address Response Biases: Implement strategies to address response biases, including social desirability bias, acquiescence bias, and common method bias. Use procedural remedies such as anonymity, counterbalancing, and temporal separation (Podsakoff et al., 2012).

4. Ensure Ethical Compliance: Follow ethical protocols including informed consent, confidentiality, and voluntary participation. Obtain ethical approval from relevant review boards.

5.3 During Data Analysis

1. Assess Data Quality: Conduct preliminary data analysis to assess data quality, including missing data analysis, outlier detection, and normality assessment. Address data quality issues before proceeding with SEM (Hair et al., 2019).

2. Validate Measurement Model: Conduct comprehensive measurement model validation, including reliability (Cronbach's Alpha, CR), convergent validity (AVE), and discriminant validity (Fornell-Larcker criterion, HTMT). Ensure that constructs meet recommended thresholds (Fornell & Larcker, 1981; Henseler et al., 2015).

3. Assess Model Fit: Evaluate model fit using multiple fit indices, including χ^2/df, CFI, TLI, RMSEA, and SRMR. Interpret fit indices collectively, recognizing that no single index provides a definitive assessment of fit (Hu & Bentler, 1999; Hair et al., 2019).

4. Test Hypothesized Relationships: Test hypothesized relationships using appropriate analytical techniques, including regression, mediation, moderation, and SEM. Report path coefficients, standard errors, t-values, and p-values.

5. Handle Poorly Performing Constructs: If constructs exhibit poor psychometric properties, consider construct disaggregation, item purification, alternative operationalization, or qualitative data integration. Acknowledge limitations and discuss implications for findings and interpretation (Hair et al., 2019).

5.4 During Reporting

1. Provide Comprehensive Reporting: Report all aspects of the methodology, including sampling, data collection, measurement, and analysis. Provide sufficient detail to enable replication and assessment of rigour.

2. Report Model Fit Indices: Report multiple model fit indices and interpret them collectively. Provide thresholds for acceptable fit and justify the choice of

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indices.

3. Report Validity and Reliability: Report reliability (Cronbach's Alpha, CR), convergent validity (AVE), and discriminant validity (Fornell-Larcker criterion, HTMT). Provide evidence that constructs meet recommended thresholds.

4. Acknowledge Limitations: Acknowledge methodological limitations and discuss implications for findings and interpretation. Be transparent about challenges encountered and how you addressed them.

5. Discuss Implications: Discuss implications for theory, practice, and future research. Consider how findings contribute to understanding of supply chain dynamics in emerging markets.

5.5 Summary of Recommendations

Phase	Recommendation	Key Actions
Before Data Collection	Thorough preparation	Literature review, qualitative research, pilot testing, cultural adaptation, power analysis
During Data Collection	Quality assurance	Multi-source data, quality control, response bias mitigation, ethical compliance
During Data Analysis	Rigorous validation	Data quality assessment, measurement model validation, model fit assessment, hypothesis testing, handling poor constructs
During Reporting	Transparent communication	Comprehensive reporting, fit indices, validity/reliability, limitations, implications

6. CONCLUSION

6.1 Summary of Contributions

This methodological paper has provided comprehensive guidance on applying Structural Equation Modelling (SEM) in emerging market supply chain research. Drawing on lessons from an empirical study of Nigeria's lubricant oil industry, we examined key methodological considerations, including sample size determination, construct operationalization, validity and reliability assessment, model fit evaluation, and handling poorly performing constructs.

The paper makes several contributions. First, we provide practical guidance on key methodological considerations for SEM in emerging markets, addressing challenges often underappreciated in literature. Second, we have identified the Institutional Context construct as a cautionary example of poor measurement (α =

0.033, CR = 0.004, AVE = 0.016), highlighting the importance of construct disaggregation, item purification, and careful operationalization in complex institutional environments. Third, we have offered recommendations for researchers applying SEM in developing economy contexts, including multi-source data triangulation, mixed-methods integration, and transparent reporting of limitations. Fourth, we contribute to the broader methodological literature by showing how SEM can be effectively applied in challenging research contexts.

6.2 Implications for Researchers

For researchers applying SEM in emerging market supply chain research, this paper suggests several implications. First, recognize that emerging markets present unique methodological challenges that require careful attention to construct operationalization, data quality, and validation procedures. Second, adopt a mixed-methods approach that combines quantitative SEM with qualitative research to enhance validity and provide contextual interpretation. Third, be prepared to handle poorly performing constructs through disaggregation, item purification, or alternative operationalization. Fourth, acknowledge limitations and discuss implications for findings and interpretation to enhance the credibility and trustworthiness of the research.

6.3 Future Research Directions

This paper suggests several directions for future research. First, methodological research should examine the effectiveness of different strategies for handling poorly performing constructs in emerging markets, including disaggregation, item purification, and alternative operationalization. Second, comparative studies should examine how methodological approaches and findings vary across different emerging market contexts, identifying context-specific challenges and best practices. Third, research should explore the application of emerging analytical techniques, including machine learning, artificial intelligence, and Bayesian SEM, in emerging market supply chain research. Fourth, studies should examine the role of digital technologies in enhancing data collection, construct measurement, and model validation in emerging markets.

6.4 Concluding Remarks

SEM is a powerful analytical technique that can significantly enhance understanding of supply chain dynamics in emerging markets. However, applying SEM in these contexts requires careful attention to methodological challenges and rigorous validation procedures. By following the best practices and recommendations outlined in this paper, researchers can enhance the rigour, validity, and credibility of their SEM studies, contributing to the advancement of

supply chain theory and practice in emerging economies. The case study from Nigeria's lubricant oil industry shows that, with careful planning, rigorous validation, and transparent reporting, SEM can be applied effectively to generate meaningful insights into complex supply chain relationships in challenging research contexts.

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THE MEDIATING EFFECT OF ORGANISATIONAL CLIMATE DIMENSIONS ON THE RELATIONSHIP BETWEEN TRANSFORMATIONAL LEADERSHIP AND INNOVATIVE WORK BEHAVIOR IN A STATE-OWNED ENTERPRISE

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Abstract

Organisational climate is known to mediate the relationship between transformational leadership and innovative work behavior, but organisational climate is itself multidimensional, and it is unclear which of its dimensions

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carry the greatest share of this effect. Using survey data from 323 employees of a South African state-owned enterprise, this paper disaggregates organisational climate's mediating effect into its five constituent dimensions, vision and values, leadership, communication, accountability, and teamwork using bootstrap mediation analysis with 700 resamples and bias-corrected confidence intervals. All five dimensions independently and significantly mediated the transformational leadership-innovative work behavior relationship, with teamwork (69 percent), accountability (58 percent), and leadership climate (57 percent) accounting for the largest shares of the total effect, followed by communication (38 percent) and vision and values (35 and 24 percent). The social and structural dimensions of climate are the strongest transmission pathways for transformational leadership's innovation effects. For state-owned enterprises leaders and human resource practitioners, these findings imply that leadership development investments will yield the greatest innovation returns when accompanied by parallel investment in cross-functional teamwork structures and in reforming accountability practices to distinguish between negligence and well-intentioned innovation risk.

Keywords: *transformational leadership, organisational climate dimensions, innovative work behavior, state-owned enterprises, South Africa.*

JEL Classification: L2; L3; M12; O31

Introduction

The dynamic and evolving nature of modern organizations has led to fundamental changes in their core characteristics, prompting alterations in leadership practices, organisational climate, and innovation capabilities. Employee creativity has emerged as a crucial factor in determining an organisation's competitiveness and long-term sustainability (Shin et al., 2017). Previous research confirms that a positive correlation exists between transformational leadership and innovative work behavior of employees (Afsar & Umrani, 2019; Hughes et al., 2018). Furthermore, organisational climate, as an overall construct, partially mediates the relationship between transformational leadership and innovative work behavior (Zuraik & Kelly, 2019). However, organisational climate is not a unitary construct but is instead constituted by distinct, separately manageable dimensions, including amongst others vision and values, leadership, communication, accountability, and teamwork (Banwo et al., 2022; Stebbings et al., 2012) The question remains: "which of these dimensions carry the greatest share of transformational leadership's indirect effect on innovative work behavior?"

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Identifying which dimensions of organisational climate carry the greatest share of transformational leadership's indirect effect on innovative work behavior would allow leaders and policymakers to target complementary interventions with greater precision, rather than treating climate as an undifferentiated construct. This paper examined the mediating effect of the dimensions of organisational climate on the relationship between transformational leadership and innovative work behavior within a selected South African state-owned enterprise. The pervasive corruption, mismanagement, and absence of transparency in South African state-owned enterprises have compromised the productivity and efficacy of these organizations whilst simultaneously eroding public confidence and trust in governmental institutions (Dlamini et al., 2020; Mahlangu, 2021). Moreover, the presence of financial instability and operational inefficiencies within state-owned enterprises directly impacts the overall organisational climate in detrimental ways (Mafini & Dlodlo, 2020). Insufficient resources and financial limitations can lead to an unfavorable atmosphere, marked by ambiguity, job instability, and a dearth of motivation amongst employees (Janiukstis et al., 2024).

Few studies have empirically decomposed the mediating role of organisational climate into its constituent dimensions within South African state-owned enterprises specifically, a context distinguished by governance and accountability challenges not typically present in the private sector or in state-owned enterprise contexts elsewhere (Badarai et al., 2023). This paper addresses that gap, guided by one overarching objective: to examine the mediating effect of organisational climate's five constituent dimensions on the relationship between transformational leadership and innovative work behavior. Correspondingly, five dimension-specific mediation hypotheses (H1-H15) are tested. The literature review section develops these hypotheses. The theoretical background section sets out the theoretical framework. The paper then describes the data and methods in full, reports the dimension-specific mediation results, discusses the findings, and concludes with dimension-specific practical recommendations.

Literature Review

Literature review shows that the dimensions of organisational climate may have effect on the relationship between transformational leadership and innovative work behavior as presented in the subsequent sections.

Vision and Values

Amabile and Pratt's (2016) framing of vision and values as components of organisational encouragement suggests that a clearly articulated, values-aligned

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vision provides the normative infrastructure within which employees interpret whether innovative effort will be recognized and supported. Wang et al. (2025) found that transformational leaders' articulated vision was transmitted to innovative behavior through followers' identification with that vision, evidencing a vision-based mediating pathway.

Moise (2014, p. 17) provides a complementary motivational rationale: that "the substantiation of an efficient motivational strategy can be based on the link between beliefs, attitudes and values of the employees and their motivation development process." Chirimbu (2014, p. 45) further argues that "employees should participate in the analysis and redesign of the organization's values". These conceptual arguments support examining whether employees experience organisational vision and values as meaningful guides to their work, while the proposed mediation of innovative behavior remains an empirical question. Furthermore, Chang et al. (2022) studied 304 employees across 40 project teams in Chinese organisations and found that inclusive leadership exerted a significant positive effect on proactive behaviour ($\beta = 0.34$, $p < 0.001$), with this relationship being partially mediated by employee trust ($\beta = 0.17$, $p < 0.01$) and when trust was included; indirect effect was 95% CI [0.07, 0.23]). According to Osman et al. (2024), employee trust is based on aligned organizational vision and values with those of employees. Therefore, the following hypothesis was formulated:

H1: Vision and values mediate the relationship between transformational leadership and innovative work behavior.

Leadership Climate

Bass's (1985) cascading leadership concept implies that the innovation-enhancing effects of transformational senior leadership are contingent on their reinforcement by intermediate managers and supervisors. Chirimbu (2014, p. 43) identifies the "development and promotion of other leaders" as a concern of modern leadership. Similarly, Jokić et al. (2019, p. 97) state that "the leader is also committed to ensuring employee development and the concept of continuous learning." These observations complement the cascading-leadership argument by emphasizing the development of leadership capacity through which organisational expectations can be reinforced in everyday supervisory relationships.

Badarai et al. (2023) confirmed that in South African state-owned enterprises, leader-follower relationship quality significantly shaped the translation of transformational leadership into organisational outcomes, consistent with a leadership-climate mediating pathway. Gwamanda and Mahembe (2023), studying

304 employees across Zimbabwean private security organisation, similarly found that a leadership-shaped climate (in their case, ethical climate) carried a substantial share of leadership's effect on downstream employee outcomes, with the leadership-to-climate path emerging as one of the strongest in their structural model, reinforcing the plausibility of a similarly strong leadership-climate pathway in the present, state-owned enterprise based sample. Hence, the proposed hypothesis:

H2: Leadership climate mediates the relationship between transformational leadership and innovative work behavior.

Communication Climate

Open, multidirectional communication sustains the flow of ideas and feedback necessary for innovation to progress from insight to implementation (Amabile & Pratt, 2016). In their discussion of managerial communication, Iacob Mihaila and Gurgu (2022, p. 184) describe communication practices intended to "ensure a working climate and a relaxed atmosphere so that subordinates feel good at work". Their account provides supporting context for the relationship between communication and employees' experience of the workplace, rather than a direct test of communication climate as a mediator of innovative work behavior.

Jin and Peng (2024) studied 580 employees across Chinese high-technology enterprises and found that communication behavior significantly mediated the relationship between team psychological safety and employee innovative performance, while Akter et al. (2024) similarly found that transformational leaders' emphasis on open communication significantly shaped downstream climate perceptions. Furthermore, Stacho et al. (2019) found that 61.2% of organisations fully supported open bottom-up communication, whilst a further 29.9% provided partial support. These findings illuminate how transformational leaders who invest in communication development create climates characterised by openness and bidirectional information flow, which in turn enable employees to contribute meaningfully to innovation processes. In light of this, the hypothesis below was tested.

H3: Communication climate mediates the relationship between transformational leadership and innovative work behavior.

Accountability Climate

Research on psychological safety suggests that a balanced accountability climate, high standards combined with psychological safety around well-

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intentioned but unsuccessful innovation attempts can convert a sense of institutional responsibility into a driver rather than an inhibitor of innovative engagement (Elsayed et al., 2023; Li and Tang, 2022). This pathway carries particular significance in South African state-owned enterprises, given the historically punitive associations of accountability discourse in this context (Masianoga & Govender, 2023). The compatibility of delegation and accountability is also evident in Chirimbu's (2014, p. 44) affirmation that "the organization becomes more accountable at all levels of decision and action" through decentralization. This perspective supports treating accountability as responsibility accompanying delegated initiative.

Chang et al. (2022) studied 304 employees across 40 project teams in Chinese organizations and offer a directly relevant mechanism through which procedural justice climate, a construct closely related to accountability climate in that both concern the perceived fairness and consistency of how responsibility and reward are administered, significantly strengthened the translation of inclusive leadership into employee trust and proactive behavior, with the leadership-outcome relationship substantially weaker under low procedural justice climate. This is consistent with accountability climate functioning as a conditional, rather than automatic, transmission pathway. Therefore, it was hypothesized that:

H4: Accountability climate mediates the relationship between transformational leadership and innovative work behavior.

Teamwork Climate

Because innovative work behavior is fundamentally a social and collaborative process, individual ideas typically require the critical engagement and collaborative refinement of colleagues to progress from initial insight to implemented innovation (Jin & Peng, 2024). Discussing joint leadership, Jokić et al. (2019, p. 96) explain that employees are encouraged to assume leadership roles and that "they are invited to take initiative in interactions". Similarly, Chirimbu (2014, p. 42) describes "co-development (interactive generation of new knowledge)". These accounts provide conceptual support for examining teamwork as a setting in which employees contribute, refine and develop ideas together.

Xu and Suntrayuth (2022) found that organisational innovation climate, operationalized partly through collaborative and knowledge-sharing conditions, was significantly associated with innovative work behavior among Research and Development employees, with the relationship partially transmitted through psychological safety and knowledge-sharing processes. Widmann et al. (2016)

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conducted a three-wave longitudinal study of 275 team members across 66 interdisciplinary work teams in German vocational education, demonstrating that team learning behaviours, which constitute critical dimensions of teamwork climate, predicted innovative work behaviour over time. Thus, team-level climate mechanisms may have effect on transformational leadership-innovation relationship, resulting in the proposed hypothesis:

H5: Teamwork climate mediates the relationship between transformational leadership and innovative work behavior.

Theoretical Background

This paper draws on three theoretical strands to explain why organisational climate's mediating effect should differ across its constituent dimensions. First, Bass's (1985) concept of cascading leadership suggests that the leadership dimension of climate, employees' perceptions of the quality and transformational orientation of their immediate supervisors, may be a particularly powerful transmission pathway, since the innovation impact of senior leaders' vision depends on the fidelity with which it is reinforced by intermediate management (Bass & Riggio, 2006).

Second, Amabile and Pratt's (2016) dynamic componential model implicates communication and vision and values as components of organisational encouragement that sustain the intrinsic motivation underlying innovative effort, suggesting these dimensions should function as meaningful, if comparatively modest, mediating pathways relative to more socially proximate dimensions.

Third, psychological safety theory holds that a climate combining high standards with freedom from interpersonal risk converts institutional responsibility into a driver, rather than an inhibitor, of innovative engagement (Elsayed et al., 2023; Li & Tang, 2022). Relatedly, because innovative work behavior is fundamentally a social and collaborative process rather than a solitary act, theories of team-based social interdependence suggest that teamwork climate may constitute an especially strong transmission pathway, given that individual ideas typically require the critical engagement and collaborative refinement of colleagues to progress from initial insight to implemented innovation (Jin & Peng, 2024; Xu & Suntrayuth, 2022; Van der Voet, 2014). Together, these three theoretical strands predict that the socially and structurally proximate dimensions of climate, leadership, accountability, and teamwork should mediate transformational leadership's effect on innovative work behavior more strongly than the more distal, cultural dimensions of vision and communication.

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Research Methodology

The study adopted a quantitative, cross-sectional, explanatory research design situated within the positivist paradigm (Creswell & Creswell, 2023). The study population comprised employees of a South African state-owned entity operating across four organisational divisions. A stratified random sampling procedure was used, with each division constituting a stratum, to ensure proportional representation across the organisation's occupational hierarchy. A total of 323 usable responses were obtained, representing a response rate of approximately 90 percent relative to the eligible population, which is acceptable (Etikan & Bala, 2017). The demographic profile of the sample is as follows: 58 respondents (18 percent) were aged 20-30, 97 (30 percent) were 31-40, 90 (28 percent) were 41-50, and 78 (24 percent) were 51 or older; 178 respondents (55 percent) were male and 145 (45 percent) were female; tenure ranged from less than five years (71 respondents, 22 percent) to more than 20 years (65 respondents, 20 percent); and 81 respondents (25 percent) held junior or entry-level positions, 145 (45 percent) held middle-management positions, and 97 (30 percent) held senior-management positions.

Participation was voluntary and anonymous, and ethical clearance was obtained prior to data collection. Data were collected using a structured, self-administered online questionnaire, containing well established scales. Transformational leadership was measured using a 23-item scale developed by Podsakoff et al. (1990), rated on a five-point Likert scale ($\alpha = 0.99$). Innovative work behavior was measured using Kleysen and Street's (2001) 14-item Innovative Work Behaviors Questionnaire ($\alpha = 0.74$). Organisational climate was measured across its five constituent dimensions rather than as a single overall score, using a 25-item instrument of the High-Performance Climate Questionnaire (HPCQ), developed by Stebbings et al. (2012), with five items per dimension. Dimension-level reliability was strong throughout: vision and values ($\alpha = 0.91$), leadership ($\alpha = 0.86$), communication ($\alpha = 0.86$), accountability ($\alpha = 0.93$), and teamwork ($\alpha = 0.90$). Confirmatory factor analysis supported the three-factor measurement structure underlying transformational leadership, innovative work behavior, and organisational climate (standardized loadings 0.68-0.86, all $p < 0.001$; CFI = 0.965; TLI = 0.962; RMSEA = 0.037; SRMR = 0.051), with average variance extracted exceeding 0.50 for all constructs and the Fornell-Larcker criterion satisfied for discriminant validity (Fornell & Larcker, 1981; Hu & Bentler, 1999; Hair *et al.*, 2019).

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Data were analyzed using IBM SPSS version 30. The mediating role of each climate dimension (H1-H5) was tested using bootstrap mediation analysis with 700 resamples and bias-corrected and accelerated 95 percent confidence intervals, consistent with Hayes's (2017) approach to conditional process modelling, with the alpha level for statistical significance set at 0.05.

Results

This section presents dimension-specific mediation analyses (H1-H5). Table 1 summarizes the results of the bootstrap mediation analyses conducted for each of the five organisational climate dimensions. All five dimensions were confirmed as significant partial mediators of the transformation leadership-innovative work behavior relationship.

Table 1. Summary of Dimension-Specific Mediation Results

Hypothesis	Dimension	Indirect effect (β)	Direct effect (with mediator)	% of total effect mediated
H1a	Vision	0.35	0.20 (combined with values)	35%
H1b	Values	0.24	0.20 (combined with vision)	24%
H2	Leadership	0.35 [0.20, 0.50]	0.20	57%
H3	Communication	— (0.52 → 0.32)	0.32	38%
H4	Accountability	0.32 [0.19, 0.46]	0.23	58%
H5	Teamwork	0.38 [0.23, 0.54]	0.17	69%

Source: Authors' own compilation, based on survey data collected for this study.

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For vision and values (H1), transformational leadership demonstrated a strong positive effect on both vision, which were in turn significantly associated with innovative work behavior. The indirect effects of transformational leadership on innovative work behavior through vision (β = 0.35) and values (β = 0.24) were both statistically significant, and the direct effect of transformational leadership was reduced to β = 0.20 when both were included as mediators, confirming partial mediation.

For leadership climate (H2), bootstrap mediation analysis based on 700 resamples confirmed a significant indirect effect (β = 0.35, SE = 0.08, 95 percent CI [0.20, 0.50]), with the direct effect reduced to β = 0.20 and 57 percent of the total effect transmitted through this pathway, the second strongest of the five confirmed mediators.

For communication climate (H3), the direct effect of transformational leadership on innovative work behavior was reduced from β = 0.52 to β = 0.32 (p = 0.002) when communication was included as a mediator, indicating that approximately 38 percent of transformational leadership's total effect operates through the communication climate it creates.

For accountability (H4), bootstrap mediation analysis confirmed a significant indirect effect (β = 0.32, SE = 0.07, 95 percent CI [0.19, 0.46]), with the direct effect reduced to β = 0.23 and approximately 58 percent of the total effect mediated through this pathway.

For teamwork climate (H5), the strongest individual mediator identified in the study, bootstrap mediation analysis confirmed a significant indirect effect (β = 0.38, SE = 0.08, 95 percent CI [0.23, 0.54]), with the direct effect reduced to β = 0.17 and approximately 69 percent of the total effect transmitted through this pathway. Figure 1 presents the relative magnitude of the proportion of the transformation leadership-innovative work behavior effect mediated through each of the five climate dimensions.

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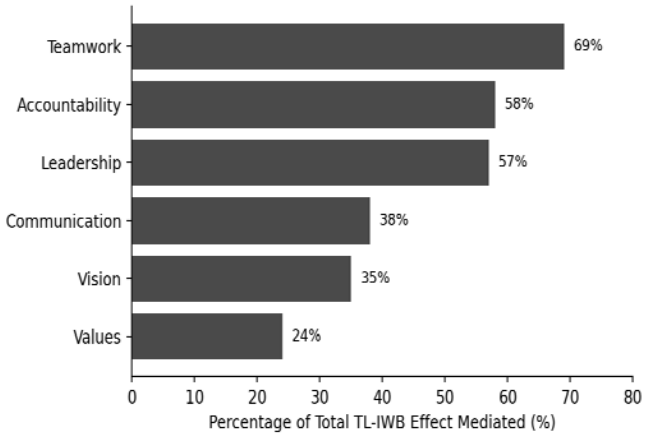


Figure 1. Proportion of the Transformation Leadership-Innovative Work Behavior Effect Mediated Through Each Organisational Climate Dimension

Source: Authors' own compilation, based on survey data collected for this study.

Discussion

This paper set out to examine through which specific dimensions of organisational climate mediates the relationship between transformational leadership and innovative work behavior within a South African state-owned entity. All five dimension-specific hypotheses were supported: vision and values, leadership, communication, accountability, and teamwork each independently and significantly mediated the transformation leadership-innovative work behavior relationship (H1-H5).

The confirmation of teamwork as the single strongest mediating pathway (69 percent of the total effect) is consistent with the fundamentally social and collaborative nature of innovative work behavior (Jin & Peng, 2024). Innovative ideas rarely progress from initial insight to implemented solution without the critical engagement, refinement, and support of colleagues (Xu & Suntrayuth 2022), transformational leaders who foster cohesive, high-quality teamwork therefore appear to create the primary social mechanism through which their leadership influence is converted into organisational innovation. Van der Voet's (2014) analysis of bureaucratic public organizations similarly highlights the centrality of collaborative structures in determining whether leadership-driven

change and innovation initiatives are successfully realized, a pattern with particular relevance for state-owned enterprises, where cross-functional collaboration is frequently constrained by siloed departmental structures.

A related finding at the inter-organisational level is reported by Weerasinghe et al. (2021, p. 30) that "inter-organization networks positively moderate the effect of both inside-out open innovation and outside-in open innovation on innovation performance". Their evidence from listed firms in Sri Lanka supports the broader relevance of collaborative relationships to innovation. However, networks between firms and firm-level innovation performance differ from the within-organisation teamwork climate and individual innovative work behavior examined in the present study.

Accountability's emergence as the second-strongest mediator (58 percent) is theoretically significant given the historically punitive and impunity-laden associations of accountability discourse within South African state-owned enterprises (Masianoga & Govender, 2023). Furthermore, the findings of Chang et al. (2022) that procedural justice climate conditions strongly influence inclusive leadership, which translates into trust and proactive behavior reinforces the interpretation offered here. Thus, accountability functions as an enabler of creative risk-taking only when it is perceived as fair and psychologically safe, rather than punitive. This is also consistent with the idealized-influence dimension of transformational leadership theory, wherein leaders who visibly model personal accountability provide followers with a behavioral template for taking ownership of their own innovative contributions (Bass & Riggio, 2006; Elsayed et al., 2023).

The leadership climate dimension's strong mediating role (57 percent) is well explained by Bass's (1985) concept of cascading leadership: the vision and standards of senior transformational leaders must be reinforced by intermediate managers and supervisors if they are to reach and influence frontline employees' innovative behavior. Gwamanda and Mahembe's (2023) finding that a leadership-shaped climate carried a substantial share of leadership's downstream effect, in an unrelated Zimbabwean security-sector sample, suggests this cascading logic is not specific to state-owned enterprises or to transformational leadership narrowly defined, but reflects a more general property of leadership-climate-outcome pathways.

The comparatively smaller, though still significant, mediating roles of communication (38 percent) and vision and values (35 and 24 percent respectively) are consistent with Amabile and Pratt's (2016) framing of these dimensions as components of organisational encouragement that sustain intrinsic creative

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motivation. Open, multidirectional communication and a clearly articulated, values-aligned vision appear to matter for innovation, but function as necessary rather than sufficient conditions, providing the normative and informational infrastructure within which the more socially and structurally proximate mechanisms of teamwork and accountability ultimately determine whether innovative intentions are converted into implemented innovations. Moise's description of transformational leaders emphasizes that "they inspire people with a shared vision of the future" (2014, p. 26). This is consistent with retaining vision as a meaningful dimension of the work environment, even where other dimensions exhibit larger indirect effects in the present sample. The conceptual account does not determine the relative magnitude of those effects.

Collectively, these findings suggest that in the bureaucratic state-owned enterprise context studied, the social and structural dimensions of organisational climate, how employees work together and how they are held responsible for their work are more powerful transmission pathways for transformational leadership's innovation effects than the more cultural or communicative dimensions of climate. For state-owned enterprise leaders and human resource practitioners, this implies that leadership development investments will yield the greatest innovation returns when accompanied by deliberate, parallel investment in cross-functional teamwork structures and in reforming accountability practices to distinguish between negligence and well-intentioned innovation risk. Communication infrastructure and vision articulation remain valuable complementary investments but should not be treated as substitutes for the more powerful teamwork and accountability pathways identified in this study. For supervisory practice, Iacob Mihaila and Gurgu (2022, p. 188) observe that "regular feedback from superiors is a strong motivating factor for a representative number of employees". This support includes regular feedback in the communication practices accompanying leadership development and teamwork initiatives, while the specific innovation benefits of such interventions require further evaluation

Several limitations should be considered when interpreting these findings. The cross-sectional design precludes definitive causal inference regarding the temporal ordering of the observed relationships, notwithstanding the strong theoretical rationale for the hypothesized causal ordering. Reliance on self-reported measures for all three constructs introduces the possibility of common method variance as well as possible social desirability bias. Finally, the focus on a single state-owned enterprise, whilst enhancing contextual specificity, limits the generalizability of the findings to other South African state-owned enterprises operating in different

sectors or governance environments. Future research should examine these dimension-specific mediating pathways longitudinally and across multiple state-owned enterprises to establish the boundary conditions of the reported findings. Furthermore, the use of multiple data collection instruments should be considered to gain deeper insights and enhance validity.

Conclusions

This paper examined the mediating role of organisational climate's five constituent dimensions in the relationship between transformational leadership and innovative work behavior within a South African state-owned entity. All five dimensions, vision and values, leadership, communication, accountability, and teamwork independently and significantly mediated this relationship, with teamwork, accountability, and leadership climate emerging as the most powerful transmission pathways. Theoretically, this paper extends Bass's cascading leadership concept and Amabile and Pratt's componential model of creativity to the empirical context of a South African state-owned enterprise, providing dimension-specific evidence of how transformational leadership's innovation effects are transmitted through the organisational climate it creates. Practically, the findings imply that state-owned enterprise leaders and human resource practitioners should priorities investment in cross-functional teamwork structures and balanced, psychologically safe accountability practices as the most strategically valuable complements to transformational leadership development, whilst extending leadership development to middle management and supervisory levels to preserve the fidelity of cascading leadership signals. Communication infrastructure and vision articulation remain worthwhile, comparatively secondary investments.

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BENEFITS OF EFFECTIVE LABOUR DISPUTE RESOLUTION SYSTEMS: A CRITICAL ASSESSMENT OF THEIR CONTRIBUTION TO WORKPLACE JUSTICE AND INDUSTRIAL HARMONY

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Abstract

The study sought to critically evaluate the role of labour dispute resolution systems in promoting workplace justice, industrial harmony, access to justice, and organisational effectiveness. It began by exploring the relationship between labour disputes, dispute resolution, and the concept of effective labour dispute resolution. To provide a strong theoretical foundation, an extensive review of the literature was conducted, focusing on key concepts such as workplace justice, industrial harmony, and access to justice. Adopting a qualitative exploratory design within an interpretivist phenomenological framework, the study gathered data through virtual semi-structured interviews with purposively selected participants from Botswana and other countries within the SADC region. The findings reveal that labour dispute resolution systems play a crucial role in advancing workplace justice, fostering trust in labour institutions, sustaining industrial harmony, and enhancing overall organisational performance.

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Keywords: *effective labour dispute resolution system, industrial harmony, workplace justice.*

JEL Classification: J52; J520

1. Introduction

Labour disputes refer to conflicts or disagreements that arise between employers and employees, or their respective representatives, concerning issues related to the employment relationship (Uzougbo et al., 2023). These disputes may involve matters such as remuneration, working conditions, employee benefits, disciplinary action, termination of employment, or the interpretation and application of employment contracts, collective agreements, and labour legislation (Bendix, 2022). According to the International Labour Organisation (2023), labour disputes are generally classified as either disputes of right, which arise from the alleged violation of an existing legal or contractual right, or disputes of interest, which occur when parties seek to establish or negotiate new terms and conditions of employment.

Labour dispute resolution encompasses the legal frameworks, institutional structures, and procedural processes designed to prevent, address, and settle workplace conflicts in a fair, timely, and effective manner. These mechanisms aim to facilitate the resolution of employment-related disputes, preserve working relationships, foster industrial peace, and provide both employers and employees with access to justice (Internation Labour Organization,2023). A labour dispute resolution system on the other hand is the wider institutional structure designed to handle and settle labour-related conflicts, while ADR refers to the specific methods used within that structure to help parties reach a settlement (Davis 2002).

Effective dispute resolution systems encompass a range of processes, including negotiation, conciliation, mediation, arbitration, and adjudication, which seek to resolve disputes in a timely, cost-effective, and equitable manner. Contemporary research suggests that well-functioning dispute resolution systems contribute significantly to workplace justice, industrial harmony, access to justice, and organisational effectiveness by reducing conflict escalation, fostering trust, and preserving employment relationships (Budd & Colvin, 2014; International Labour Organization, 2013).

The present study critically examines the extent to which effective labour dispute resolution systems contribute to workplace justice, industrial harmony, and organisational effectiveness.

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1.1 Problem Statement

Although labour dispute-resolution systems are intended to promote fairness, safeguard employment rights and foster harmonious workplace relations, their mere existence does not guarantee that disputes will be resolved fairly, efficiently or effectively. Employees may encounter barriers in accessing grievance mechanisms, obtaining relevant information, receiving impartial consideration and timely decisions, or ensuring that settlements and determinations are implemented. These difficulties may be further compounded by unequal power relations, limited awareness of available remedies, procedural delays and fears of retaliation (Bendersky, 2003). The study therefore addresses the limited understanding of whether, and under what conditions, labour dispute-resolution systems effectively promote workplace justice, industrial harmony, access to justice and organisational effectiveness. It critically examines these systems in terms of their design, implementation, accessibility, fairness, outcomes and inherent limitations.

1.1.1 Research Questions

- To what extent do effective labour dispute resolution systems contribute to workplace justice, industrial harmony, and organisational effectiveness?

1.1.2 Research Objectives

- To critically assess the contribution of labour dispute resolution systems to workplace justice, industrial harmony, access to justice, and organisational effectiveness.

2. Literature Review

Labour dispute-resolution systems are essential mechanisms for advancing workplace justice, as they enable employees to contest decisions, raise grievances and seek appropriate remedies. However, their effectiveness depends not merely on the existence of formal procedures, but also on their accessibility, impartiality, transparency and responsiveness (Bendersky, 2003). According to Van Gramberg & Teicher (2006) the effectiveness of a labour dispute-resolution system is closely associated with perceptions of workplace justice. Employees are more likely to regard a system as legitimate when they are given an opportunity to be heard, treated with dignity, provided with adequate information and assured that decisions are made by impartial and competent decision-makers. Workplace justice therefore involves the fairness of outcomes, the fairness of procedures and the quality of interpersonal treatment during the dispute-resolution process.

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Indeed, effective labour dispute resolution promotes industrial harmony and organisational performance by enabling disputes to be addressed early, thereby reducing absenteeism, turnover, workplace conflict and industrial action. Effective grievance management can also strengthen employee confidence, commitment and workplace relationships (Nyitse & Zamani,2024). However, the mere existence of a formal dispute-resolution procedure does not necessarily ensure effective outcomes. Such mechanisms may be inaccessible, excessively slow, poorly communicated, dominated by management, or incapable of providing meaningful and appropriate remedies.

Workplace justice is a fundamental criterion for evaluating the effectiveness of labour dispute-resolution systems, encompassing the fairness of outcomes, procedures, interpersonal treatment and communication. Nabatchi et al. (2007) proposed a six-factor model of organisational justice in workplace mediation, highlighting that perceptions of fairness extend beyond the outcome of a dispute. The model incorporates distributive, procedural, interpersonal, informational, systemic and restorative justice. This framework demonstrates that the successful settlement of a dispute does not necessarily mean that the parties perceive the process as fair.

Industrial harmony is a fundamental objective of an effective labour relations framework and is significantly supported by an effective labour dispute-resolution system. By providing mechanisms for the fair and timely management of workplace disputes, such systems help promote stable employment relations, reduce industrial conflict and create a conducive environment for economic stability and the attraction of foreign investment (Koorapetse, 2011). Effective labour dispute-resolution mechanisms contribute to industrial harmony by providing credible avenues for workers to raise and address concerns before they develop into broader collective disputes. The International Labour Organization (2023) underscores the importance of effective institutions and procedures for preventing and resolving labour disputes and ensuring meaningful access to labour justice.

Access to justice encompasses various mechanisms, including mediation, evaluation, arbitration and other appropriate processes, aimed at facilitating the timely resolution of disputes within the formal legal framework (Davis & Turku, 2011). It is a fundamental aspect of individuals' rights and is central to the effective functioning of the rule of law. Article 8 of the Universal Declaration of Human Rights recognises every person's right to an effective remedy through competent national tribunals where their fundamental rights have been violated

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(United Nations, 1948). Selim and Murithi (2011) further emphasise that access to justice is a critical component of an effective judicial system and the broader rule of law.

3. Reseach Methodology

This chapter describes the research methodology applied in the study. It explains the main methodological elements, including the research design, research philosophy, chosen research approach, overall research strategy, and the measures implemented to ensure the study's quality, validity, reliability, and ethical compliance.

This study adopted a qualitative research approach, guided by an exploratory research design and grounded in an interpretive phenomenological framework. The selection of a qualitative phenomenological approach was driven by the study's objective of eliciting rich, in-depth accounts of participants' lived experiences related to the phenomenon under investigation (Knight & Ukpere, 2026).

Purposive sampling was utilized to recruit participants possessing relevant expertise and firsthand experience in labour dispute resolution, thereby ensuring the collection of rich and meaningful data. The study comprised fifteen (15) participants drawn from Botswana and four Southern African Development Community (SADC) member states: Eswatini, Mauritius, South Africa, and Tanzania. Data were generated through semi-structured interviews, which provided a flexible yet systematic means of exploring participants' experiences and perceptions in depth. This interview approach is considered particularly appropriate for qualitative research because it provides sufficient structure to maintain alignment with the research objectives while allowing participants the flexibility to express their experiences, meanings and perspectives in their own words (Koorapetse & Ukpere, 2026).

Data was analysed using thematic analysis in accordance with the six-phase framework proposed by Braun and Clarke (2019) supported by ATLAS. which assisted with data organisation, coding, theme development, and pattern identification. Accoding to Mathebula (2026) this software also facilitates the maintenance of a transparent and auditable record of analytical decisions throughout the research process.

4. Research Findings and Discussion

The interview participants were asked about the benefits of an effective dispute resolution system, and their responses are presented below:

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Table 1: Responses to the question on what the benefits of an effective dispute resolution system are.

PARTICIPANT	RESPONSE
Kenneth B	Disputes are addressed quicker - as soon as they happen and without any cost. When conflicts/disputes are addressed quickly, they do not sour the work relations between an employee and employer.
Tumelo B	It is meant to stem the flow of litigation at the Industrial Court. A cheaper and faster process compared to the court route.
Steve B	ADR processes are important because they save time, and they are not costly.
Joseph S	The processes are cost effective, and the system is not bureaucratic.
Phenyo B	The social partners need to support the system. Currently, the employer body, Business Botswana, does not educate their members about the processes of the system. Workers are being educated about the system; that is why they are utilising it.
Ngaka B	Labour peace
Lucky B	Allows for participation of parties in an IR relationship to work out inherent workplace conflicts systematically.
Mochuchisi B	An effective dispute resolution system ensures public trust in the judiciary, deters unlawful behaviour and strengthens relations within labour, commercial and generally relations.

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Wethu S	The CCMA, as an example of an effective dispute resolution entity, does the following: • Conducts a `know your rights' programme to educate the community about labour rights. • Empowers members of the public on how to enforce existing labour rights. Fairness in the outcomes from the CCMA. • Information sharing. • Protect labour peace at workplaces (democratisation of the workplace, workplace forums). • Accredit bargaining councils to further enhance labour peace.

The information provided above by the participants presents effective dispute resolution as an important means of preventing workplace conflicts from intensifying and of maintaining positive employment relationships. Kenneth B noted that timely intervention helps to prevent disputes from damaging relationships between employers and employees, while Ngaka B identified industrial harmony as one of its key advantages. Similarly, Lucky B emphasised the value of enabling parties to engage actively in the industrial relations process and address workplace conflicts in a structured and constructive manner. These views are consistent with the International Labour Organization's perspective that dispute-resolution mechanisms play a vital role in fostering harmonious workplace relations and strengthening labour market governance. The ILO also highlights that effective dispute-settlement systems help keep workplace conflicts under control, thereby promoting industrial harmony, economic productivity, and social justice (Mihes et.al, 2023).

The emphasis on education and awareness is particularly important because even the most well-designed dispute resolution system may be ineffective if employees and employers do not understand their rights, responsibilities, or the remedies available to them. Consistent with the ILO's position that accessible grievance mechanisms are fundamental to effective labour justice, the observations of Wethu S regarding rights-awareness programmes and Phenyo B concerning inadequate employer education indicate that institutional effectiveness extends

beyond resolving disputes. It also encompasses the ability of institutions to inform, educate, and empower users to engage meaningfully with the labour justice system(International Labour Organisation, 2025).

The findings also suggest that participants viewed an effective labour dispute-resolution system positively because it enables the timely, cost-effective, and accessible resolution of workplace disputes. Kenneth B, Tumelo B, Steve B, and Joseph S highlighted its ability to resolve conflicts quickly, reduce costs, and avoid unnecessary bureaucracy. Participants also noted that early intervention helps preserve employment relationships and provides a practical alternative to costly and time-consuming litigation. These views align with the ILO's position that effective dispute-resolution systems should be speedy, fair, and affordable, ensuring that workers and employers can resolve disputes efficiently and with minimal expense (Shroff, 2023). The importance of relatively accessible and efficient mechanisms is particularly relevant in the context of Botswana, where Mogapaesi (2023) explains that mediation occupies an important position within the country's labour dispute-resolution framework, with mediators playing a significant role in facilitating the resolution of trade disputes.

5. Conclusion

This study found that labour dispute-resolution systems play an important role in promoting workplace justice, industrial harmony, access to justice, and organisational effectiveness. Participants viewed these mechanisms as valuable because they provide timely, affordable, and less adversarial ways of resolving workplace conflicts. Key benefits identified included early intervention, reduced costs, minimal bureaucracy, and the prevention of lengthy litigation. These systems offer practical avenues for addressing disputes before they escalate into more serious workplace conflicts. However, the study concludes that their effectiveness depends not merely on their existence but on their accessibility, fairness, affordability, timeliness, and ability to provide meaningful remedies. Effective dispute resolution also requires participatory processes that are trusted by users and capable of preserving employment relationships. Ultimately, effectiveness should be assessed not only by the number of disputes resolved but also by the quality, fairness, sustainability, and broader institutional impact of outcomes. Accordingly, labour dispute-resolution systems should be understood as vital mechanisms for advancing workplace justice, strengthening confidence in labour institutions, maintaining industrial harmony, and supporting organisational performance.

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INTELLECTUAL CAPITAL COMPETENCY AS A DRIVER OF SUSTAINABLE PERFORMANCE IN SMEs

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Abstract

Small and Medium-sized Enterprises (SMEs) play a crucial role in economic development, innovation, employment creation, and social welfare worldwide. However, the sustainability of SMEs remains a major concern due to increasing technological disruption, AI driven technology, market competition, environmental challenges, and economic uncertainty. Intellectual Capital has emerged as a critical strategic resource that enables SMEs to achieve sustainable growth and long-term competitiveness. Unlike tangible resources, Intellectual capital consist of intangible assets such as organisational processes, employee knowledge, innovation capability and stakeholder relationship. This paper examines the relationship between intellectual capital competency and SME sustainability through a review of secondary data from academic literature, organizational studies and industry reports. The study explores the three major components of intellectual capital which are human capital, structural capital, and relational capital and their contribution to sustainable SMEs performance. Intellectual Capital Competency (ICC) refers to an organisation`s ability to effectively acquire, develop, integrate and utilize these intangible resources to create value. The findings present practical recommendations for policymakers, researchers and business owners that effective management of intellectual capital are more adaptable, innovative, and resilient in dynamic business environments. The article concludes by highlighting the strategic importance and

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recommendations of intellectual capital competency in achieving social, economic, and environmental sustainability.

Keywords: *intellectual capital, human capital, structural capital, sustainability, innovation, SMES, competitive advantage*

JEL Classification: M11, M31

1. Introduction

Small and Medium-sized Enterprises (SMEs) constitute more than 90% of businesses globally and contribute significantly to employment generation and economic growth (OECD 2023). Despite their importance, many SMEs face challenges related to limited financial resources, weak knowledge sharing culture, low market access, weak collaboration with universities and research institutions, technological capability and inadequate employee training. These challenges often affect their ability to sustain operations and maximizing the value of their intellectual capital. These challenges require SMEs to leverage knowledge-based resources rather than relying solely on physical assets.

Small Medium-sized enterprises (SMEs) are essential to promote equitable organizational growth and the long-run sustainability of economies (Chinomona 2019). Intellectual capital (IC) is acknowledged as a significant contributor to value creation for the sustainability of SMEs, facilitating job creation and innovation (Bansal et al., 2023). Intellectual Capital Competency has emerged as a critical capability that enables Small Medium Enterprises to transform knowledge into improve organisational performance, innovation and achieve sustainable development. One challenge faced by SMEs is their inability to effectively integrate fresh intellectual capital (Bansal et al., 2023). The domain of intellectual capital is predominantly controlled by large enterprises, with minimal exploration conducted about intellectual capital in (SMEs).

Intellectual capital is defined as the difference between the market value and the book value, which represents the value of intangible assets (Prasasti et al., 2025). Alvino et al. (2021) indicated that intellectual capital is a term that remains relevant, dynamic, and adaptive, consistently generating increasing scholarly interest and renewal over time. It is reasonable to conclude that intellectual capital allows SMEs to combine the diverse knowledge, abilities, and experiences of their personnel to generate value and secure a competitiveness. It's about using what

people know to achieve business goals (Shahbaz & Malik, 2025). Intellectual capital competency pertains to leveraging the aggregate knowledge, abilities, and expertise of an organization's personnel to generate value, foster innovation, and secure a competitive advantage in the market, aligning with one of the aims of the South African economy.

In the contemporary knowledge-based economy, tangible resources alone are insufficient for long-term success (Stewart 1997). Organizations increasingly depend on intangible assets such as employee expertise, knowledge, innovation, organizational processes, and customer relationships (Bansal et al., 2023). Collectively, these assets form intellectual capital, which has become a key determinant of organizational sustainability and performance. For SMEs, intellectual capital competency can provide a sustainable pathway to productivity enhancement, innovation, and competitive differentiation.

In South Africa, SMEs constitute over 98 percent of enterprises, employ 50 to 60 percent of the workforce across public and private sectors, and generate a quarter of new jobs in the private sector (OECD, 2023). In the United States, 50 percent of SMEs fail within the first three years (OECD, 2023; Rizvi & Garg, 2022). (SMEs) in Malaysia account for 98.5% of all firms, generating approximately 40% of the country's GDP and the workforce particularly depends on SMEs for employment (OECD, 2023). SMEs are pivotal in the global economy, accounting for over 90% of businesses worldwide. Their collective impact on sustainability cannot be underestimate. Within this context, the purpose of this article is to contribute to the body of literature on intellectual capital competency in the SMEs context by investigating the different dynamics of intellectual capital competency and understanding its impact on their organisational performance and processes (Gintiny 2020; Amran et al., 2021; Hariyoro & Narsa 2024).

Based on the explanation and description provided above, this study aims to explain, analyse, and provide a more in-depth study of intellectual capital competency and its perceived value on SMEs. Consequently, this issue continues to be overlooked by SMEs, which do not afford it the urgent attention it necessitates. This research main goal is to investigate how intellectual capital competency can help South African SMEs gain enhance competitiveness, and sustain business growth. The study will focus on a secondary literature analysis by examining the adoption of intellectual capital competency as the key role for SMEs sustainability.

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The main objective of this research is to analyse the impact of SMEs' ability to leverage intellectual capital competency contributes to SME sustainability and identifies strategies that SMEs can adopt to strengthen their growth and long-term competitive advantage.

Purpose of the study

This paper intends to examine the impact of intellectual capital competency of SMEs, as well as their effects on long-term sustainability in South Africa, while addressing the following questions:

- What constitutes intellectual capital, and in what ways will it influence the capacity of SMEs to achieve success and development?
- What is the significance of intellectual capital for SMEs?
- What is the best recommendation on intellectual capital competency for SMEs operating in the South African economy?

2. Literature Review

2.1 Intellectual Capital

Intellectual capital is commonly categorized into three dimensions (1) **Human capital** consists of skills, employees' knowledge, digital competencies, experience, creativity, and problem-solving abilities. It represents the intellectual capabilities that employees bring to the business. Research indicates that skilled employees contribute significantly to operational efficiency, innovation, and strategic decision-making (Kumar et al., 2025). Continuous training and knowledge development enhance organizational performance and sustainability. **Structural Capital** refers to organizational systems, knowledge management systems, procedures, culture, databases, intellectual property, research and development processes and technological infrastructure that support business operations. Strong structural capital enables SMEs to retain organizational knowledge, facilitate innovation and improve operational efficiency. Effective knowledge management systems help organizations preserve expertise even when employees leave (Ahmad & Krishna 2026). **Relational Capital** encompasses relationships with suppliers, customers, business partners, brand reputation, stakeholders, government support and communities and university collaboration (Tu et al., 2025). Strong external relationships improve market reputation, customer loyalty, and access to business opportunities. Relational capital also enhances collaboration and trust, which are crucial for long-term sustainability.

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2.2 SME Sustainability

Sustainability refers to the ability of SMEs to grow, survive and remain competitive while balancing environmental, economic and social responsibilities. SME sustainability involves maintaining long-term business viability while balancing economic performance, environmental stewardship and social responsibility (Durrani et al. 2024). Sustainable SMEs demonstrate social responsibility toward communities and employees, financial profitability and stability, innovation and adaptability to changing market conditions, environmental consciousness and resource efficiency (Saha & Shrivastava 2026). The sustainability of SMEs in South Africa depends heavily on their ability to leverage intangible resources and knowledge-based assets.

2.3 Intellectual Capital and SME Sustainability

Human Capital and Sustainability

Human capital is often regarded as the most valuable component of intellectual capital. Employees drive innovation, organizational learning and productivity. Studies indicate that SMEs investing in employee development experience higher levels of organizational resilience and innovation (Zhang & Wang 2026). Skilled employees are better equipped to respond to technological advancements, market changes, and customer demands. Furthermore, employee engagement and knowledge sharing contribute to sustainable organizational growth by fostering innovation and continuous improvement.

Structural Capital Sustainability

Structural capital provides the organizational framework necessary to support sustainable operations. Efficient digital systems, business processes, and knowledge management practices enable SMEs to reduce operational costs and improve productivity (Akter et al., 2025). Digital transformation and technological integration further strengthen sustainability by enhancing operational efficiency and resource utilization. Strong structural capital also facilitates innovation and organizational learning, enabling SMEs to adapt quickly to environmental changes.

Relational Capital Sustainability

Relational capital strengthens business sustainability through stakeholder engagement and collaboration. Community relationship, customer loyalty and supplier partnerships create value that extends beyond immediate financial returns (Xi et al., 2025). Positive stakeholder relationships enhance business reputation and contribute to long-term market success. In addition, collaborative networks provide SMEs with access to information, resources, and opportunities that support sustainable growth.

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Intellectual Capital Competency as Driver of Sustainability

Strong intellectual capital competency **improves organisational learning** continuous learning strengthens employees` skills while improving organisational adaptability. Knowledge exchange and sharing enhances operational efficiency and reduces duplication of effort (Zhang & Wang 2026). It **enhancing innovation** SMEs with strong intellectual capital competency continuously generate creative ideas that eventually lead to new services, products and business models. Innovation enables adaptability to remain competitive and changing customer needs (Xi et al., 2025). Organisations that possess unique knowledge and strong stakeholder relationship develop **increased competitive advantage** that competitors find difficult to imitate.

Intellectual capital competency drivers **support in digital transformation**. Artificial intelligence, big data analytics, cloud computing and enterprise systems require competent human capital (Akter et al., 2025). Adoption of intellectual capital competency enables organisations to successfully implement digital transformation initiatives. **Strengthening business resilience** knowledge-rich SMEs respond more effectively to technological disruption, economic crises and market uncertainty through better organisational flexibility and decision-making.

3. Methodology

This study is grounded in a thorough review of the research literature pertaining to intellectual capital competency and its impact on the sustainability of SMEs. Multiple databases were selected to ensure comprehensive coverage. As such, this study will contextualize an integrative review of literature collected from North West University; Scopus, Google Scholar, Web of Science and EBSCOhost was selected as the databases in which the search for research literature would be carried out and further analysed integrating the bibliometric and manual review in a systematic approach which serve as the platforms for the search for relevant research literature.

A comprehensive search for relevant research papers on intellectual capital competency and SMEs sustainability was conducted across all specified databases, utilizing a defined set of keywords. This review aims to identify existing studies that have explored the impact of intellectual capital competency. Articles that do not pertain to business, management and accounting, computer science, decision science, or social science was excluded. This study presents the inclusion and exclusion criteria in Table 1. The inclusion and exclusion of studies ensure that the

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literature review concentrates on recent and methodologically rigorous research that specifically addresses the issues and challenges encountered by SMEs in South Africa.

Table 1: Review`s inclusion and exclusion criteria

Key concepts	Inclusion	Exclusion
Relevance to intellectual capital competency in South Africa	The sources to be included will focus specifically on intellectual capital competency on sustainability in South Africa.	Articles which do not specifically focus on intellectual capital competency on sustainability in South Africa will be excluded.
Peer-reviewed Journals	Only peer-reviewed academic sources will be included to ensure the reliability and scholarly rigor of the information.	To uphold the academic quality of the literature review, non-peer-reviewed sources, non-academic publications, and magazines will be excluded.
Publication Currency	Studies published in the last decade (2015-2025) will be included to incorporate recent research and contemporary insights.	Research conducted prior to 2015 will be removed to incorporate recent advancements in strategic leadership in South Africa.
Language	Only studies published in the English language will be included.	Studies not published in English will be excluded due to the language constraints of the research team.

4. Discussion

A thematic analysis was employed to examine the data, as it is a suitable method for understanding a range of experiences related to intellectual capital competency and its impact on the sustainability of SMEs in emerging markets, particularly within the South African economy. A deductive approach to theme identification was employed, utilizing pre-existing theories or researcher-driven frameworks to identify relevant themes (Xu & Zammit, 2020). The study proposes a better understanding of how intellectual capital competency impacts the sustainable development of SMEs and how it will aid the SMEs owners in South

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Africa. It will also help business owners to be alert of areas for operational improvement, ultimately promoting business growth. The researcher focuses on the key elements of each theme and the corresponding aspects of the dataset to construct a cohesive narrative (Kiger & Varpio, 2020). A list of codes was generated by analysing and clustering data into broader themes pertinent to this paper.

The analysis of secondary literature reveals a strong relationship between intellectual capital and SME sustainability. A strategic asset that supports competitiveness, innovation, and organisational resilience is intellectual capital competency (Stratone & Vatamanescu, 2026). Innovation and the generation of new knowledge are two ways that human capital contributes in an organisation (Capozza & Davella 2019). Effective operations and knowledge retention are supported by structural capital. Stakeholder trust and market access are improved in relational capital. These elements work together to produce a synergistic effect that helps organisations perform sustainably. SMEs that make investments in the creation of intellectual capital competency are better equipped to handle shifting consumer expectations, market unpredictability and technological upheaval (Sari & Ahmad 2025). The function of intellectual capital competency is further highlighted by the increasing significance of digital technology. To stay competitive in the knowledge economy, organisations must constantly improve personnel talents, form a business strategic alliance and fortify organisational structures.

The Resource-Based View (RBV) theory posits that organisations get sustainable competitiveness through resources that are uncommon, valued, inimitable, and non-substitutable (Barney, 1991). In SMEs, intellectual capital competency constitutes a paramount intangible resource due to its challenging replicability by competitors. In contrast to physical assets, intellectual capital competency expands through innovation, learning, and the cultivation of relationships, rendering it essential for sustainable organisational performance (Alvino et al., 2021). Human capital continues to be the most crucial aspect of intellectual capital. The expertise, innovation, and problem-solving abilities of employees empower businesses to innovate and adjust to changing market conditions. Wang et al., (2021) asserts that businesses possessing advanced human capital exhibit improved financial results and enhanced innovative performance. In organisations, where resources are frequently constrained, human capital emerges as a strategic advantage that mitigates financial limitations. Moreover, a study by

Osman (2026) revealed that human capital plays an essential role in enhancing SMEs innovation potential, which directly affects long-term sustainability.

However, human capital by itself cannot ensure a lasting competitiveness. Knowledge confined exclusively to employees might be forfeited when employees depart the organization. Consequently, structural capital is important for codifying, capturing, and institutionalising knowledge. Structural capital includes organisational processes, intellectual property, databases, information systems, and management protocols (Ahmad et al., 2026). Robust structural capital guarantees the retention of organisational knowledge notwithstanding the departure of individual employee. The growing utilisation of digital technology has amplified the significance of structural capital. Digital transformation projects empower organisations to fortify knowledge management systems, enhance operational efficiency and automate procedures. The OECD (2023) indicates that SMEs investing in digital technology infrastructure are more likely to attain sustainable business growth because of their enhanced ability to adapt to market uncertainty and environmental changes.

These findings underscore the connection between intellectual capital competency and technical innovation as important catalysts for SMEs sustainability. Relational capital is equally crucial for organisational sustainability. Supplier partnerships, customer relationships, stakeholder trust and strategic alliances provide value that transcends financial success (Mariam 2025). Strong relational networks provide organisational access to resources, information, and market possibilities that would otherwise be challenging to acquire. Tu et al. (2025) indicates that organisations with strong relational capital exhibit elevated collaboration and knowledge sharing, hence improving business resilience and innovative performance.

Furthermore, sustainability necessitates that organisations reconcile economic goals with environmental and social obligations. Intellectual capital competency facilitates this equilibrium by empowering organisations to cultivate sustainable business practices, engage stakeholders more proficiently and enhance resource efficiency (Shahbaz & Malik 2026). Ali and Kamran (2026) assert that intellectual capital competency enhances sustainable SMEs success by promoting flexibility, learning, and ongoing improvement. SMEs possessing strong intellectual capital competency are consequently more adept at addressing sustainability concerns, including regulatory demands, climate change, and evolving consumer expectations.

From a knowledge-centric viewpoint, intellectual capital competency also enhances organisational resilience (Gupta et al., 2026). Business resilience denotes the capacity of organisations to endure disruptions and recuperate from unfavourable incidents. The COVID-19 pandemic revealed that organisations with strong knowledge management capabilities, collaborative networks and digital proficiencies, were better equipped to react to swiftly evolving organisational environments (World Bank, 2024). This indicates that intellectual capital competency serves as both a source of competitiveness and a crucial factor for organisational growth in times of uncertainty. Despite its advantages, the management of intellectual capital competency poses numerous challenges for SMEs (Elshaer et al., 2025). Small enterprises lack structured methodology for assessing intellectual capital competency performance. In contrast to tangible assets, intellectual capital competency is challenging to report and quantify. Ijaz and Ishfaq (2026) contend that the lack of standardised frameworks for measuring intellectual capital competency frequently hinders effective strategic management. As a result, SMEs undervalue their intangible assets and neglect to include intellectual capital competency into their long-term strategic planning. Furthermore, financial constraints may hinder expenditures in employee training, knowledge management and technical infrastructure (Rashid et al., 2025). This difficulty is especially critical for organisations in underdeveloped countries where access to financial resources may be limited. However, data indicates that even minor expenditures in intellectual capital competency development can yield significant long-term advantages through productivity, improved creativity, and stakeholder relations (Stewart, 1997).

Overall, the review demonstrates that intellectual capital competency serves as a fundamental enabler of SME sustainability. Human capital enhances innovation, structural capital enhances operational efficiency and knowledge retention and relational capital bolsters market competitiveness and stakeholder engagement. The amalgamation of these three elements establishes a lasting competitive advantage that enhances enduring organisational success in progressively intricate commercial landscapes.

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5. Recommendations

To strengthen intellectual capital competency and promote SME sustainability, the following framework has been recommended:



1) AI-Assisted knowledge management systems SMEs should adopt artificial intelligence tools that capture organisational knowledge, facilitate knowledge sharing, automate documentation and support decision-making processes also supported by Khan and Khan (2025). 2) University industry collaboration SMEs must strengthen partnership with universities, innovation centres and research institutions which provide SMEs with access to research expertise, student internship, technological innovation and collaborative research projects. 3) SMEs should build intellectual capital resilience which should establish succession planning, digital documentation systems, knowledge retention strategies and leadership development programs to prevent knowledge loss during organisational change or employee turnover. 4) Adoption of data-driven decision-making SMEs should leverage the business intelligence and analytics to transform SMEs knowledge into evidence-based strategic decisions. 5) Promotion of knowledge sharing culture SMEs should encourage cross-functional collaborations through mentoring programs, communities of practice, internal workshops and digital collaboration platforms (Hussain 2025) 6) Integrate intellectual capital measurement into strategic planning should be developed through Key Performance Indicators (KPIs) for measuring the human capital competency, structural capital competency and relational capital competency for them to achieve SMEs sustainability (Dinu 2025). Monitoring intellectual capital performance enhances better strategic decision-making and resource allocation.

This above conceptual framework advances existing intellectual capital competency by translating recommendations into strategic capability development dimensions that are actionable for SMEs implementation. Innovation capability, digital transformation and organisational learning are mechanisms through which intellectual capital enhances sustainability and the integration of human capital competency, structural capital competency and relational capital competency are unified intellectual capital competency that enhances SMEs sustainability.

6. Conclusion

This study demonstrates that intellectual capital competency is not simply a supplementary business asset but a strategic catalyst for the sustainability of SMEs. The integration of human, structural, and relational capital establishes a foundation for flexibility, innovation, and sustained competitiveness. In the contemporary knowledge-based economy, SMEs that effectively cultivate and oversee intellectual capital competency are better equipped to overcome resource constraints, responding to environmental volatility, and attain sustainable growth. Moreover, intellectual capital competency should be regarded as a dynamic capability instead of a static resource. Sustainable SMEs consistently convert knowledge into value by adopting digital technology, promoting learning, and cultivating collaborative partnerships with universities. Therefore, intellectual capital competency constitutes a pivotal success factor for SMEs pursuing long-term economic, social, and environmental sustainability.

Ethical Consideration

The study adhered to the stipulations of the Protection of Personal Information Act (Act 4 of 2013) (POPIA), and non-identifiable responses would be securely maintained in a password-protected file on Google Drive. The study received ethical approval (NWU-00867-26-A4) from North-West University.

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RISK TAKING AND ENTREPRENEURIAL INTENTION: UNIVERSITIES STUDENTS' PERSPECTIVES

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Abstract

In order to address the long-term effects of the nation's out-of-school unemployment issues and encourage undergraduates to pursue entrepreneurship as a career after graduation, the National Universities Commission mandated that entrepreneurial education be provided in the form of skills acquisition and development programs in Nigerian Universities. However, there is little empirical evidence risk-taking propensities directly impact students' entrepreneurial intentions across socioeconomic contexts. As a result, the study focuses on determining the influence of risk-taking propensities on entrepreneurial intentions among undergraduates in Nigerian Universities. Final-year students of six selected Universities in Southwest Nigeria in the 2024/2025 academic session participated in the study. The study descriptive survey research design method using structured questionnaires.

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The target population was 14,359. Multistage sampling approach was used to draw 450 samples from final-year students. SPSS was used in analyzing data. The study found that students' risk taking ((R=0.479; p=0.000; R^2=0.230) significantly influence entrepreneurial intention of students. The study concludes that students' knowledge of risk-taking go beyond theories. It recommends that universities should reinforce entrepreneurial skills learning into their core curricula not as isolated modules but as integrated, interdisciplinary experiences that simulate real-life entrepreneurial environments where students acquire skills in soft and practical contexts.

Keywords: *entrepreneurial intention, risk - taking propensity, Nigerian Universities, youth unemployment*

JEL Classification: L26; I23; D81; J24.

Introduction

The economic and unemployment situations in Nigeria call for paradigm shift from the theoretical nature of our university learning curricula to a more robust, in-depth skills-based training development courses that can engender the production of entrepreneurial students that are capable of innovative capacities, self - sufficiency and employment generation. It is almost an illusion in the current situation in Nigeria for parents to have the notion that their children after graduating from the universities with good grades will automatically secure existing white-collar jobs with government or private organisations if they do not have any political connection. God-fatherism in securing jobs is gradually becoming a bane in Nigeria.

Exacerbating the issue is how jobs are disappearing and population of graduates increasing with few efforts to redeem the deepen crisis. It has been argued that the situation – youth unemployment is worsened due to the curricula that had in the past lay more emphasis on theoretical contents many of which neither address nor prepare graduates for future life challenges nor wealth creation (Udukeke, Eno, & Benjamin, 2022). This was affirmed by then Nigeria Universities Commission (NUC) Secretary, Okojie (2011) that Nigeria universities curricula are loaded with more of theoretical contents devoid of emphasis on skills acquisitions and development. Oyedele, Abdulraheem and Brimah (2018) also acknowledged that one of the main factors responsible for unemployment among the vibrant graduate youths in the country, is lack of relevant skills to engage current challenges in many diversified sectors of the economy.

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The International Labour Organisation (ILO) strategy puts the second quarter of 2023 unemployment at about 3.99 per cent while in Quarter two of 2023, the labour force population (LU2) had a combined rate of 15.5% for unemployment and time-related underemployment, with around 88% of workers employed in jobs connected to self-employment (National Bureau of Statistics, 2023). However, the National Bureau of Statistics (2021) reported that the statistics for unemployment as at the last quarter of 2021 was 33.3 percent while underemployment was above 22.7 percent, youth unemployment was about 42.4 percent with youth underemployment at about 20.9 percent while the estimated general unemployment rate for 2022 was 33 percent (National Bureau of Statistics, 2022). Virk et al. (2023) report that 35% of Nigerians aged 15 to 34 are unemployed, actively looking for employment, or working fewer than 20 hours per week, whereas 28% of young people in the workforce are officially classified as underemployed, working 20–39 hours per week. This is according to Federal Ministry of Youth Development (FMYSD), 2022). The National Bureau of Statistics, (NBS) (2024), reported youth unemployment rate of 5.3% for those aged 15-34 in 2024 and according to Egbo, (2025) the reality of underemployment and unemployment situations on ground is more precarious considering the persistence of gender and regional inequities in addition to the challenges such as cultural norms, restricted opportunities, security, job discrimination, rural areas factors and conflict-affected zones. Danlami et al. (2025) argued that when young people are unable to find satisfying employment, their potential for economic contribution is underutilized, which hinders the nation's overall progress. Therefore, it is imperative for the Country to critically address youth unemployment by focusing on reforming and improving the entrepreneurship aspect of the educational system through better funding, quality teaching and practical concentrations of students in skills acquisitions and development needed to thrive in a rapidly changing job market.

In the realisation of the contemporary economic and unemployment challenges and to reduce the future effect of the problems, the NUC in 2011 directed Nigerian Universities to as a matter of obligation establish entrepreneurship study centres in their universities and include entrepreneurship course in their curricula as a way of fostering development of sustainable entrepreneurship mindset amongst universities students (Okojie, 2011). This mandatory policy of entrepreneurial skills acquisition-based training programme for students in tertiary institutions as mandated by the NUC is aimed to be an intervention approach to inculcate entrepreneurial mindsets and development strategy in students for self-efficiency (Ubogu, 2023) and a way of offering sustainable remedy to the frustrating

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challenge of unemployment facing timid universities` graduates leading to mass relocation syndrome (Colman, Silva, Westermann & Dlamini, 2021).

Arising from the NUC directives, there is an increasing rate of supports from higher institutions at all levels for entrepreneurial programmes and courses that promote entrepreneurship growth (Salau, & Akanbi, 2021). Many universities now have departments of entrepreneurship studies and centres for entrepreneurship training/programmes with different nomenclatures according to their perceived goals and targets in the areas of skills and entrepreneurial innovations. For instance, at the University of Ibadan, it is called Centre for Entrepreneurship and Innovation Studies (Centre for Entrepreneurial Institutes, University of Ibadan [CEI], 2024) while at Obafemi Awolowo University it is called Institute for Entrepreneurship and Development Studies (IFEDS) (Institute for Entrepreneurship and Development Studies [IFEDS], 2023). At Osun State University, it is simply called Centre for Entrepreneurship Studies (Osun State University CISCO Network Academy, 2017) while Redeemer`s University tagged it as RUNCEDS - Redeemer's University Centre for Entrepreneurial Study (RUN, 2024). In Kwara State University, it is named the Centre for Entrepreneurship, KWASU (KWASU, 2024) while the National Open University of Nigeria (NOUN) calls it the Directorate for Entrepreneurship and General Studies (DE&GS) (National Open University of Nigeria, 2023). The Usmanu Danfodiyo University, Sokoto, calls it Centre for Entrepreneurship Development (CED) just like many others with their appellations. This shows that in the present-day exigency, the importance placed on entrepreneurship skills acquisition and development in providing solution to unemployment and youth restiveness cannot be over emphasized.

The entrepreneurship skill acquisition programme (SA) which include risk-taking popnsities is premised on impacting basic entrepreneurial skills and mindset in students for the purpose of modeling their attitudes and behaviours towards entrepreneurial self-intention (EI) in business and ventures. It may practically be impossible to be entrepreneurial inclined and successful without having the required entrepreneurial skills. Entrepreneurial skill is therefore a germane consideration towards effective stimulation of entrepreneurial intention.

As much as Nigerian Universities have adopted entrepreneurship courses and skills-based training programmes in their curricula since the mandatory policy of NUC on entrepreneurship education in 2011, the number and agitation for employment keeps increasing and little or no significant volume of young enterprises' businesses are noticeable compared with graduates being produced annually by universities. During entrepreneurial skills acquisition programmes,

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students were trained in rudiments of managerial skill, communication skill, vocational skill and risk-taking inclination that would expectedly spur their interests in becoming self-sufficient in entrepreneurial venture which is the target of the NUC entrepreneurial policy. The knowledge of these skills is expected to influence intentions of students in the area of professional attractions, subjective norms, attitudes towards behaviour and perceived behavioural control as stipulated by Ajzen theory of intention (1991), but what is visible is the increasing numbers of job applicants over the years. Many students after graduation still persist to search for white collar jobs or with the mentalities of jetting out of the Country ("Japa syndrome"). The question is that has the entrepreneurship training and skills acquisition programmes really affects the students' mindsets of becoming entrepreneurs before or after their studies in the Universities. Does it simply mean that these programmes do not have significant impact on the participants or our graduates prefer paid job rather than becoming entrepreneurs. The problem this study wants to address is whether or not the risk-taking propensities as embedded in the entrepreneurial skills acquisition programmes of universities have been able to influence entrepreneurial intention of undergraduate students.

Some studies have investigated the influence of entrepreneurial skills' acquisition (SA) programmes of Nigerian Universities on entrepreneurial intention (EI) of students in business ventures (Manishimwe & Ndifreke, 2021). It was noted that as much as there are researches in so many developed countries on entrepreneurial skills acquisitions and development, little researches abound in Nigeria that studied the construct of entrepreneurial skills acquisition – risk-taking propensities on students` entrepreneurial intention in South west Nigeria. It is therefore a concern to ascertain the significance of the programmes on the employment economy. It is of utmost importance to ascertain whether relationship exist between students that engaged in risk-taking propensity and their entrepreneurial intention before or after graduation. This study specifically examined the influence of risk-taking tendency in determining keen intentions of students in entrepreneurial undertakings in the future using the dependent proxy variables of subjective norms, perceived behavioural control, attitude towards behaviour which are the constructs of entrepreneurial intention, and professional attraction as the fourth variables. The study was hinged on Ajzen theory of entrepreneurial intention to address this question: What is the influence of students` knowledge of risk-taking on entrepreneurial intention?

Ho: Students` knowledge of risk-taking (RSK) does not have impact on entrepreneurial intention (EI).

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Literature Review

Risk taking and Entrepreneurial Intention

One important element of entrepreneurial skills dimension is the risk-taking ability. Most studies treated this variable along with innovativeness and proactiveness dimensions of studies. Abubakar and Yakubu (2019) assert that the performance of entrepreneurial enterprises is mostly determined by three elements: innovation, proactivity, and risk-taking. While very risk averse individuals are unlikely to be enduring entrepreneurs, most successful entrepreneurs take significant risks. Therefore, in most instances, risk taking always propels an individual to be innovative and proactive at the same time. Among other psychological characteristics like goal orientation, a strong drive for performance and internal locus of control. Risk-taking is also thought to be a driver of entrepreneurial intention (Abubakar & Yakubu, 2019).

Risk-taking may be context-specific in relationship with entrepreneurship which could be understood when organizational environment and its relationship to factors of ownership, governance, and management are put into consideration (Venzon 2023). It can be inferred that risk taking is the desire of individuals or organization to keenly pursue a recognized opportunity in an environment of uncertainty putting into consideration the associated risks involved and readiness to bear them. Risk-taking behaviour is very germane as an entrepreneur (Ilevbare, Ilevbare, Adelowo & Oshorenua, 2022). The capacity of individuals to take feasible decisions under the condition of uncertainties is an apparent essential element of entrepreneurship behaviour (Gubik, 2021). One of the psychological characteristics that affects an entrepreneurial mindset and subtly influences the desire to start new firms is the willingness to take risks (Fei &Liu, 2023). The model of structural entrepreneurial intention suggests that attitudes play a mediating role in the relationship between key personality traits and specific entrepreneurial activities, (Fei & Liu 2023). The model emphasizes the relationship between extrinsic background factors (perception of impairment and support), intrinsic personality factors (need for achievement, risk-taking propensity, and internal control), and background factors tagged as "supports and impairments" in relation to motivational factors that together determine entrepreneurial intentions.

Numerous research has investigated the extent to which risk-taking, as a component of entrepreneurial orientation, influences students' intentions to pursue entrepreneurship (AlMamary; Abdulrab; Alwaheeb, Alshammari, 2020; Chipeta & Surujlal, 2017). The results of a study by Ilevbare et al. (2022) on social support

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and risk-taking propensity as predictors of entrepreneurial intention among Nigerian undergraduate students revealed that risk-taking propensity, along with other push factors like perceived family social support, prior business experience, age, and father's occupation, are important determinants of the students' intention to pursue entrepreneurship. The entrepreneurial intention of 318 female undergraduate students from Malaysia who were sampled for the study by Ahmed, Pahi, and Umrani (2018) using structural equation modelling revealed a significant positive correlation between risk-taking and entrepreneur intention. The study by Ameh, Abu, Amodu, and Udu (2016) on the association between the size of social networks and the risk tolerance of student entrepreneurs also revealed a strong positive correlation between the risk factor and the students' intention to start their own business. Tekin and Asar, (2021), argues that having the right skills is crucial for entrepreneurs who want to start their own business in order to make the most use of their finances and take on the risk of investing. They looked at how risk-taking inclination and self-efficacy of entrepreneurs mediated the relationship between financial knowledge and entrepreneurial ambition. Using simple linear regression to investigate the mediating effects, the study examined the association between risk-taking inclination, entrepreneurial intention, entrepreneurial self-efficacy, and financial literacy, the study found a strong positive correlation between risk-taking propensity, financial literacy, and entrepreneurial self-efficacy.

Entrepreneurial Intention

According to Upandhaya and Chadha (2019), the first basic step to ascertain the perspective behaviour of an individual is intention. The term entrepreneurial intention had been used interchangeably by researchers “with other words like entrepreneurial interest, entrepreneurial self-reliance, entrepreneurial inclination, entrepreneurial propensity, entrepreneurial desire, entrepreneurial disposition, entrepreneurial self - reliance intention and entrepreneurial self-reliance initiatives (Ayedun, & Ajayi, 2018; Mustapha, Brimah, Adebayo & Ajibola, 2025, p.124; Ayegba & Omale, 2016; Ukah, & Atah, 2021; Wu, Jiang, Wang, Yu, Wang, and Pan 2022). Munir, Jianfeng and Ramzan (2019) defined entrepreneurial intention as “the quest for information helpful to the fulfillment of the goal of venture creation”. It is a determined desire to carry out productive actions towards effective utilization and implementation of relevant concepts of new ventures. Ina and Bayu (2016) perspective of entrepreneurial intention as the "growing conscious state of mind that a person desires to start a new enterprise or create new core value in existing organization".

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Entrepreneurial intention is a behavioral display of capability to search, discover, evaluate, and exploit new business prospects and have the conviction of self-belief ability to organize and launch a new company for a sustainable future to a sustainable future (Dung & Tu, 2021; Dao et al, 2021). The entrepreneurial intention in this study was considered in the dimensions of Subjective Norms (SN), Attitude to Behaviour (ATB) and, Perceived Behavioural Control (PBC) as postulated by the popular theory of Planned behaviour by Ajzen (1991), and the inclusion of Professional Attraction as the fourth variable. According to Ajzen, the intention to carry out a given behaviour will depend on three variables namely Attitude Toward Behaviour, (ATB) Subjective Norms (SN), and Perceived behavioural Control (PBC).

The construct of Professional Attraction (PA) was included in this study as the fourth variable under entrepreneurial intention to consider the influence of desirability, passion and interest for a particular profession. The theory of planned behaviour is, in principle, amenable to addition of new predictors if it can be demonstrated that they account for a sizable amount of the variation in intention or behaviour after the factors already included in the theory have been considered (LaMorte, 2022; Akter & Md. Iqbal, 2022; Pingying et al, 2015). Hence the inclusion of Professional attraction in this study as the fourth variable considered under entrepreneurial intention. The concept of the theory of planned behaviour, to put it briefly, looks at intention as a function of attitude toward a behaviour, subjective or social norms around the behaviour, and the resources and abilities required to do the behavior.



Figure 2.5: The Study's Conceptual Framework.

Theoretical Review

The Schumpeterian Theory

Schumpeter (1934) aver that entrepreneurship is primarily a function of economic conditions and a causal variable for economic development. According to him, an entrepreneur possesses the abilities to innovate, handle risks, and have the knowledge necessary to introduce new technological processes or goods that could alter the world (Nwosu, 2019). Essentially, the Schumpeter theory emphasized that entrepreneurship is primarily an economic phenomenon driven

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primarily by economic motives. People take risks, create new production techniques, and start their own businesses because they want to improve their financial situation, either individually or as a society. These are all examples of entrepreneurial endeavours that have the potential to affect economic change (Dedekuma et al, 2015). Schumpeter maintained that entrepreneurs are motivated by the need for financial success since it enhances their financial status, even though he agreed with McClelland that the urge for achievement plays a crucial role in entrepreneurial involvement. He presented a strong argument that, absent tangible or monetary benefits, people are unlikely to be sufficiently motivated to invest the required funds and take on the associated risk (Dedekuma & Akpor-Robaro, 2015; Kaya, 2015). The main tenet of the Schumpeterian theory is that economic growth depends on entrepreneurship, which is crucial to the process of innovative economic progress.

The main tenet of Schumpeter theory is that entrepreneurship is about innovation, risk management, and skill that enable turnarounds brought about by new discoveries, new production techniques, technological advancements, the opening of new markets, new sources of supply, new types of organizations, or the redefinition of current processes or products for financial gain (Nwosu, 2019).

There was some denigration of the theory. The idea that it views innovation and entrepreneurship as interchangeable and asserts that entrepreneurship transcends innovation led to criticism. While creativity plays a crucial role in entrepreneurship, it cannot be substituted for entrepreneurship itself since entrepreneurship involves more than just innovation, and invention only becomes entrepreneurial when it results in a financially successful business.

Ajzen Theory of Planned Behaviour

One common theory that dwell on entrepreneurial Intention is the popular Ajzen theory of intention proposed by Ajzen, 1991. The Ajzen theory of planned behaviour (TPB) is a well-known theory that clarifies the principles of entrepreneurial intention. TPB is a well-known tool that is frequently used to look into each person's ambition to start their own business in relation to several aspects of entrepreneurial behaviour (Nessel et al., 2024; Nunfam et al., 2022; Farooq et al, 2016).

According to Ajzen (1991), three factors—attitude toward behaviour, perceived behaviour control, and subjective norms—are predictive of the theory of planned behaviour. According to the theory, individual attitudes, perceived control, and subjective norms all influence intentions, which in turn determine behaviour. According to the theory, a person's behaviour shapes their intents to display a

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specific behaviour, and their attitudes toward the behaviour and personal expectations have an impact on the motive that results (Iriobe, 2022). In other words, (TPB) implies that intention may be predicted by attitude, and that intention then results in planned conduct. Positive or negative attitudes toward behaviour may result from an individual's evaluation of their ideals in a certain circumstance. An individual's choice of action may stem from their assessment of the many outcomes that can be anticipated from handling the given circumstance (Iriobe, 2022).

According to Kavita (2020), an individual's total attitude is the culmination of their own perceptions of the consequences and assessments of the desirability of every action. It is emphasized that an individual's attitude toward a certain behaviour (ATB) is the degree to which they have a positive or negative attitude toward it. According to Ojewumi (2019), who provides a straightforward explanation of the theory of Planned Behaviour (Ajzen, 1991), an individual's intention to engage in a behaviour depends on three factors: (1) their attitude toward the behaviour (do I want to do it?); (2) the subjective norm (do other people want me to do it?); and (3) perceived behavioural control (do I believe I am capable of doing it and have the resources to do it?). PBC, the third of the three elements, is thought to influence behaviour without being motivated (Ojewumi, 2019). A person's perception of how simple or difficult it is to launch and operate a business is known as perceived behavioural control (PBC). It involves the speculation of a collection of attainable, particular, and regulating ideas about elements that can operate as catalysts and as restraints on action. It is the behaviour's perceived difficulty (Upandhaya & Chadha, 2019).

According to Natália and Elisete (2022), entrepreneurial attitude has a direct and significant impact on entrepreneurial intention since it involves researching human behaviour and is based on Ajzen's (1991) popular theory of planned behaviour (TPB). Students use this trend to embrace and determine their entrepreneurial area, designing their own focus and highlighting their tendencies to create sustainable star-up businesses following their entrepreneurial education acquired. As cited by Natalia et al. (2022), entrepreneurial intention is a mindful and planned decision necessary to determine decision to launch a business. Numerous research endeavours have endeavoured to ascertain the mindset required for successful entrepreneurship. An individual's intention is considered to be the most important indicator of how much effort he or she will put into achieving a specific goal (Ajzen, 1991).

According to research, TPB has a big impact on students' intentions to start their own business (Asghar, Hakkarainen, & Nada, 2016). According to the study's

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interpretation of TPB, students who possess appropriate entrepreneurial skills intend to launch their own small business because the characteristics.

Empirical Review

In contrast to external elements like social support, academic support, and environmental supports, internal components are those that are thought of as locus of control, predisposition for taking risks, and personality (Ina and Bayu 2016). Some researchers measured students' entrepreneurial intention by taking into account variables like entrepreneurship education, environmental circumstances, and society entrepreneurship mindset (Adamu 2017). Others examined the idea in terms of values, attitudes, and beliefs (Ojo & Okwilagwe, 2024; Ferreira-Neto et al., 2023), personality traits (Neupane et al., 2025; Owoseni, 2014), demographic variables and perceptions (Olomojobi et al., 2024; Habtamu 2022), the entrepreneurship course and field of study, and the student level of studies (Campaner et al., 2025; Dotong & Manalang 2023).

METHODOLOGY

This study adopted descriptive survey research design to investigate the influence of risk-taking propensities on entrepreneurial intention among university undergraduate. The study covers the final year students of selected universities in south west, Nigeria in 2024/2025 academic session. There are six (6) states in Southwest Nigeria, namely, Lagos, Oyo, Ogun, Ondo, Osun and Ekiti States and a total of seventy-one (71) universities comprising eight (8) federal, sixteen (16) states and forty-seven (47) private Universities. The choice is premised on consideration of universities that engage in entrepreneurial programmes, the ownership of the university weather federal, state or private, the viability of entrepreneurial skills acquisition programmes/courses as mandated by the National Universities Commission (NUC), and the year they produced graduates after commencement of entrepreneurial skill acquisition programmes, the location of the university based on geographical region in south west upon which the results of this study can generally be accepted as true reflection of other states in the country.

Based on the above factors and considerations, this study covers two federal, two State and two private universities from the six states that comprise South West, Nigeria. Final year students of the selected universities who had participated in entrepreneurial skills acquisition training programmes in the course of their studies in the universities who are in their last academic sessions of 2024/2025 were considered as the population for the study which was 14,359 students. Sample size

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of 375 was obtained by the use of Krejcie and Morgan sampling determination table. To this, an additional 75 were added to each of the spread across the universities proportionately to make up for non-responses, incomplete data taking the sample size to 450.

Multistage sampling approaches was used in obtaining sample for the study. Purposive sampling technique was at the first stage for selection of participating universities based on year of establishment of over ten years, ownership of the University whether federal, state or private and the geographical/senatorial district location of the University. Thus, University of Lagos, University of Ibadan, Osun State University, Ekiti State University, Covenant University and Elizade University were selected. Proportionate stratified random sampling technique was used at the second stage which involved chosen Faculties across the Universities and students among those who have offered entrepreneurial training/studies using simple random sampling. Based on the percentage of students` population in each university selected. This study used structured questionnaire. The questionnaire targets final year students who have engaged in entrepreneurial skill acquisition/development training/courses/programmes in six universities in the southwest states of Nigeria. The questionnaire was broken up into three sections: section A focused on the demographic information and opinions of the respondents. The demographic information gathered includes age, gender, university attendance, course of study, entrepreneurial experience in the past, among others. Section B addressed the student's risk-taking propensities on a 5-Likert scale from strongly disagree to strongly agree. Section C also measures of core entrepreneurial intention, comprising professional attraction, subjective norms, perceived behavioural control and attitude towards behaviour. Experts in the fields of business management and entrepreneurship from the Kwara State University and Osun State University reviewed the questionnaire and ensured both its face and content validity of the research instrument. Their unbiased opinions and professional recommendations were taken into account prior to the administration of the instrument. Pilot study was also conducted and the results is reported in Table 1

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Table 1: Reliability and Validity of the Research Instrument

Items	**Cronbach's Alpha**	Cronbach's Alpha Using Standardized Items	Number of Items
Knowledge of Risk – Skills	.861	.857	7
Subjective Norms	.899	.879	7
Perceived Behavioural Control (PBC)	.876	.872	7
Attitude Toward Behaviour (ATB)	.826	.838	7

These values exceeded 0.70 threshold recommended by Nunnally (1978), hence, it was concluded that the instrument has high reliability. The instrument was administered and the data collected were analysed using descriptive and inferential statistics. Pearson correlation coefficient was used to test for relationship and regression analysis was used to test the stated hypothesis.

The model for the study is: Y=f(X)

X= students' risk-taking propensities

Where:

Y (EI) = Entrepreneurial Intention

The variables to test are X (students' risk-taking propensities

Y (Students` Entrepreneurial Intention (EI))

From the above representations, the following equations are generated:

$EI = f(\alpha_0 + \beta_1 x_1 + e_i)$ ……..……. (1)

The hypothesis was tested at 0.05 level of significance to determine the statistical significance.

RESULTS

Preliminary analysis were performed on the collected data and issues of missing values, outliers, assumptions of OLS: normality, homoscedasticity, multicollinearity, were addressed statistically.

Response Rate

A total of 450 copies of questionnaire were administered out of which 418 were retrieved from between November, 2024 and February, 2025. Only 375 were found

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useful for the study which represents 83.33% response rate. This response rate is considered suitable for further analysis.

Demographic Description of Respondents

The result of demographic data is as presented in Table 2.

Gender Distribution: The majority of the respondents are female, with 233 (62.1%), while males constitute 37.9% (142). This indicates a higher participation of females in the survey, which could suggest either a greater interest in the subject matter or a higher female enrolment in the relevant courses and universities.

Age Distribution: The largest age group is between 21-25 years (52.0%), followed closely by the 16-20 years category (43.5%). The representation of respondents aged 26-30 years (4.3%) and 31 years and above (0.3%) is minimal. This reflects a youthful demographic, with the majority being in their early twenties, which aligns with the typical university enrolment age.

Table 2: Demographic Information of the Respondents.

Demographic Constructs	**Count**	**Percentage**
Gender		
Male	142	37.9
Female	233	62.1
Age		
16-20yrs	**163**	**43.5**
21-25yrs	195	52.0
26-30yrs	16	4.3
31yrs and above	1	.3
Total	375	100%

Frequency Analysis of Entrepreneurial Knowledge of Risk-Taking Propensity

The analysis focuses on the respondents' perceptions of their entrepreneurial knowledge of risk-taking propensity, measured through five constructs.

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Table 3: Entrepreneurial Knowledge of Risk-Taking propensity

Constructs	SD		D		U		A		SA	
	Frq.	%	Frq.	%	Frq.	%	Frq.	%	Frq.	%
I have learnt the concept of business risk and uncertainty through the entrepreneurial skill acquisition training	11	2.9	22	5.9	81	21.6	160	42.7	101	26.9
I now have the capacity and willingness to take on risk and gather resources required to venture into business opportunity before or after I complete my degree in the university	21	5.6	29	7.7	90	24.0	190	50.7	45	12.0
I've developed skills that will enable me to make reasonable and successful business venture decisions	16	4.3	26	6.9	93	24.8	183	48.8	57	15.2
I am not afraid of competition	16	4.3	36	9.6	89	23.7	185	49.3	49	13.1
I can take reasonable risks involved in securing capitals and loan for my business	11	2.9	24	6.4	89	23.7	184	49.1	67	17.9

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Table 2 presents the respondents' perceptions of their entrepreneurial knowledge of risk-taking propensity. The first construct, learning business risk and uncertainty, was having a majority (69.6%) of respondents agree (42.7%) or strongly agree (26.9%) that they had learned the concept of business risk and uncertainty through entrepreneurial skill acquisition training. This suggests that entrepreneurship training is largely effective in imparting knowledge of business risks. The second construct, Capacity and Willingness to Take Risks, was having more than half of the respondents (62.7%) agreed (50.7%) or strongly agreed (12.0%) that they now have the capacity and willingness to take risks in business before or after completing their degree. This indicates that while many students feel prepared to take business risks, a significant portion remains uncertain. The third construct, Development of Business Decision-Making Skills, had a large proportion (64.0%) that agreed (48.8%) or strongly agreed (15.2%) that they had developed skills to make reasonable and successful business decisions. This reflects a generally positive impact of entrepreneurship education on decision-making skills.

The fourth construct, fear of competition, had more than half (62.4%) of respondents agree (49.3%) or strongly agree (13.1%) that they are not afraid of competition. While most respondents show confidence in facing competition, the relatively high neutrality suggests that some remain hesitant. The last construct, risk-taking in securing capital and loans, was having a majority (67.0%) of respondents agree (49.1%) or strongly agree (17.9%) that they can take reasonable risks in securing capital and loans. This indicates that while many feel confident in taking financial risks, some still need additional assurance or support.

Therefore, from the analysis presented, it can be obtained that entrepreneurial education has been largely successful in enhancing students' knowledge of risk-taking in business. A significant majority express confidence in learning about business risk, developing decision-making skills, and facing competition. However, a considerable proportion remains uncertain about their willingness to take risks, particularly in securing capital and loans.

Entrepreneurial Intention of Subjective Norms

The frequency table presents data on respondents' perceptions of subjective norms influencing their entrepreneurial intention. The responses are categorized into Strongly Disagree (SD), Disagree (D), Uncertain (U), Agree (A), and Strongly Agree (SA).

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Table 4: Entrepreneurial Intention of Subjective Norms

Constructs	SD		D		U		A		SA	
	Frq.	%	Frq.	%	Frq.	%	Frq.	%	Frq.	%
My immediate family would be very supportive of my decision to start a business	15	4.0	13	3.5	85	22.7	152	40.5	110	29.3
If I were to launch a business, my close friends would be delighted to encourage and support me	13	3.5	24	6.4	103	27.5	153	40.8	82	21.9
I will not be deterred by the perception or negative impression of friends and people around me for choosing to go into business venture	19	5.1	19	5.1	67	17.9	160	42.7	110	29.3
I see myself influencing people in my environment to key into my vision of being an entrepreneur	12	3.2	22	5.9	92	24.5	162	43.2	87	23.2
Shifting my focus possibility mentality of successful business owners and dream helpers will help my entrepreneurial intention	12	3.2	18	4.8	77	20.5	172	45.9	96	25.6

Table 4 presents the respondents' perceptions of subjective norms influencing their entrepreneurial intention. The first construct, is family support for entrepreneurship, with 69.8% (A + SA) of respondents agreeing or strongly

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agreeing that their immediate family would be supportive of their decision to start a business. The second construct, friends' encouragement and support, was having 62.7% (A + SA) believe their close friends would encourage them if they started a business. The last construct is shifting focus to a positive entrepreneurial mindset, with 71.5% (A + SA) agree that focusing on successful business owners and positive influences will enhance their entrepreneurial intention. Therefore, it can be established that subjective norms, particularly family and peer support, play a significant role in shaping entrepreneurial intention. Most respondents feel encouraged by their immediate social circle, are resilient to negative opinions, and believe they can inspire others.

Entrepreneurial Intention of Perceived Behavioural Control

The frequency table provides insights into respondents` perceived behavioural control regarding entrepreneurial intention, which reflects their confidence and self-efficacy in starting and running a business based on the five (5) constructs.

Table 7: Entrepreneurial Intention of Perceived Behavioural Control

Constructs	SD		D		U		A		SA	
	Frq.	%	Frq.	%	Frq.	%	Frq.	%	Frq.	%
I have acquired adequate skills needed to succeed as an entrepreneur	14	3.7	18	4.8	76	20.3	163	43.5	104	27.7
I have what it takes to launch and run a successful business, therefore I'm ready to get started	19	5.1	16	4.3	63	16.8	186	49.6	91	24.3
I believe in my ability to be successful as an entrepreneur and I can create a realistic goal for the firm I wish to run	23	6.1	22	5.9	111	29.6	168	44.8	51	13.6

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Constructs	SD		D		U		A		SA	
	Frq.	%	Frq.	%	Frq.	%	Frq.	%	Frq.	%
I can manage the process of starting a new business since I am aware of the essential practical elements	13	3.5	36	9.6	113	30.1	153	40.8	60	16.0
Once I decide to engage in a task, I am always determined to succeed despite the challenges	12	3.2	17	4.5	69	18.4	188	50.1	89	23.7

Table 7 presents the constructs of Entrepreneurial Intention of Perceived Behavioural Control. The first construct, acquisition of skills for entrepreneurship, with a majority (43.5%) Agree (A) that they have acquired the necessary skills to succeed as an entrepreneur, with an additional 27.7% Strongly Agree (SA). This implies that most respondents feel they possess entrepreneurial skills, but around 8.5% do not share this confidence. The third construct, confidence in entrepreneurial success and goal setting, 44.8% Agree (A) and 13.6% Strongly Agree (SA) that they can set realistic business goals and be successful. Therefore, while most respondents feel confident, a considerable proportion remain undecided about their ability to set and achieve realistic goals. The fifth construct, determination to succeed despite challenges, shows the highest percentage of respondents Agree (50.1%) and Strongly Agree (23.7%), indicating strong perseverance. The results suggests that most respondents possess strong perceived behavioural control, believing they have the necessary skills, resilience, and confidence to start and sustain a business. However, uncertainty is notable in areas like setting realistic business goals and managing the start-up process, suggesting the need for further training and mentorship to boost confidence and reduce hesitation in decision-making.

Entrepreneurial Intention of Attitude towards Behaviour

The table presents data on entrepreneurial intention based on respondents' attitudes toward specific behavioural constructs. The frequency and percentage

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distributions of responses ranging from Strongly Disagree (SD) to Strongly Agree (SA) are analyzed below.

Table 8: Entrepreneurial Intention of Attitude towards Behaviour

Constructs	SD		D		U		A		SA	
	Frq.	%	Frq.	%	Frq.	%	Frq.	%	Frq.	%
I've learned about entrepreneurship and its benefits.	14	3.7	14	3.7	73	19.5	177	47.2	97	25.9
I'm prepared to make any sacrifice necessary to launch and successfully manage my own business	12	3.2	16	4.3	57	15.2	199	53.1	91	24.3
I approach things from a business perspective, and I want to use what I've learned.	9	2.4	22	5.9	66	17.6	167	44.5	111	29.6
I'm committed to start a business in the future because my interest to become an entrepreneur has been spurred	20	5.3	19	5.1	66	17.6	178	47.5	92	24.5
In order to start my own company and pursue entrepreneurship, I'm prepared to look for the needed resources	11	2.9	18	4.8	68	18.1	191	50.9	87	23.2

Table 8 presents the entrepreneurial intention based on respondents' attitudes toward specific behavioural constructs. The first construct is learning about entrepreneurship and its benefits, with 72.1% (47.2% A, 25.9% SA) of respondents agreeing or strongly agreeing that they have learned about entrepreneurship and its benefits. This suggests that a vast majority of respondents recognize the benefits of

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entrepreneurship, though a small percentage remain unsure or disagree. The second construct, Willingness to Make Sacrifices for Entrepreneurship, 77.4% (53.1% A, 24.3% SA) are willing to make sacrifices to start and manage a business. This high level of agreement indicates strong entrepreneurial motivation among respondents. In the fourth construct, commitment to starting a business, 72% (47.5% A, 24.5% SA) express commitment to starting a business due to their interest in entrepreneurship. This suggests a considerable entrepreneurial drive among respondents, though a small percentage still hold reservations. The last construct, Willingness to Seek Resources for Entrepreneurship, with 74.1% (50.9% A, 23.2% SA) agree or strongly agree that they are prepared to seek the necessary resources to start a business. 18.1% are undecided and 7.7% (2.9% SD, 4.8% D) disagree. This further reinforces a strong entrepreneurial intention among respondents, with resource-seeking behaviour being a key factor.

The overall analysis indicates a strong entrepreneurial inclination among respondents. Across all constructs, over 70% of respondents exhibit a positive attitude toward entrepreneurship. Therefore, the results suggest a favourable entrepreneurial attitude with potential for future entrepreneurial engagement, provided the right support mechanisms are in place.

Descriptive Statistics of the Items of the Study

The predominant measure of central tendency is the mean, representing the average value of data collection (Best & Kahn, 2016; Contreras-Barraza *et al.*, 2021). The SD is a measure of dispersion that indicates the variability within a data collection, calculated as the square root of the variance. Both the mean and SD are essential descriptive statistics for data. Both methodologies indicate that a score below 2.33 is classified as low, a score between 2.33 and 3.67 is considered moderate, and scores beyond 3.67 are deemed high.

Entrepreneurial Knowledge of Risk-Taking Propensity

Table 9 presents the descriptive statistics of entrepreneurial knowledge and risk-taking propensity based on respondents' perceptions. The key indicators assessed include the mean, SD, and kurtosis for each variable.

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Table 9: Entrepreneurial Knowledge of Risk-Taking Propensity

Variables	Mean		SD	Kurtosis	
	Statistic	Std. Error	Statistic	Statistic	Std. Error
I have learnt the concept of business risk and uncertainty through the entrepreneurial skill acquisition training	3.85	.051	.982	.489	.251
I now have the capacity and willingness to take on risk and gather resources required to venture into business opportunity before or after I complete my degree in the university.	3.56	.051	990	.596	.251
I've developed skills that will enable me to make reasonable and successful business venture decisions.	3.64	.050	.966	.652	.251
I am not afraid of competition	3.57	.051	.978	.364	.251
I can take reasonable risks involved in securing capitals and loan for my business	3.73	.048	.929	.706	.251
Overall Total	**3.67**		**0.969**	**0.5614**	

Table 9 presents the five (5) constructs for the Entrepreneurial Knowledge of Risk-Taking propensity. The overall mean score (3.67) suggests that respondents generally agree with the statements regarding their entrepreneurial knowledge and risk-taking propensity. The overall SD (0.969) indicates moderate variability in responses. The positive kurtosis value (0.5614) suggests a slightly peaked distribution, indicating that responses are not widely spread but tend to cluster around the mean. The analysis imply that entrepreneurial skill acquisition programs have significantly influenced respondents' knowledge and confidence in risk-taking. However, there are variations in how individuals perceive their ability to take risks, particularly in securing loans and facing competition.

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Hypothesis Testing

Hypothesis: **Students' knowledge of risk-taking (RSK) does not have an impact on entrepreneurial intention (EI)**

Table 10A: Contributions of Regression Analysis to the Students` Knowledge of Risk-taking (RSK) on entrepreneurial intention with attitude towards behaviour

R	R^2	Adjusted R^2	Std. Error of the Estimate	Durbin-Watson
.479[a]	.230	.219	.813	1.874

Table 10A presents the contributions of regression analysis to the students' knowledge of risk-taking (RSK) on the entrepreneurial intention with attitude towards behaviour. The R = 0.479 suggests a moderate positive correlation/relationship between students' knowledge of risk-taking and entrepreneurial intention (attitude towards behaviour). R^2= 0.230 indicates that approximately 23.0% of the variance in entrepreneurial intention (EI) is explained by students' knowledge of risk-taking. This is a moderate explanatory power, meaning other factors might also contribute to entrepreneurial intention. The adjusted R^2=0.219 accounts for the number of predictors in the model. The Standard Error of the Estimate of 0.813 represents the average deviation of the observed values from the predicted values. Also, Durbin-Watson of 1.874 tests for autocorrelation in the residuals. Since it is close to 2, it suggests that there is no significant autocorrelation in the residuals, meaning errors are randomly distributed.

Table 10B: Contributions of Regression Analysis to the Students` Knowledge of Risk-taking (RSK) on entrepreneurial intention with attitude towards behaviour

	Sum of Square		Df	Mean Square	F	Sig.
Regression	72.739		5	14.548	21.984	.000[b]
Residual	244.178		369	.662		
Total	316.917		374			

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Table 10B shows the Regression Sum of Squares of 72.739 represents the variance explained by the predictors (students' knowledge of risk-taking), The Residual Sum of Squares of 244.178 accounts for the unexplained variance in the dependent variable (EI), while the Total Sum of Squares of 316.917 for variability in EI. The F-statistic of 21.984 tests whether the model as a whole significantly predicts entrepreneurial intention and the Sig. = 0.000 is less than 0.05, indicating that the regression model is statistically significant. In other words, students' knowledge of risk-taking has a significant impact on entrepreneurial intention (with attitude towards behaviour).

Table 10C: Coefficients of Regression Analysis to the Students` knowledge of risk-taking (RSK) on entrepreneurial intention with attitude towards behaviour.

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.730	.214		8.096	.000
	EKRP01	.137	.053	.146	2.579	.010
	EKRP02	.129	.059	.139	2.176	.030
	EKRP03	.076	.059	.080	1.279	.202
	EKRP04	.091	.054	.097	1.686	.093
	EKRP05	.158	.058	.160	2.744	.006

Table 10C show the coefficients of regression analysis to the students' knowledge of risk-taking on the entrepreneurial intention with attitude towards behaviour. The constant (intercept) B = 1.730, t = 8.096, Sig. = 0.000, representing the baseline level of preparedness to make sacrifices for business success when all independent variables are set to zero. The construct "I have learnt the concept of business risk and uncertainty through the entrepreneurial skill acquisition training" with B = 0.137, Beta = 0.146, t = 2.579, Sig. = 0.010. The positive coefficient (B = 0.137) suggests that learning about business risk and uncertainty through training increases the preparedness to make sacrifices for business success. The

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significance level ($p = 0.010 < 0.05$) confirms that this factor has a statistically significant impact. The construct, "I can take reasonable risks involved in securing capital and loans for my business" with B = 0.158, Beta = 0.160, t = 2.744, Sig. = 0.006. The positive coefficient (B = 0.158) indicates that the willingness to take financial risks is the strongest predictor of readiness to sacrifice for business success. The significant pvalue ($0.006 < 0.01$) suggests this factor has a robust impact on entrepreneurial preparedness. Therefore, the analysis implies that Training on business risk and financial risk-taking is crucial for fostering entrepreneurial readiness, supporting the argument that students' knowledge of risktaking enhances entrepreneurship potential with attitude towards behaviour. As a result, the null hypothesis is rejected, and students' knowledge of risk-taking (RSK) has an impact on entrepreneurial intention, with attitudes towards behaviour being accepted at a 5% level of significance. However, the scale fearlessness of competition and decision-making skills may still be important but require further investigation.

Discussion of Findings

From the demographic characteristics analysis of the respondents, it was observed that the respondents are predominantly young (16-25 years), with a female-majority representation. The construct's variables revealed that while a significant proportion of respondents have a moderate understanding of managerial skills, there are gaps in legal/risk management and financial knowledge that may need to be addressed through targeted training or entrepreneurial education programs. The analysis also showed the need to strengthen competencies that would likely enhance business performance and sustainability among the students. However, uncertainty is notable in areas like setting realistic business goals and managing the start-up process, suggesting the need for further training and mentorship to boost confidence and reduce hesitation in decision-making. Therefore, the results suggest a favourable entrepreneurial attitude with potential for future entrepreneurial engagement, provided the right support mechanisms are in place.

Furthermore, the analysis conducted on descriptive with mean scores, standard deviations, and Kurtosis revealed significant contributions to the construct scales of skill acquisition to entrepreneurial intention dimensions. The analysis revealed the need for targeted managerial skill development, particularly in legal and risk management aspects, to enhance overall entrepreneurial knowledge. It was equally reported that university entrepreneurship training effectively equips students with

vocational skills and confidence in their ability to launch businesses. However, while students show readiness to pursue self-employment, additional support in business development and resource accessibility could further enhance their entrepreneurial success. The analysis imply that entrepreneurial skill acquisition programs will significantly influenced respondents' knowledge and confidence in risk-taking. Although, there are instances of variations in how individuals perceive their ability to take risks, particularly in securing loans and facing competition. From these, it can be said that respondents generally feel capable of becoming entrepreneurs, with high confidence in their skills acquisition, determination, and ability to launch a business.

The findings from the hypothesis implied that training on business risk and financial risk-taking is crucial for fostering entrepreneurial readiness, supporting the argument that students' knowledge of risk-taking enhances entrepreneurship potential with attitude towards behaviour. As a result, the null hypothesis was rejected and students' knowledge of risk-taking has an impact on entrepreneurial intention with attitude towards behaviour is accepted at a 5% level of significance. But, the scale fearlessness of competition and decision-making skills may still be important but require further investigation. According to Udekwe and Iwu (2024), entrepreneurial education, particularly in risk assessment and management, significantly improves students' attitudes and intentions toward entrepreneurship. Kusumawijaya and Partiwi (2021) confirm that attitude toward behaviour, which includes willingness to take calculated risks, is one of the strongest predictors of entrepreneurial intention. While Md Abu et al. (2024) highlight the importance of self-efficacy and confidence (closely linked to fearlessness), they caution that overconfidence may not translate into actual entrepreneurial success. Although decision-making is a core entrepreneurial skill, some studies (e.g., Vargas-Martínez et al., 2023; Steenkamp et al., 2024) suggest that in the early stage of entrepreneurial intention, individuals rely more on heuristics and attitudes than on rational decision-making.

CONCLUSION AND RECOMMENDATIONS

The study found that students' knowledge of risk-taking is important in shaping their entrepreneurial intentions. The study also found the need for the risk management knowledge for navigating the certainty and uncertainty in the business environment. This implies that educational stakeholders will need to design curricula that challenge students to engage in critical thinking and enable them to develop positive attitudes toward entrepreneurship despite potential risks.

However, from the mixed analysis, it is evident that skills acquisition with respect to the managerial, communication, vocational skills, and risk-taking tendencies exert significant influence on students' entrepreneurial intentions. Meanwhile, cultivating an awareness of risk-taking will help them demystify uncertainty and build resilience, both of which are critical traits for entrepreneurial success.

Following these findings and the conclusion drawn in this study, the following recommendations are strongly offered to the relevant educational stakeholders:

a) Universities should embed risk management skills into their core curricula, not as isolated modules but as integrated, interdisciplinary experiences that simulate real life entrepreneurial environments, where students apply their skills in practical contexts, thereby reinforcing their attitudinal shifts.
b) Universities should reinforce the communication skill development programmes that leverage peer influence and social norms by encouraging collaborative projects, entrepreneurial clubbing, and networking events that align with subjective norms and promote entrepreneurial identities.

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PRICE CHOICE AND ETHICAL CONSUMPTION AMONG GENERATION Z CONSUMERS

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Abstract

This study examines the influence of price choice on ethical consumption among Generation Z consumers, with a focus on undergraduate students in Ogun State, Nigeria. Despite the growing awareness and positive attitudes toward sustainable and ethical products, a persistent attitude–behaviour gap remains evident, largely influenced by economic constraints. Anchored on the Theory of Planned Behaviour, the study adopts a cross-sectional survey design and collects primary data through structured questionnaires administered to Gen Z respondents. Using regression analysis, the findings reveal a statistically significant and positive relationship between price choice and ethical consumption. Specifically, price considerations account for a substantial proportion of the variation in ethical consumption behaviour, indicating that affordability and perceived value are critical determinants of purchase decisions. The results suggest that while Gen Z consumers are ethically conscious, their financial pragmatism and price sensitivity often limit their ability to translate ethical intentions into actual behaviour. The study concludes that price is both a barrier and an enabler of ethical consumption, depending on how it aligns with consumers' financial expectations. It recommends that firms adopt value-based and competitive pricing strategies, alongside effective communication of product benefits, to enhance ethical consumption among Gen

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Z. Policymakers are also encouraged to support affordability through incentives that promote sustainable production and consumption.

Keywords: *price choice, ethical consumption, generation Z, price sensitivity, sustainable products*

JEL Classification: D12; D91; M31; Q56.

1.0 Introduction

An average customer always looks for how to maximize satisfaction or value derived from their consumptions. The satisfaction may largely depend on the quality of the products while it is also likely for quality products to come with high prices. Price can be an essential factor in determining the consumption of products and value. Ethical products are products that come with organic quality and from responsible manufacturers. Ethical or sustainable products have become the most desired and advocated products due to their responsible sources but it remains to be seen if high price will not serve as an obstacle for all age groups. Gen Z consumers have demonstrated their desires to consume products that promote responsible and healthy environment. The age group also has financial pragmatism as its characteristic. How does this group balance its desire and characteristic? Researchers have shown that there has been attitude-behaviour-gap in ethical consumption (Budhathoki, Adhikari & Koirala, 2025; Dinesha, Jayarathne & Galdolage, 2024). This study intends to know if price preference can be adduced to be one of the reasons for the attitude-behaviour-gap among Gen Z. Ethical consumption can be viewed as intentionally choosing products that are not dangerous to the environment; rejecting goods that contribute to global warming; guiding against pollution and waste; promoting animal welfare; and ensuring that employees obtain fair wages and improved working conditions. It encompasses buying organic products; participating in local and fair trade; boycotting unethical products or organisations; and purchasing goods with lower carbon emissions (Shuute & Gregory-Smith, 2015).

Dwidienawati and Gandasari (2018) state that money motivates Gen Z members. These scholars attribute this to their upbringing which clashed with the global economic downturn. Gen Z sees money as a significant factor when it comes to consumption decisions. Wood (2013) states further that Gen Z are mostly the children of Gen X, born during economic recession when most Parents lost their jobs. This reduced most families' purchasing power and personality. He claims that

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such families will want to invest in their children's education in order to protect the future generation.

It has been observed that the choice in lifestyle of these youngsters in terms of outlook, food identity and more importantly, price preferences are prevalent. This generation is aware of ethical consumption and is concerned about the need to sustain the environment, with the expectation that organizations should be responsible in their operations as they aspire to generate revenue (Campbell, 2022). Despite the ethical awareness among this cohort, there is reluctance to adopt ethical consumption which has been attributed to financial factors such as prices, incomes and unemployment (Delistavrou, Katrandjiev & Tilikidou, 2017; Pencarelli, Taha, Skerhakova, Valentiny & Fedorko, 2020). Ethical products usually come with high prices which may discourage consumers from making a purchase (Ryoo & Kim, 2023). The factors that determine Gen Z consumption of products are very important to marketing firms in order to translate this generation purchase intention into actual behaviour. These determinants will in no small measure, help organisations in getting this group to patronise ethical products. Therefore, with the rising advocacy for Sustainable Development Goals (SDGs) all over the world, then, the motivation to study the determinants of Gen Z ethical consumption specifically on sustainable products like recyclable wears, organic products and recyclable designer packaging in Ogun State. More importantly, this study serves as a template and working tools for organisations, especially fast-moving consumer goods (FMCGs) to engage the Gen Z while scholars in the field of marketing and other allied fields of study will leverage on the findings of this work to boost their research.

2.0 Literature Review

Gulyas (2008, p. 2) provides an insight into when the term ethical consumption first occurred; he claims that the term used to be "value-based attitudes, which entered the realm of Anglo-American social sciences at the beginning of the 1960s. He claims the term used to be referred to as responsible consumption or socially responsible consumption; value-based consumer behaviour finally became ethical consumption around the turn of the millennium. Many scholars, such as Gopaldas (2014), have defined ethical consumption as an ideology where businesses and consumers consider the effects of their choices on the environment and society rather than just the function and monetary implications. Gen Z is a group of young consumers born between 1997 and 2012. Due to their affinity for technology, the cohort also goes by names such as Generation, Gen Tech, and Zoomers (Jayatissa,

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2023). Coughlin and Dorner (2023) posit that Gen Z is the largest generation on earth, as it holds substantial market power.

Price Choice

This involves the disposition of Gen Z towards the price of products and services. It addresses the influence of price or money on their desired products. Zhou, Sulaiman, Wang, Yi, Yuan and Zhiyong (2022) describe price choice as the influence of price over consumers' buying decisions. It's claimed that it helps company to study how price variations impact product demand. Zhou *et al*. (2022) claim that price choice or preferences is part of the foundational components for predicting customer behaviour and purchasing intent. Handa and Gupta (2020) posit that price sensitivity is directly correlated with consumer behaviour. They state that an increase in the price of products to the extent that consumers can no longer afford them, consumers will explore other options, hence, firms should work on their pricing techniques. Buyers are motivated to consume ethical products and may likely not be influenced by price, though several studies have found that ethical consumption can be influenced by price and convenience (Arnot, Boxall & Cash, 2006)

According to Zhou *et al.* (2022) low price choice or sensitivity means that consumers are willing to pay more than the quoted price for a good because it exceeds their expectations, as ethical products are vigorously bought and are sensitive to price. They state that buyers with the high price sensitivity or choice are dissatisfied with the product and reject its supplied price while companies are admonished to maintain the price sensitivity of products in order to maintain products' good market value. Bird and Hughes (1997) as cited by Arnot, Boxall and Cash (2006) have stated that a type of consumer is self-centered and would not be easily persuaded to purchase ethical products, but would be motivated by price.

Gen Z's Price Choice and Ethical Consumption

Price has been an important factor when making purchasing decisions over products and services. It mostly determines the quantity that consumers will purchase; generally, as price increases, demand decreases. Banton (2023) states that an individual places economic value on a product or service based on the benefits they derive from it. The value of a product or service is subjective, difficult to measure, and subject to estimation. We can estimate it through willingness to pay, hedonic pricing, and economic value in marketing (Adeyemi, Dukku, Gambo & Kalu, 2013). On the other hand, the economic value estimate can set product prices, considering both tangible and intangible factors, such as brand

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name. Some consumers have discovered that they use price as a yardstick to determine the ethicality of products. Werner *et al.* (2021) state that consumers use price as a measure of ethics when they lack adequate information or are skeptical about the organization's claims, which involve fair trade and eco-friendliness. High prices can impede ethical consumption, leading to post-purchase dissonance and future avoidance of ethical products (Bray *et al*., 2010). Ryoo and Kim (2023) also argue that higher prices can discourage consumers from making a purchase, yet some consumers are ready to pay higher prices or premiums for products and services that do not breach human rights, deteriorate the environment, exploit labour, or are unfairly traded. Consumers who prioritise societal involvement over personal benefit are considered ethical.

Gen Z members as a group of consumers are conscious of ethical and environmental issues; they are sensitive to price due to their financial pragmatism. Despite Djafarova *et al*. (2022) assertion that Gen Z possesses a strong awareness and desire for environmental and ethical issues, their primary perceived barrier to purchasing ethical products or services remains price. Gen Z members usually have low disposable income and are more price-sensitive (Kaur, Gupta & Bajpai Singh, 2023). This group may decide to jettison the ethicality of a product for an alternative product with low prices. Price preference or sensitivity may be impacted by a combination of elements involving Gen Z's limited financial resources, which revolve around long-term value and a choice of goods which provide both quality and affordability (Djafarova *et al*., 2022; Dwyer & Kim, 2003). Scholars have described Gen Z as pragmatic and financially minded. It is a core characteristic of the cohort due to their growing-up stages during an economic recession. People say they witnessed their parents and guardians struggle during the economic downturn. The cohort are, as a result, motivated by money and the security of their jobs. In addition to what they learn at home, Gen Z receives practical lessons on personal finance from school. The current economic environment influences the cohort members, making them more cautious and careful with their spending (Wood, 2013). Conservative spending, secured jobs, and smart investments provide the stability they seek. The challenges encountered during the economic downturn have contributed to Gen Z's frugality; they are aware of the need to save for the future and the importance of job stability. They prefer full-time jobs to part-time jobs. This cohort analyses both what they purchase and what they consume; due to their exposure to different sources of information, they evaluate a wide range of information before making a purchase (Francis & Hoefel, 2018).

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According to Francis and Hoefel (2018, p. 2), Gen Z members see "consumption" as access rather than possession, which demands that organisations rethink how they deliver value to consumers. This cohort doesn't believe that they must own products; they just need to have access to them, for example, renting an apartment, car-riding services, video streaming, and so on. Consumption of this group is an act of creating value. Despite Gen. Z's strong awareness and willingness towards sustainable and ethical issues, their desire to buy things that align with their values so that the environment will be sustained, the affordability of ethical products is still a determinant (Djafarova *et al*., 2022; Navaratne, 2024).

Gen Z members are price sensitive, as they usually consult price comparison websites (PCWs), which help them to check the prices of many companies offering a particular type of product simultaneously in one place. This PCW is advantageous to this cohort in a situation where prices of likely homogeneous products are usually dispelled. These sites are prominent in many markets involving financial services, hotels, utilities, and durable goods (Ronayne, 2018). This cohort also relies on recommendations from social media influencers and celebrities before purchasing products (Macheka, Quaye & Ligaraba, 2023). Gen Z members' price preference implies they value ethical considerations; the decision to purchase ethical products can still strongly be influenced by price (Tran, Nguyen, Tren, Nguyen, Luu & Nguyen, 2022). According to Helmersson and Svensson (2016), members of Gen Z lack the will to pay high prices for ethical products. They reiterate that firms will have to offer ethical products with lower prices to attract Gen Z as their consumers. Such incentives can come in the form of discount prices. Ryoo and Kim (2023) advised that organisations should employ discount prices with caution, as discount strategies can induce doubt about the ethicality of products, most especially to the ethically minded consumers. They recommended providing valid reasons for the discount.

To improve Gen Z's purchasing behaviour in ethical consumption, there is a need for companies and marketers to communicate the value of ethical products to them and what they are to benefit from that exceeds the market price of the products, which must be done in the way they can best be reached. Djafarova *et al*. (2022) suggest that marketers should consider using digital influencers as part of their communication campaigns. Kovaes (2021) posits that sustainable fashion products are believed to be pricier and luxurious than what some consumers can afford; he, therefore, suggests that educating consumers on product values, commonalities in price, and eco-friendly options must be part of the marketing communication messages employed by the concerned firms.

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Theory of Planned Behaviour

The theory of planned behaviour, a psychological theory, was proposed in 1985 by Icek Ajzen in his book titled "From Intentions to Actions: A Theory of Planned Behaviour". This theory was conceived to improve on the theory of reasoned action proposed by Martin Fishbein and Icek Ajzen in 1980, which believes that if an individual has a positive attitude towards an item and such individual believes that others around him or her are also in support of the item, there will be an intention to go for the item, meaning that behavioural intentions are in support of the items, there will be in an intention to go for the item, meaning that behavioural intentions are functions of attitudes and subjective norms, that intention will lead to action or actual behaviour. Ajzen, in his theory of planned behaviour, added a component called "perceived behavioural control" to extend the theory of reasoned action to better predict actual behaviour. Perceived behavioural control can be described as the perception of an individual's ability to perform a given behaviour. The theory states that individuals tend to behave in a certain way when they can do that successfully. The theory now has three components: perceived behavioural control, subjective norms and attitudes that lead to behavioural intention and then actual behaviour. Ajzen added that behaviour is a function of compatible intentions and perceived behavioural control. Ok and Hwang (2013) state that an individual's strong attitude and subjective norms, combined with no barriers of control, which are accessibility, inconvenience, and financial position, will lead to the intention to purchase. The theory of planned behaviour has been used to predict different behaviours like gambling, quitting smoking, adolescents' use of social networking, health-related behaviours, environmental psychology, voting, and financial (Cameron, Ginsburg, Westhoff & Mendez, 2012)

Perceived behavioural control as a component of theory of planned behaviour can be applied to this study. This involves the Gen Z being aware and able to choose ethical products. The ability to identify an ethical item or the financial power to purchase it are examples of perceived behavioural control. In other words, when Gen Z believes that they have what it takes to purchase ethical products, they develop the intention to do so.

Empirical Review of the Literature

Tran, Nguyen, Tran, Nguyen, Luu and Nguyen (2022) investigated how the perceptions of Vietnamese Gen Z regarding product-service quality, environmental awareness, and pro-environmental behaviour influence their purchase intention and

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loyalty towards eco-friendly fashion products. The study employed a mixed-method approach with thematic analysis and the SEM PLS technique with 313 participants. The qualitative results showed that the knowledge and attitudes towards eco-friendly fashion practices were adequate to fascinate Gen Z to afford ethical fashion products and that customers' perceived behavioural control plays a more significant role in stirring purchase intention; loyalty can only be impacted by product-service quality. The study recommended that businesses should prioritise improving service and product quality instead of funding green marketing when targeting Vietnamese Gen Z because of financial constraints, and the government should prioritise financial and technological support for fashion companies to develop high-quality, ethical fashion.

Djafarova and Foots (2022) explored the factors that inspire Gen Z consumers to turn an ethical purchase intention into action in the United Kingdom. The study was to understand how the theory of planned behaviour model could be applied to Gen Z's ethical consumption. The qualitative method in the form of 18 semi-structured interviews was conducted on a sample size of 18 participants with the age bracket (18-26). It was revealed that the cohort's frugality limits them from purchasing ethical products in the current stage but their financial aspirations suggest a future desire to purchase high-value ethical items. Price as well as quality and convenience propel the purchase of ethical products. It was recommended that Marketers consider employing digital influencers as they communicate ethical messages to Gen Z.

Ryoo and Kim (2023) in their study, investigated how consumers perceive the association between price and ethicality which influences their ethical purchase decisions. Six studies were conducted using university students and women from Amazon's MTurk. The first study used 120 sample sizes with a chi-square goodness-of-fit test and binomial test. The second study used a 200 sample size, and MANOVA was used. The third study used a 203 sample size, Process macro model 1, 5000 bootstraps was used for regression analysis. Studies 4, 5 and 6 used 168, 135 and 193 sample sizes respectively. Studies 3 and 6 used the same measure and procedures while study 4 used ANCOVA, study 5 used Process macro for SPSS, model 1. It was revealed that consumers do perceive that ethical products sold at discounted prices cannot be genuinely ethical and they avoid buying them, as this is common among ethically minded consumers. It was recommended that marketers should through their communication campaigns assure consumers of the legitimacy of their product's ethicality despite discounted prices.

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Jahrl and Mebrahtom (2024) investigated how Gen Z sustainable consumption is affected by inflation in Jonkoping University, Sweden. The sample size was 11, of which 7 were female and 4 were male. Purposive and convenience sampling designs were employed. Qualitative analysis was used. The paradigm of interpretivism and adductive reasoning was employed and multiple case study was conducted using semi-structured interviews. It was concluded that Gen Z is experiencing a difficult time purchasing sustainable products due to inflation. The paucity of funds among Gen Z has made ethical consumption difficult. Due to this, this cohort has resorted to less costly and more sustainable alternatives to adapt to the economic situation. The result still showed that Gen Z consumers are still dedicated to social and environmental responsibility.

3.0 Methodology

The study adopts a cross-sectional survey research design. This design is appropriate because it allows for the collection of data from a large population at a single point in time, thereby enabling the researcher to establish patterns, relationships, and generalisations within the target population. The population of the study comprises undergraduate students from Ogun State-owned universities, specifically Olabisi Onabanjo University and Tai Solarin University of Education, with an estimated total population of 79,500 students as indicated in the document. This population is considered suitable because it largely represents individuals within the Gen Z cohort, who are the focal point of the study. The sampling technique employed is judgmental sampling, which allows for the deliberate selection of respondents who meet predefined criteria, particularly age (16–28 years) and enrolment status. This approach is justified on the grounds that the study specifically targets Gen Z consumers who are presumed to possess the awareness and behavioural characteristics relevant to ethical consumption, as supported by prior studies (Djafarova et al., 2022; Kaur et al., 2023). Primary data was collected using a structured questionnaire designed to capture respondents' perceptions of price preference and ethical consumption. The instrument is based on a 5-point Likert scale ranging from strongly disagree to strongly agree, which ensures consistency in responses and facilitates quantitative analysis. The use of Likert scaling is appropriate for measuring attitudes, perceptions, and behavioural intentions, particularly in studies anchored on behavioural theories such as the Theory of Planned Behaviour, which emphasises attitudes, subjective norms, and perceived behavioural control as predictors of behaviour (Ajzen, 1985; Ok & Hwang, 2013). The questionnaire items relating to price choice are adapted to

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reflect the construct as defined in the literature, ensuring content validity and alignment with the study objectives. To ensure the reliability and validity of the instrument, internal consistency measures are implied through the analysis of standard deviation and kurtosis values, which indicate the degree of dispersion and concentration of responses around the mean. The relatively low variability and concentrated responses observed in the dataset suggest that the measurement scale is stable and captures a consistent underlying construct, thereby enhancing the reliability of the findings. Data analysis was conducted using both descriptive and inferential statistical techniques. Descriptive statistics, including mean, standard deviation, minimum and maximum values, are used to summarise the data and provide insights into the general trends in respondents' perceptions of price preference. Inferential statistics are then employed to test the effect of price choice on ethical consumption was regression analysis, to determine the strength and significance of the relationship between the variables.

This study adopted a cross-sectional survey research design, using a quantitative technique. The population for this study was 79,500 students of Ogun State-owned Universities, Nigeria, as of September, 2024. These include Olabisi Onabanjo University, Ago-Iwoye (50,000) and Tai Solarin University of Education, Ijagun (29,500). Judgmental sampling was adopted in order to deliberately choose Gen Z undergraduate students of the two institutions who fall within the age of 16 and 28.

4.0 results and discussions

Table 4.1: Regression Analysis of the Price Choice vs. Ethical Consumption

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.629[a]	.395	.393	.56392

a. Predictors: (Constant), Price choice

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	65.923	1	65.923	184.143	.000[b]
	Residual	100.809	281	.358		
	Total	166.732	282			

a. Dependent Variable: Ethical consumption

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b. Predictors: (Constant), Price choice

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.799	.217		3.674	.000
	Price Choice	.747	.052	.629	14.398	.000

a. Dependent Variable: ethical consumption

Source: Author's computation

The regression results provide strong empirical evidence on the influence of price choice on ethical consumption among Gen Z consumers. The model summary indicates a correlation coefficient (R) of 0.629, which suggests a moderately strong positive relationship between price choice and ethical consumption. This implies that as price considerations become more favourable or acceptable to consumers, their likelihood of engaging in ethical consumption increases. The coefficient of determination (R^2) is 0.395, indicating that approximately 39.5% of the variation in ethical consumption can be explained by price choice. The adjusted R^2 of 0.393 further confirms that the model maintains its explanatory power even after adjusting for sample size and predictors, suggesting that price choice is a meaningful determinant of ethical consumption behaviour within the studied population. The ANOVA results reinforce the overall significance of the regression model. With an F-statistic of 184.143 and a significance level of $p < 0.001$, the model is statistically significant, indicating that price choice reliably predicts ethical consumption. This means that the observed relationship is unlikely to have occurred by chance and that price choice plays a critical role in shaping ethical consumption decisions among Gen Z consumers. Further insight is provided by the coefficient estimates, which reveal that price choice has a positive and statistically significant effect on ethical consumption ($\beta = 0.629$, $t = 14.398$, $p < 0.001$). The unstandardized coefficient ($B = 0.747$) indicates that a one-unit increase in price choice leads to a 0.747 unit increase in ethical consumption, holding other factors constant. This finding suggests that when Gen Z consumers perceive prices as reasonable, affordable, or justified, they are more inclined to purchase ethical products. The constant term ($B = 0.799$, $p < 0.001$) further indicates that even in the absence of price influence, there is a baseline level of ethical consumption, likely driven by awareness, values, and social influence. The findings align with

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existing literature which emphasises the significant role of price in shaping consumer behaviour, particularly among younger consumers who are often financially constrained. Studies such as those by Carrington et al. (2020) and Bray et al. (2020) argue that although consumers may possess strong ethical intentions, these intentions are frequently moderated by price considerations. The present result supports this assertion by demonstrating that price is not merely a barrier but also a facilitating factor when aligned with consumers' financial expectations. Similarly, Djafarova et al. (2022) highlight that Gen Z consumers are highly price-sensitive due to their economic realities, which directly affects their ability to translate ethical intentions into actual purchasing behaviour.

Interestingly, the strength of the relationship observed in this study suggests that price choice may play a more influential role than previously assumed in some studies that reported weaker associations. While some scholars, such as Shaw et al. (2025), argue that highly ethically conscious consumers may prioritise values over price, the current findings indicate that for Gen Z consumers in this context, price remains a dominant consideration. This reinforces the notion of the attitude–behaviour gap, where positive ethical attitudes do not always translate into actual behaviour due to financial constraints. From a theoretical standpoint, the results can be explained using the Theory of Planned Behaviour, particularly the concept of perceived behavioural control. Price can be viewed as a financial control factor that either enables or restricts ethical consumption. When consumers perceive that they have sufficient financial capacity to afford ethical products, their intention is more likely to translate into actual behaviour. Conversely, high prices may act as a constraint, limiting their ability to act on their ethical beliefs.

5.0Conclusion and Recommendation

The study concludes that while Gen Z consumers demonstrate a high level of awareness and concern for ethical and sustainable consumption, their actual purchasing behaviour is significantly influenced by price considerations. The findings reveal that price choice has a strong and positive effect on ethical consumption, indicating that affordability and perceived value play a decisive role in determining whether ethical intentions are translated into real buying behaviour. Although this cohort is ethically inclined, their financial pragmatism and sensitivity to price create a constraint that sustains the attitude–behaviour gap identified in prior studies. The empirical evidence shows that price is not merely a barrier but also a key enabling factor; when ethical products are perceived as reasonably priced or offering commensurate value, Gen Z consumers are more likely to adopt

them. This reinforces the relevance of the Theory of Planned Behaviour, particularly the role of perceived behavioural control, where financial capability directly influences behavioural outcomes.

Based on these findings, it is recommended that organisations, especially those operating in fast-moving consumer goods and sustainable product markets, adopt strategic pricing approaches that balance profitability with accessibility. Firms should consider competitive pricing, cost-efficiency innovations, and value-based pricing strategies that clearly communicate the long-term benefits and quality of ethical products. There is also a need for organisations to strengthen their value communication by educating consumers on the economic, environmental, and social benefits embedded in ethical products, thereby justifying their prices and reducing price resistance. Additionally, marketers should leverage digital platforms and influencers that resonate with Gen Z to effectively position ethical products as both desirable and financially sensible choices. Policymakers and relevant stakeholders may also play a supportive role by creating incentives, subsidies, or policies that reduce the cost of producing and distributing ethical products, making them more affordable to the average consumer. Ultimately, bridging the gap between ethical intention and actual behaviour among Gen Z requires a coordinated effort that addresses both economic constraints and value perception.

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A SCOPING REVIEW OF THE ROLE OF SOCIAL ENTREPRENEURSHIP IN ADVANCING SDG 13

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Abstract

Social entrepreneurship constitutes a hybrid organisational form uniquely positioned to address climate change while advancing the SDG 13 (Climate Action). By integrating social and environmental value creation with economic viability, social enterprises provide innovative pathways for mitigation and adaptation. This scoping review synthesizes existing literature to examine social entrepreneurship contribution to SDG 13 (Climate Action) identifying systemic barriers to scalability and sustainability and evaluate methodological approaches that assessed environmental impact. Adhering to the Arksey and O'Malley framework . We conducted a systematic search of Scopus, Web of Science, PubMed, and grey literature sources peer-reviewed articles and reports that meets the inclusion criteria. We performed qualitative thematic analysis techniques for data extraction and analysis. Findings revealed four primary themes emerged from the analysis: (1) hybrid business models

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strategically balancing social missions with commercial viability through regenerative principles; (2) the roles of servant leadership and stakeholder engagement in enabling the achievement of dual missions; (3) resource mobilisation strategies including effectuation, institutional bricolage, and cyclical ecosystems that facilitate operation within constrained environments; and (4) an integration-education paradox highlighting tensions between policy mainstreaming and the preservation of innovative capacity. Social enterprises demonstrate measurable contributions towards climate change mitigation and adaptation through initiatives such as renewable energy deployment, waste management systems, climate-smart agriculture, and community resilience enhancement.

Keywords *social entrepreneurship, climate action (SDG 13), hybrid business models, sustainable development, and systemic barriers*

JEL Classification: L26, Q56, O 35, Q58

Introduction

This scoping review examines the extent to which social entrepreneurship contributes to addressing climate change and promoting sustainable practices in alignment with the United Nations' Sustainable Development Goals. Social entrepreneurship is distinguished by its dual commitment to generating social and environmental value alongside economic profit. This review synthesises a range of studies to delineate the innovative approaches employed by social entrepreneurs to confront environmental challenges, with particular emphasis on SDG 13, which advocates urgent measures to combat climate change and its associated impacts. Social entrepreneurs formulate distinctive models that target climate-related issues, including renewable energy projects and waste management systems (Bangura & Lourens, 2025). Through the strategic utilisation of local resources, social enterprises empower marginalised communities, facilitate employment opportunities, and enhance resilience against climate-related adversities (Kumar & Tyagi, 2025). The effectiveness of social entrepreneurship hinges on supportive policy frameworks and the availability of financial resources, which are vital for amplifying its contribution to sustainable development (Ayyoob & Sajeev, 2024; Onileowo & Muharam, 2024). Nonetheless, multiple challenges persist, such as funding limitations that restrict the scalability of social solutions (Bangura & Lourens, 2025), regional regulatory inconsistencies that impede effectiveness (Ayyoob & Sajeev, 2024), and the necessity for increased awareness and capacity-building initiatives to fully harness the potential of social entrepreneurship in

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climate action (Kumar & Tyagi, 2025). Although social entrepreneurship offers a promising pathway toward the realisation of SDG 13, systemic barriers and regional disparities can hinder progress. Addressing these obstacles through context-specific policy interventions and collaborative efforts is essential to maximising the impact of social enterprises in combating climate change.

Theoretical Background

Social entrepreneurship

Social entrepreneurship is fundamentally defined as a hybrid approach that utilises business ventures to address social problems, promote economic growth, and enhance community development (Abdullahi & Sallau, 2023). It operates at the intersection of social innovation and commercial strategy, serving as a transitional vehicle for creating shared value among entrepreneurs, society, and the environment (Sinthupundaja, Kohda, & Chiadamrong, 2019). Unlike traditional commercial enterprises that prioritise profit maximisation, or nonprofit organisations that rely primarily on donations, social entrepreneurship integrates the pursuit of social and environmental value with financial sustainability through innovative business models (Kamaludin, Xavier, & Amin, 2021). This dual mission requires a sophisticated operational framework where social value creation is not merely an outcome but a core component of the value proposition, often necessitating a redefinition of standard business model architectures (Todaria, Azevedo, Joã, & Ferreira, 2020).

The conceptualisation of social entrepreneurship remains complex due to its definitional elusiveness, yet it is increasingly understood through a three-dimensional framework that functions along continua of social and economic objectives (Ran, & Weller, 2021). This framework highlights that social ventures are not static entities but dynamic systems that balance competing demands. The integration of social and environmental values into business models often involves the adoption of regenerative principles, where the venture actively restores ecological systems rather than simply minimising harm (Sinthupundaja et.al., 2019). For instance, in the context of rural tourism, social entrepreneurship achieves sustainable development goals by leveraging legitimacy and social capital to ensure that economic outcomes do not overshadow social values, and this approach underscores the necessity of embedding social capital into the operational fabric of the venture, thereby enhancing its ability to generate sustained impact (Wang, Huang, & Huang, 2024).

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Social entrepreneurship is a strategic modality for effectuating sustainable impact, aiming to mitigate issues such as poverty, hunger, and unemployment, while enhancing the overall quality of life within communities facing development constraints. (Mosia, 2026). Premised on the ongoing deliberation, business models in social entrepreneurship are distinct in their emphasis on stakeholder engagement and cross-sector collaboration. Empirical analyses using fuzzy-set qualitative comparative analysis reveal that capabilities such as mission-driven leadership, stakeholder management, and environmental mindfulness are critical for shared value creation (Sinthupundaja et al., 2019). These capabilities enable social ventures to navigate the tensions between social and economic objectives, ensuring that the business model remains aligned with its foundational mission (Lambrechts, Caniëls, et al., 2020). The role of leadership, particularly servant leadership, is pivotal in this alignment, as it fosters a culture where social value creation is prioritised alongside financial performance, and this leadership style helps mitigate the inherent tensions in social ventures, facilitating a cohesive strategy that supports both growth and impact (Kimakwa et al., 2021).

The operationalisation of these values often requires innovative resource mobilisation strategies, such as effective action, which serves as a knowledge management tool in contexts of scarce resources (Malsch & Guieu, 2019). Social entrepreneurs frequently operate in environments with limited investment opportunities, necessitating the formation of cyclical social business ecosystems where interactions between entrepreneurs, investors, and stakeholders facilitate project financing through mechanisms like share transfer fees, and these ecosystems provide the structural support needed for social ventures to scale their impact while maintaining financial viability (Cato & Nakamura, 2022). Furthermore, in developing countries, social ventures often employ institutional bricolage to address hostile institutional conditions, creatively combining available resources to pursue social value despite systemic constraints (Mzembe, Novakovic, Melissen, & Kamanga,2019).

The measurement of social and environmental value within these business models is increasingly supported by frameworks that integrate triple bottom line principles. For example, the implementation of triple bottom line concepts into business model canvases in reverse logistics demonstrates how sustainable hazardous waste management can be structured to reduce environmental harm while maintaining economic feasibility, and this integration highlights the potential for business models to serve as tools for risk management and sustainable development, particularly in sectors with significant environmental impacts (Wit &

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Pylak, 2020). Additionally, the concept of natural capital provides a theoretical basis for valuing ecosystem services, allowing social ventures to quantify the environmental benefits of their operations and incorporate them into their value propositions.

Educational and policy frameworks further support the development of these business models by fostering the competencies required for social entrepreneurship. Higher education institutions are increasingly integrating social innovation into their curricula, emphasising the combination of knowledge exploitation and exploration processes to prepare students for the complexities of social venture creation (Ndou, 2021). Programs that focus on teacher-student co-entrepreneurship have shown positive effects on students' perceptions of social entrepreneurship, indicating the importance of experiential learning in developing the necessary skills (Du, Han, & Huang, 2020). Moreover, public policy guidelines play a crucial role in shaping the ecosystem for social entrepreneurship, with region-specific strategies proving more effective in nurturing robust social enterprise sectors (Tišma, et.al., 2024).

The motivational drivers for social entrepreneurs also reflect the integration of social and environmental values into their business models. Empathy and critical life events often serve as triggers for social entrepreneurship, leading individuals to pursue ventures that address societal needs (Lambrechts et.al., 2020). This personal disposition is complemented by an entrepreneurial mindset that balances interest in social causes with the practicalities of business creation (Marjerison, Chen, & Lin, 2021). In contexts such as Nigeria, social entrepreneurship is viewed as a panacea for poverty alleviation, with ventures creating jobs and providing access to essential goods and services (Arejiogbe et.al., 2023). Similarly, in Peru, the sustainability of women-led social enterprises is influenced by factors such as current employment status and entrepreneurial experience, highlighting the diverse pathways through which social value is created (Ramos Farroñán et al., 2024).

In summary, social entrepreneurship is defined by its strategic use of business models to generate social and environmental values. It is characterised by a hybrid approach that blends social mission with commercial viability, supported by capabilities in stakeholder engagement, cross-sector collaboration, and innovative resource mobilisation (Malsch & Guieu, 2019). Furthermore, Vaduva, (2024) describe social entrepreneurship as an innovative organisational model that integrates core business competencies with a primary objective of social impact generation. Unlike conventional commercial enterprises whose primary goal is profit maximisation, social entrepreneurs prioritise the development and

implementation of solutions to societal challenges. They operate sustainable enterprises that achieve financial viability while actively addressing critical social issues through targeted interventions.

The success of these ventures depends on the alignment of leadership, organisational culture, and operational strategies with the dual objectives of impact and sustainability (Kimakwa et.al., 2021). As the field continues to evolve, the integration of frameworks such as the triple bottom line and natural capital accounting will further refine the definition and practice of social entrepreneurship, ensuring that business models effectively contribute to sustainable community development (Wit & Pylak, 2020).

United Nations Sustainable Development Goal 13 (urgent action to combat climate change and its impacts, including targets on resilience, policy integration, and education).

The United Nations Sustainable Development Goal 13 (SDG 13) highlights the critical importance of taking immediate and effective actions to address climate change and its associated impacts. This goal encompasses various targets focused on building resilience, integrating climate policies into national strategies, and enhancing education related to climate change. Specifically, SDG 13 calls for strengthening adaptive capacities to climate-related hazards, embedding climate considerations into national planning, and promoting awareness and education on climate mitigation and adaptation (Bhadouria & Macknight, 2025).

Key Components of SDG 13:

- Resilience and Adaptive Capacity: The goal seeks to improve the ability of communities and nations to withstand climate-related disasters, thereby reducing vulnerability (Al-Ababneh et al., 2025).
- Policy Integration: It advocates for the incorporation of climate change considerations into national policies and planning processes to support cohesive and sustainable development (Leal Filho et al., 2023; Jung et al., 2018).
- Education and Awareness: Emphasis is placed on education and capacity-building initiatives to empower individuals and organisations in contributing to climate action (Bhadouria & Macknight, 2025).

While SDG 13 is essential in combating climate change, some critics note that its implementation can sometimes overlook its interconnectedness with other

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SDGs, which may hinder progress toward broader sustainable development objectives (Leal Filho, et al., 2023).

Global Climate Challenges, Limitations of Traditional Approaches, and the Rise of Social Entrepreneurship

The escalating climate crisis represents one of the most profound systemic challenges to global stability, necessitating a fundamental reevaluation of traditional governance and economic models. As greenhouse gas concentrations rise, the limitations of conventional state-centric and purely market-driven approaches have become increasingly apparent, creating a critical vacuum for innovative hybrid solutions. Social entrepreneurship (SE) has emerged as a pivotal mechanism in this landscape, uniquely positioned to address environmental degradation by blending commercial viability with social impact and ecological stewardship. This hybrid organisational form operates at the intersection of business and charity, leveraging entrepreneurial strategies to solve complex socio-environmental problems that neither the public nor the private sector can address in isolation (Boldyzhar & Khokhlova, 2024). The integration of mitigation and adaptation strategies within these hybrid models is no longer optional but urgently required, as historical separations between these approaches have proven insufficient for effective climate action and traditional approaches to climate change mitigation and adaptation have historically been developed and implemented in silos, often failing to account for the interconnected nature of socio-ecological systems (Howarth & Robinson, 2024). Market-based mechanisms, such as carbon trading, have dominated policy discussions but face significant ethical and practical limitations. Besides, critics argue that these mechanisms can inadvertently normalise pollution by treating it as a tradable commodity, thereby crowding out more transformative structural alternatives and failing to address the root causes of environmental degradation (Monios,2022). Furthermore, top-down command-and-control governance structures often lack the flexibility and local responsiveness required to manage the dynamic and uncertain realities of climate impacts (Cosoveanu et al., 2024). The complexity of these challenges is compounded by sociopolitical barriers, particularly in sectors like agriculture, where implementation of mitigation policies is hindered by conflicting interests and inadequate consideration of local contexts (Kabir et, al 2024). Consequently, there is a growing recognition that effective climate action requires polycentric governance frameworks that enable multiple independent

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decision-making centres to coordinate and experiment with diverse solutions (Young,2021).

In this context, social enterprises function as hybrid organisations that simultaneously pursue social missions and commercial objectives, creating a unique value proposition for sustainable development (Armstrong and Grobbelaar 2023). These entities are characterised by their ability to navigate the tensions between financial sustainability and social impact, often employing innovative business models that internalise environmental costs and generate positive externalities (Neessen et al.2021). Unlike traditional non-profits that rely heavily on donations or conventional corporations that prioritise shareholder value, social enterprises adopt a triple bottom line approach, measuring success through social, environmental, and financial performance (Premadasa et al. 2023). This hybridity allows them to access diverse funding streams, including impact investment, which is increasingly recognised as a critical determinant of their ability to scale and sustain operations (Fernandes et al. 2023). For instance, in developing countries, social enterprises are developing new funding models and promoting sustainable practices to mitigate and adapt to climate change, despite facing significant operational and regulatory challenges (Ahatsi, Nie, & Olanrewaju, 2024).

The role of social entrepreneurship in environmental sustainability is further underscored by its capacity to drive innovation and foster resilience in vulnerable communities. Research indicates that social entrepreneurs possess specific competencies, such as adaptive leadership and systems thinking, which are essential for navigating the complexities of sustainable development (Ramadani, Agarwal, Caputo, Agrawal, & Dixit, 2022). These organisations often serve as intermediaries, connecting local stakeholders with global resources and knowledge networks, thereby enhancing the effectiveness of climate adaptation efforts (Din, et al., 2021). In regions like Ghana, social enterprises are actively engaged in creating new funding models and promoting sustainable agricultural practices to enhance community resilience against climate variability (Ahatsi, Nie, & Olanrewaju, 2024). Similarly, in Indonesia, the sustainability of social enterprises is closely linked to their dynamic capabilities and innovation strategies, which enable them to anticipate and respond to changing environmental and market conditions (Desiana, et al 2022).

Moreover, the digitalisation of social entrepreneurship is reshaping how these hybrid organisations manage their dual logic, offering new tools for transparency, efficiency, and stakeholder engagement (Xiao & Beckmann, 2024). Digital platforms enable social enterprises to localise their interventions while maintaining

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global connectivity, thereby optimising their impact across different geographical contexts (Benmamoun, et al. 2020). This technological integration supports the development of more robust monitoring and evaluation systems, allowing for real-time assessment of social and environmental outcomes (Sottini, et al. 2025). However, the success of these initiatives depends heavily on the supportive institutional environment, including favourable policies, access to finance, and collaborative ecosystems (Bui et al. 2023). In Brazil, for example, the readiness of entrepreneurial ecosystems towards knowledge-intensive sustainable entrepreneurship is influenced by factors such as infrastructure, human capital, and regulatory frameworks (Siqueira et al.2023).

The strategic importance of social entrepreneurship is also evident in its contribution to the United Nations Sustainable Development Goals (SDGs), particularly those related to climate action, poverty reduction, and responsible consumption and production (Siqueira et al.2023). By addressing multiple SDGs simultaneously, social enterprises demonstrate the potential for integrated solutions that tackle the root causes of societal and environmental challenges (Rhena et al. 2024). In Ukraine, social entrepreneurship is increasingly viewed as an innovative tool for addressing acute social and environmental problems, combining entrepreneurial approaches with social missions to create sustainable value (Boldyzhar & Khokhlova 2024). This trend is mirrored in India, where social businesses are shifting the entrepreneurial landscape by emphasising both social impact and financial sustainability, thereby contributing to long-lasting beneficial change (Punye,2024).

Despite their potential, social enterprises face significant challenges, including mission drift, resource constraints, and regulatory ambiguities (Bhattacharjya, 2023). Mission drift occurs when the pressure to achieve financial sustainability compromises the organisation's social or environmental objectives, a risk that is particularly acute in hybrid organisations. Also, cultural values and institutional contexts play a crucial role in mitigating this risk, as they influence the prioritisation of social versus economic goals (Esposito, Doronzo, & Dicorato, 2022). Additionally, the lack of clear conceptual frameworks for understanding the distinctive context of social entrepreneurship in developing countries remains a barrier to effective policy support and academic research. Thus, addressing these challenges requires a deeper understanding of the antecedents of social entrepreneurial intention and the factors that contribute to the long-term sustainability of these ventures (Bergner et al., 2022).

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Taking into consideration the ongoing discussion, the rise of social entrepreneurship represents a critical evolution in the global response to climate change and sustainable development. By blending profit, social impact, and environmental sustainability, these hybrid organisations offer a viable alternative to traditional approaches that have failed to address the complexity of contemporary challenges adequately. Their ability to innovate, adapt, and collaborate across sectors positions them as key actors in the transition towards a more resilient and equitable future. However, realising their full potential requires sustained support from policymakers, investors, and civil society, as well as continued research into the mechanisms that enable their success and sustainability (Karadayı, Yazıcı, & Akdemir Ömür, 2024). The integration of anticipatory governance principles and polycentric frameworks can further enhance the effectiveness of social enterprises, ensuring that they remain responsive to the evolving needs of both people and the planet (Creutzig et al., 2024).

Intersection Between Social Entrepreneurship and United Nations Sustainable Development Goal (SDG) 13

Social entrepreneurship has become a strong way to tackle deep-rooted social, environmental, and economic problems in order to achieve sustainable development.It refers to business activities that are based on a social purpose and also aim to be financially successful.Unlike traditional entrepreneurship, which mainly focuses on making money, social entrepreneurship looks for opportunities that can create value in social, environmental, and economic areas at the same time.At the heart of sustainable development are the United Nations Sustainable Development Goals (SDGs), a global plan introduced in 2015 that aims to balance the needs of people, the planet, and economic growth.The connection between social entrepreneurship and the SDGs offers a clear way to see how businesses with a mission can help make the world more sustainable, resilient, and inclusive. (Attah, & Yonkor, 2025). It functions as a critical mechanism for climate action by embedding environmental sustainability into the core of viable business models, thereby facilitating the transition toward a low-carbon economy (Kumar and Tyagi, 2025). By prioritising green innovation and climate-smart practices, these enterprises actively mitigate environmental risks through the deployment of renewable energy projects and the development of carbon-free products (Zhao,2025). Furthermore, these organisations increasingly adopt circular economy concepts and climate-adaptation strategies ranging from drought-resilient agriculture to resource-efficient systems, which strengthen community resilience

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against climate-related threats (Adithya et.al.,2025). By prioritising these "green policy" frameworks, social enterprises are successfully aligning local development goals with global decarbonisation efforts (Wronka-Pospiech,2023). Moreover, by leveraging impact investment and technological innovation, these ventures transcend traditional profit-seeking to address systemic environmental challenges such as pollution and resource depletion (Sharma & Subba, 2025; Wronka-Pośpiech & Twaróg,2024). Specifically, the adoption of digitisation and artificial intelligence allows these entities to optimise resource efficiency and scale their impact, facilitating a broader transition toward decarbonisation (Wronka-Pośpiech & Nghargbu, 2024). This "twin transition" effectively integrates environmental stewardship with technical scalability, enabling social enterprises to implement low-carbon solutions that directly address the complex systemic challenges of climate change (Gayathiri and Parvathi,2026). Furthermore, this intersection of social and green entrepreneurship acts as a catalyst for eco-social innovation, fostering inclusive business models that empower marginalised communities to actively participate in climate mitigation (Lahmidi et.al., 2025). These ventures also serve to bridge the gap between policy objectives and grassroots action, demonstrating that sustainable practices such as waste-to-resource transformation and renewable energy adoption can foster both ecological restoration and long-term economic viability (Mishra and Sexana, 2025).

Beyond these environmental outcomes, the integration of green business practices within small and medium-sized enterprises further enhances operational resilience against climate-related resource scarcity and extreme weather events (Omowole et al.,2024). In line with the ongoing assertion, it is important to affirm that social entrepreneurship plays a crucial role in promoting sustainable development by devising innovative solutions to address environmental, social, and economic challenges. Through initiatives in sectors such as renewable energy, sustainable agriculture, and waste management, social entrepreneurs significantly contribute to achieving Sustainable Development Goal 13 (SDG 13), which emphasises climate action. Empirical evidence indicates that social entrepreneurs utilise local resources, foster community engagement, and employ innovative strategies to mitigate climate change and promote environmental sustainability (Kumar and Tyagi, 2025). Their contributions encompass expanding access to renewable energy sources, enhancing waste management systems, and supporting climate adaptation and resilience efforts. In addition, various models and mechanisms, including microfinance initiatives and community-based enterprises, have demonstrated effectiveness in fostering sustainable practices and empowering

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local populations (Bangura & Lourens, 2025). Moreover, the field of social entrepreneurship has matured into a professional domain supported by frameworks that facilitate systemic change and generate enduring social and environmental impacts; nonetheless, several limitations persist, notably the paucity of comprehensive longitudinal data regarding the environmental sustainability outcomes of social entrepreneurship initiatives (Lahmidi et al., 2025). Additionally, regional disparities, particularly within areas such as CEN-SAD and ECOWAS, pose significant challenges due to funding constraints, weak institutional support, and regulatory barriers (Bangura & Lourens, 2025). While social entrepreneurship exhibits substantial potential in addressing climate-related issues and advancing sustainable development, further research is essential to deepen understanding of these contextual factors and to enhance the scalability and sustainability of successful models across different regions.

Materials and Methods

This study employs a scoping review methodology grounded in the framework initially established by Arksey and O'Malley (2005), subsequently refined by Levac et al. (2010) and Tricco et al. (2022). Bangura and Lourens (2026) affirmed that scoping reviews are utilised primarily to assess the extent of evidence available on a particular subject, elucidate the various conceptual perspectives involved, and identify gaps that warrant future research. Unlike systematic reviews that aim to address specific policy-related questions, scoping reviews are oriented toward mapping and synthesising the existing body of knowledge. Given the nascent state of social entrepreneurship and the multidisciplinary nature of the evidence base, this approach was deemed most appropriate. The review protocol was developed in accordance with the PRISMA Extension for Scoping Reviews guidelines (Tricco et al., 2022), which provide a standardised framework for reporting scoping reviews. The protocol delineated the research questions, inclusion and exclusion criteria for studies, search strategy, data extraction procedures, and the approach for synthesising results prior to the commencement of the review.

Stage 1: Specify the research question i) How do social enterprises operationalise their hybrid business models to address the specific targets of SDG 13 ii) What are the documented systemic barriers that influence the scalability and long-term sustainability of social enterprises in climate action? iii) What outcome measures and methodological approaches have been used to assess the environmental impact of social entrepreneurship on climate change mitigation and adaptation

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Stage 2: Identifying relevant studies. Information sources were searched from reliable and relevant academic sources such as Scopus, Web of Science, ABN Inform, PubMed, Google Scholar, grey literature via reports from UN, OECD. Date range (e.g., 2020–present, post-SDGs adoption). The Search strategy was aided by keywords: *Social Entrepreneurship, Climate Action (SDG 13), Hybrid Business Models, Sustainable Development, and Systemic Barriers*

Stage 3: Study selection Based on the current review protocol, the inclusion criteria encompassed only peer-reviewed articles, reports, and case studies pertinent to sustainable entrepreneurship and climate change. Exclusion criteria comprised non-English publications, studies focusing exclusively on conventional entrepreneurship without integration of organisational, ethical, or policy dimensions, as well as opinion pieces lacking empirical data or theoretical frameworks. Additionally, conference abstracts devoid of accessible full-text manuscripts were omitted. The selection process entailed an initial screening of titles and abstracts, followed by full-text review to determine eligibility. The study selection workflow was documented using a PRISMA flow diagram.

Stage 4: Extracting, mapping, and charting the data, the framework allowed for the synthesising and interpreting qualitative data.

Stage 5: Summarize, synthesise, and report the results

In the regard to a qualitative thematic analysis the report the results within the context of the research aims and the findings were also reported within the context of future research, practice, and policy.

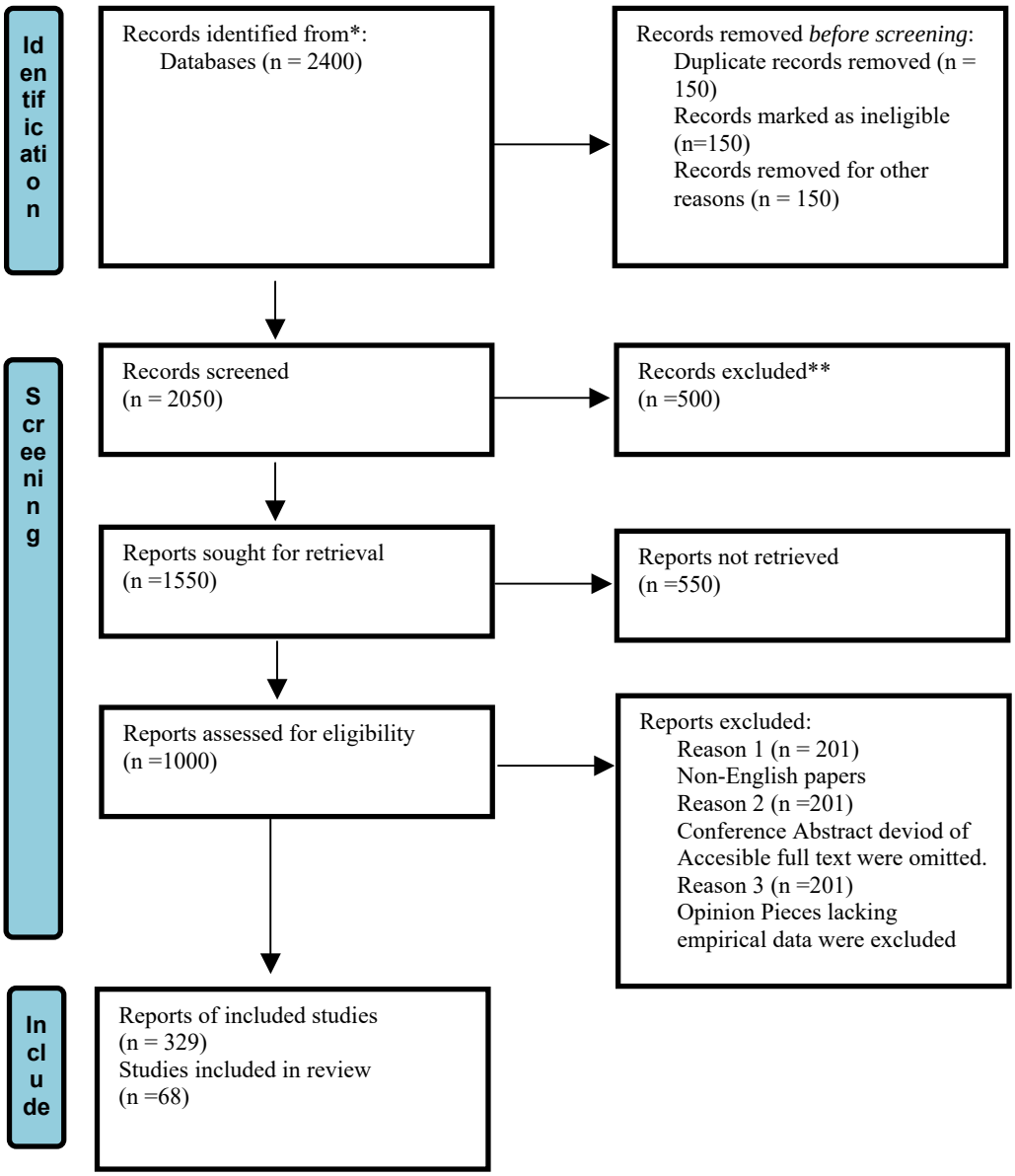
Stage 6: Integrate expert consultation

In this category, the study incorporates knowledge from experts and other key stakeholders. On the same token, consultation with stakeholders offers added contextual value, which allows for the gathering of valuable insights that may not be visible within literature.

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Figure 1. PRISMA Guidelines



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Findings and Discussion

This review synthesises the research findings pertaining to social entrepreneurship and its intersection with United Nations Sustainable Development Goal 13 (Climate Action). The analysis delineates four overarching themes emerging from the literature: (1) The Hybrid Nature of Social Entrepreneurship, (2) Capabilities and Leadership for Dual Mission Achievement, (3) Resource Mobilisation in Constrained Environments, and (4) The Integration-Education Paradox in Climate Action. Each theme is subjected to critical examination in relation to the relevant theoretical frameworks and existing scholarly discourse.

Theme 1: The Hybrid Nature of Social Entrepreneurship as a Strategic Imperative

The findings consistently characterise social entrepreneurship as fundamentally embodying a hybrid approach that operates at the nexus of social mission and commercial viability. This hybridity transcends mere structural characteristics, representing a strategic necessity for addressing complex socio-environmental challenges.

Interpretation and Significance

The conceptualisation of social entrepreneurship as existing along "continua of social and economic objectives" (Ran & Weller, 2021) signifies a notable departure from traditional binary classifications of organizations as either profit-oriented or nonprofit entities. This observation aligns with Abdullahi and Sallau's (2023) definition of social entrepreneurship as a "hybrid approach" that employs business ventures to address social issues while fostering economic development. The dynamic nature of this hybridity where ventures are described as "not static entities but dynamic systems that balance competing demands" suggests that successful social enterprises must perpetually negotiate tensions rather than attain a fixed equilibrium. Critically, the findings extend this understanding by introducing regenerative principles as a distinguishing characteristic. Unlike conventional corporate social responsibility, which often emphasises harm minimisation, social entrepreneurship within the environmental domain actively endeavours to restore ecological systems (Sinthupundaja, Kohda, & Chiadamrong, 2019). This regenerative orientation holds relevance to SDG 13, which advocates for enhancing resilience and adaptive capacity. Social enterprises that embed restorative practices into their operational models transcend mere mitigation of climate impacts, contributing instead to ecological recovery a distinction bearing significant implications for the conceptualisation and assessment of climate action.

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Critical Reflection

While the findings valorise hybridity as a strength, scholarly discourse recognises an enduring tension: the potential risk of mission drift. As Bhattacharjya (2023) notes, the pressures exerted by the pursuit of financial sustainability can undermine social or environmental objectives. Although the findings acknowledge this risk, they do not thoroughly explore how a regenerative orientation might influence the propensity for mission drift. For example, regenerative practices often require extended investment horizons and may yield lower short-term financial returns, thereby heightening economic pressures on social enterprises. Future scholarly inquiry should investigate whether ventures emphasising regenerative principles experience distinct patterns of mission drift relative to those primarily focused on harm reduction.

Theme 2: Capabilities and Leadership for Dual Mission Achievement

The findings identify critical capabilities: mission-driven leadership, stakeholder management, and environmental mindfulness that underpin the creation of shared value (Sinthupundaja et al., 2019). Servant leadership emerges as particularly pivotal in cultivating an organisational culture wherein social value creation is prioritised alongside financial performance (Kimakwa et al., 2021).

Interpretation and Significance

The emphasis on servant leadership possesses notable theoretical implications, as it challenges dominant paradigms of entrepreneurial leadership characterised by aggressive growth and shareholder primacy. Servant leadership's focus on empowering stakeholders and serving the collective good resonates inherently with the dual objectives of social entrepreneurship. The findings suggest that such leadership "facilitates the mitigation of inherent tensions in social ventures, fostering a cohesive strategy that supports both growth and impact." This capability framework directly addresses a core challenge articulated within the SDG 13 literature: the necessity for polycentric governance and adaptive management. Climate change is characterised by uncertainty, nonlinear dynamics, and localised variability, conditions demanding flexible, learning-oriented leadership rather than rigid command-and-control mechanisms. Competencies associated with adaptive leadership and systems thinking (Ramadani et al., 2022) position social ventures as viable agents for implementing SDG 13's resilience objectives at community levels.

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Cross-Theme Connection

The capability related to stakeholder engagement directly correlates with the concept of cross-sector collaboration. Social enterprises are depicted as "intermediaries, connecting local stakeholders with global resources and knowledge networks" (Din et al., 2021). This brokerage function is particularly salient for SDG 13 implementation, given that local communities often lack access to climate finance and technical expertise, whereas global institutions may lack nuanced local knowledge necessary for effective adaptation. Social enterprises that develop robust stakeholder management capabilities can bridge these informational and resource gaps and insight of practical relevance for development practitioners.

Critical Reflection

However, the findings tend to treat these capabilities as broadly universal without sufficiently accounting for contextual variability. The study by Ramos Farroñán et al. (2024), focusing on women-led social enterprises in Peru, notes that sustainability is influenced by factors such as "current employment status and entrepreneurial experience." This suggests that pathways to capability development may differ substantially across gender, cultural, and economic contexts. A more nuanced approach would explore how structural factors like patriarchal norms, access to education, and property rights influence the feasibility of servant leadership and stakeholder management in diverse environments.

Theme 3: Resource Mobilisation in Constrained Environments

The findings highlight innovative resource mobilization strategies employed by social entrepreneurs, including effectuation as a knowledge management tool (Malsch & Guieu, 2019), cyclical social business ecosystems (Cato & Nakamura, 2022), and institutional bricolage (Mzembe et al., 2019).

Interpretation and Significance

Institutional bricolage the creative recombination of available resources to pursue social value amidst systemic constraints is particularly pertinent to climate action in developing nations, where formal institutions supporting environmental governance may be deficient or absent. This insight challenges resource-based theories that positing efficient resource allocation assumes well-functioning markets and property rights. Instead, social entrepreneurs in contexts such as Ghana (Ahatsi, Nie, & Olanrewaju, 2024) demonstrate that meaningful climate adaptation is feasible through strategic recombination of existing resources, including social capital, indigenous knowledge, and informal networks. The description of cyclical social business ecosystems, characterized by "interactions

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among entrepreneurs, investors, and stakeholders to facilitate project financing through mechanisms such as share transfer fees" (Cato & Nakamura, 2022), marks an important divergence from traditional impact investing models. Rather than relying solely on philanthropic grants or commercial debt, these ecosystems generate internal financial circuits that recycle capital within the social enterprise sector. This approach bears significant implications for SDG 13 financing, an area marked by chronic underfunding despite increasing political commitments.

Critical Reflection

While the findings recognize resource constraints, they do not sufficiently confront scalability issues. Although bricolage and effectuation are effective techniques for launching initiatives in resource-limited environments, the extent to which they can support the large-scale interventions necessary for substantial climate change mitigation remains uncertain. As highlighted by Bangura and Lourens (2025), persistent regional disparities within economic blocs such as CEN-SAD and ECOWAS stemming from "funding constraints, weak institutional support, and regulatory barriers" may inhibit the capacity of social enterprises to transcend niche roles. This tension balancing local adaptation with the need for broader scalability presents a vital avenue for future inquiry.

Theme 4: The Integration-Education Paradox in Climate Action

The findings address the dual themes of integration embedding climate considerations into business strategies and national policies and education building competencies via higher education and experiential learning. As SDG 13 targets both policy integration and climate education, this theme holds relevance.

Interpretation and Significance

Integration is exemplified by the adoption of triple bottom line frameworks and natural capital accounting within business models (Wit & Pylak, 2020). By quantifying ecosystem services and environmental benefits, social enterprises can incorporate these values into their value propositions, rendering visible the environmental outcomes often omitted from conventional accounting. This aligns with Filho et al.'s (2023) calls for embedding climate considerations into national policies and planning processes to foster sustainable development. The educational dimension is reflected in increasing incorporation of social innovation into higher education curricula (Ndou, 2021) and the observed positive influence of "teacher-student co-entrepreneurship" on students' perceptions of social entrepreneurship (Du, Han, & Huang, 2020). Such findings imply that educational interventions can shape entrepreneurial intentions and equip students with the skills necessary for social venture creation.

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The Paradox Identified

The findings reveal what may be termed the integration-education paradox: although SDG 13 advocates for both policy integration and climate education, these objectives may function at cross-purposes in practice. Policy integration aimed at mainstreaming climate considerations into existing institutional frameworks tends toward standardization and institutional permeability, translating climate concerns into the language and priorities of sectors such as transportation, energy, and agriculture. Conversely, effective climate education aimed at fostering social entrepreneurship entails critical thinking, experimentation, and a readiness to challenge prevailing frameworks characteristics which standardized policies and bureaucratic structures may inhibit. The findings allude to this tension indirectly, citing that "region-specific strategies are more effective in nurturing resilient social enterprise sectors" (Tišma et al., 2024) and that "top-down, command-and-control governance often lacks the flexibility and local responsiveness necessary" (Cosoveanu et al., 2024). Nevertheless, the paradox itself remains unnamed and under-theorised.

Critical Reflection

If the integration-education paradox holds, efforts to mainstream social entrepreneurship into national climate policies risk diluting the innovative and adaptive capacities that make social enterprises effective. Conversely, preserving the autonomy and experimental orientation inherent in social enterprise education may hinder their integration into formal climate governance structures. Addressing this tension likely necessitates polycentric governance models (Young, 2021), which facilitate coordination among diverse decision-making centers without enforcing homogenization thus supporting both innovative experimentation and policy integration simultaneously.

Synthesis and Theoretical Implications

Reconciling Competing Demands

Across all four identified themes, a fundamental tension is evident: social enterprises are required to concurrently fulfill varying demands imposed by diverse stakeholders, institutional logics, and temporal frameworks. The empirical evidence indicates that successful ventures do not achieve a permanent resolution of this tension; rather, they develop dynamic capabilities that facilitate continuous negotiation and re-balancing. This perspective challenges static contingency theories that seek to determine optimal organizational forms tailored to specific

environmental conditions. Instead, social entrepreneurship necessitates what may be termed dialectical competence the capacity to sustain contradictory demands in a productive tension without premature resolution.

Contribution to SDG 13 Theory

The findings advance the scholarship surrounding SDG 13 in three significant respects. First, they substantiate that social enterprises contribute to climate action through mechanisms distinct from those of state regulation and market-based approaches. While governmental bodies impose mandates and markets generate price signals, social enterprises foster relational infrastructure encompassing trust, social capital, and collaborative networks that enables communities to adapt collectively. Second, the results illustrate that climate resilience and mitigation are mutually reinforcing rather than conflicting objectives when pursued via hybrid business models. For instance, regenerative agriculture can simultaneously sequester carbon (mitigation) and enhance drought resistance (adaptation). Third, the study demonstrates that educational interventions influence not only knowledge acquisition but also the entrepreneurial identity, bearing implications for how climate action is conceptualized and pursued across successive generations.

Limitations of Existing Literature

Several limitations are acknowledged within these findings, meriting further discussion. Foremost is the "paucity of comprehensive longitudinal data regarding the environmental sustainability outcomes of social entrepreneurship initiatives" (Lahmidi et al., 2025), which constitutes a considerable research gap. Most existing studies utilize cross-sectional designs, case studies, or qualitative interviews; the absence of longitudinal data tracking the progression of ventures over time impedes the ability to ascertain whether social enterprises maintain their environmental outcomes, experience mission drift, or cease operations due to financial constraints. Furthermore, the body of research predominantly reflects contexts from specific geographical regions including Nigeria, Peru, Indonesia, Brazil, India, and Ukraine without systematic comparative analysis. While such diversity is valuable, it raises questions about the generalizability of findings. Strategies rooted in institutional bricolage that prove effective in rural Ghana might have limited relevance in urban settings within Europe or North America, where regulatory frameworks are more established but face different political obstacles to climate action.

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Practical Implications

For Social Entrepreneurs

The findings suggest that social entrepreneurs should emphasize the development of measurement systems capable of capturing triple bottom line outcomes, especially environmental benefits that may lack immediate monetary valuation. Incorporating natural capital accounting (Wit & Pylak, 2020) offers a practical framework for such measurement. Additionally, entrepreneurs are encouraged to actively cultivate servant leadership and stakeholder engagement practices, recognizing these relational assets as vital for long-term sustainability alongside financial considerations.

For Policymakers

The evidence indicates that region-specific strategies (Tišma et al., 2024) outperform generic, one-size-fits-all approaches in supporting social enterprise development. Policymakers should also address regulatory ambiguities such as unclear legal classifications, tax treatments, and eligibility criteria for public procurement that introduce uncertainty for social enterprises (Bhattacharjya, 2023). However, the integration-education paradox warrants caution; it may be necessary to preserve experimental spaces through regulatory sandboxes or special zones where standard rules are relaxed to foster innovation and social enterprise growth.

For Educators and Researchers

Higher education institutions should broaden experiential learning opportunities in social entrepreneurship, moving beyond theoretical instruction toward models involving co-entrepreneurship between educators and students (Du, Han, & Huang, 2020). Researchers are called to prioritize longitudinal studies that monitor social enterprise outcomes over extended periods, as well as comparative analyses exploring how diverse institutional contexts influence the feasibility and efficacy of various capability-development pathways.

Conclusions

This thematic analysis has identified four interconnected themes linking social entrepreneurship with SDG 13: the strategic necessity of hybridity, capabilities and leadership essential for dual mission accomplishment, resource mobilisation within constrained environments, and the paradoxical nature of integration and education. Collectively, these themes demonstrate that social enterprises advance climate action not by resolving inherent tensions between social and commercial objectives but by cultivating dynamic capabilities to navigate such tensions productively. The

hybrid character of social entrepreneurship its aptitude for blending profit-making, social impact, and environmental stewardship positions it as a vital mechanism for achieving SDG 13 targets, particularly in contexts characterised by limited state capacity or market failures. Nevertheless, actualising these potential demands sustained attention to the paradoxes and tensions intrinsic to hybrid organisational forms, alongside ongoing investment in longitudinal research, contextual analysis, and supportive institutional frameworks. Ultimately, the findings suggest that social entrepreneurship is not a panacea for climate change but an indispensable complement to state regulation and market mechanisms distinctive in its capacity to foster the relational infrastructure upon which effective climate action depends.

Disclosure of Interest

"The authors declare no competing interests".

AI disclosure Statement

During the preparation of this work, the author(s) used [https://goblin.tools/Formalizer] to [check grammar and clarity]. After using this tool, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content.

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STRATEGIC MANAGEMENT OF SMALL-SCALE POULTRY PRODUCTION: RURAL ECONOMIC DEVELOPMENT

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Abstract

Small-scale poultry plays a critical role in employment, food security and income generation for rural economic development in South Africa. However, the poultry industry faces challenges such as high costs, limited access to formal markets and disease outbreaks. This study applies the dynamic capabilities theory to examine how small-scale poultry farmers can enhance their strategic management practices to be competitive. It will also explore barriers of growth experienced by small scale farmers in the poultry industry in South Africa, and furthermore to assess the strategic importance of this sector to the development of a rural economy. Drawing on qualitative research design, this study adopted semi-structured interviews conducted on informal small-scale farmers operating in poultry production. Thematic analysis was used to identify patterns relating to strategic alignment, message interpretation and dynamics. The study highlights the importance of sensing, seizing and configuration capabilities in navigating environmental uncertainties. The paper concludes that implementation of dynamic capabilities can significantly improve the sustainability and performance of informal small-scale poultry farmers. Practical implications are that small-scale poultry farmers must emphasise the need for targeted financial support,

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marketing training, and strategic management interventions to ensure the long-term sustainability of small-scale poultry enterprises.

Keywords: *dynamic capability theory, growth strategies, poultry industry, rural development, small-scale farmers*

JEL Classification:M11, M31

1. Introduction

Rural communities are disproportionately affected by unemployment and poverty (Bounds & Zinyemba, 2018). Despite the significant contribution of the poultry business to mitigating food insecurity, enhancing rural livelihoods, and sustaining numerous households, most governments in developing nations assign less attention to this industry, as examined by Nkukwana (2018). Despite its potential, the sector is constrained by structural inefficiencies, including limited access to finance, volatile input prices and poor infrastructure which makes it difficult to manage strategy implementation.

Traditional strategic management approaches, which emphasise static resource allocation, are insufficient in such a dynamic environment. The dynamic capability theory is adopted because it provides a more suitable framework by empathises on organisational ability to adapt, innovate and transform resources in response to changing conditions (Teece et al., 1997). There is substantial literature on strategic management and the challenges business faces with implementation (Aondo, 2023; Baliyan & Marumo 2016; Banerjee & Ghosh 2021; Otiwa, Ojie & Marshal-Agbe 2024). Despite smallholder farming accounting for 60-66% of food consumption in sub-Saharan Africa, insufficient input in crop and livestock production leads to relatively low agricultural productivity, often intensifying low income, poverty, and high unemployment rates (Nyoni et al., 2022).

Sustainable poultry farming requires knowledge to quickly adapt to the environment, policy changes and market. However, these abilities are generally straightforward and may be imparted to rural populations with minimal or no formal schooling. Most farmers possess expertise about substantial poultry farming, as it is customary for many to maintain a small number of poultries in their backyards in South Africa, as noted by Bounds and Zinyemba (2018). This study introduces rural small-scale poultry farmers, as noted by Bounds and Zinyemba (2018), to engage in semi-intensive poultry farming to generate income and enhance their nutritional needs, hence improving their living conditions. Small-scale poultry farms are essential to South Africa's economic development by

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supporting livelihoods and generating employment. However, small-scale poultry farms frequently face challenges to expansion and sustainability due to several factors, including restricted access to institutional financing. Funding institutions, especially banks, exhibit hesitance in providing financing due to information asymmetries, inadequate collateral such as land and property, low financial literacy levels, and the prevalence of unregistered enterprises, among other factors (Zondi et al., 2025). The study aims to demonstrate that poultry farming can be employed to mitigate rural unemployment and poverty in South Africa.

The purpose of this exploratory study is to explore barriers of growth experienced by small-scale farmers in the poultry industry in South Africa, and to assess the strategic importance of this business sector to the development of a rural economy. Equally important to explore business backing needed by small-scale farmers operating within the informal sector. The following research questions informed the study:

- What are the barriers of growth experienced by small-scale farmers in the poultry industry in South Africa?
- What is the strategic importance of this business sector to the development of rural economy?
- What factors are equally important to explore business backing needed by small-scale farmers operating within the informal sector?

2. Literature Review

Theoretical Foundation of Dynamic Capability Theory

This study is underpinned by the Dynamic Capability Theory (DCT) which is a strategic management concept that examines how small-scale poultry farmers can adapt, integrate and reconfigure their internal and external resources to survive and succeed in the changing environment (Teece *et al.,* 1997). This theory goes beyond just having resources like finance. It mainly focuses on organisational ability to change its resources effectively over time through strategic management implementation. This theory aids the study on how small-scale poultry farmers respond quickly and strategic intelligent they can change what the situation at hand.

Dynamic capability theory is divided into three main activities the sensing, seizing and reconfiguring which is (transforming). This study will identify the opportunities and threats in the poultry environment, what the poultry small-scale farmers are doing to capture the opportunities for example entering a new market or investing in a new product. Lastly are they configuring to adjust the internal

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structures, resources and processes for example restructuring their businesses to adopt new models. This application of dynamic capability theory to small-scale farmers is practical way to give an understanding why small-scale poultry farmers are struggling to strategically manage under uncertainty conditions. The core idea of dynamic capability theory to this study is for small-scale farmers to reconfigure the scarce resources which is the capital, land and labour efficiently and to encourage a continuously learning and innovation despite the challenges of the constraints.

Dynamic capability theory emerged as an extension of the resources-based view (RBV), addressing its shortfalls in rapidly changing environments. Teece *et al.* (1997), defined the theory as the organisational ability to integrate, innovative and reconfigure both the internal and external capabilities to address changing environments. Small-scale farmers must focus on three components sensing opportunities and threats, seizing opportunities and reconfiguring or transforming resources. These three capabilities enhance organisations to achieve and sustain competitive advantage.

Dynamic Capabilities in SMEs

Dynamic capability is particularly relevant for small-scale farmers which operate in resources-constrained environments. Sousa and Mmadubuko (2025) research show that SMEs with strong dynamic capabilities are better able to respond to environmental challenges, innovate and improve performance. In small-scale poultry industry dynamic capabilities manifest through flexible production systems, adoption of new technologies and strategic partnerships and networks.

Strategic management in Rural entrepreneurship

Effective strategy management in rural entrepreneurship is important to a business success, although it is often more challenging to be implemented (Alkhodany, 2023; Evans 2024; Rego *et al.*, 2022). Despite the significant focus on strategic management in academic research, rural entrepreneurship implementation remains a difficult and underexplored area (Christie & Tippmann 2024; Elbanna, Colak *et al.,* 2026; Fumasoli & Hladchenko, 2023). Even a well-formulated strategy can fail, if not implemented effectively, highlighting the need for a holistic approach that integrates the implementation process, communication, financial support, processes and management support (Alkhodany 2023; Ferreira & Carayannis, 2022).

For a considerable time, researchers have proposed various models and frameworks to address strategic management implementation obstacle. For

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instance, Allam *et al.* (2024) emphasised the importance of management support, communication and employee buy-in in strategic management, while Gichuki *et al.* (2024) argued for the integration of implementation considerations from the formulation stage. Holm *et al.* (2025) identified eight levers for successful strategy implementation, focusing on structure and skills. Despite these insights, the literature acknowledges that failure to implement strategic management effectively remains a significant challenge.

The strategic management implementation challenge is exacerbated by the complexity of tasks, need for continuous adaptation and involvement of multiple stakeholders (Gichuki *et al.*, 2024; Holm *et al.*, 2025). Previous studies have identified numerous strategic management implementation challenges, including the influence of top management, upper management's role and the clarity of the strategic message (Aondo 2023; Banerjee & Ghosh, 2021). Addressing these challenges is crucial for overcoming the multi-layered barriers of strategy management implementation and ensuring organisational success (Baliyan & Marumo 2016).

Strategic significance of the poultry industry (Agricultural SMEs)

The poultry industry is the largest agricultural subsector in South Africa, contributing to employment and protein consumption as noted by Kleyn and Ciacciariello (2021), Poultry industry contributes to poverty alleviation, rendering the establishment of dynamic poultry industry essential for social welfare and a fundamental aspect of the economy in numerous locations. 'Poultry' denotes domesticated birds, particularly those esteemed for their flesh and eggs, including chickens, turkeys, ducks, geese, and guinea fowl, as examined by Nkukwana (2018). In South Africa, Poultry farming generally means the production of domesticated birds such as broilers for meat, layers for eggs, and a small segment consisting of turkeys and ostriches (Rameetse, 2023). Poultry farming, as defined by SME South Africa (2024), is the cultivation of chicken for meat production or egg production. According to SME South Africa (2024) and Mncwango (2025), chicken farming is generally less complex than other forms of animal husbandry. Poultry meat and eggs are the primary source of animal protein in the global human diet. Poultry, in contrast to cattle, possesses lower energy requirements for bodily maintenance, making them highly efficient converters of feed into meat and eggs. The price of these goods has remained comparatively low compared to the cost of beef and mutton, as elucidated by the South African Poultry Association (2025). Poultry production is driving the increase in livestock production in both emerging

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and developed economies; in particular, output in developing nations surpasses that of developed countries, (Kleyn & Ciacciariello, 2021).

The South African poultry industry has progressed in accordance with global trends observed in many wealthy nations (Nkukwana, 2018). The industry is characterised by a predominance of some fully integrated major commercial producers alongside numerous small-scale farmers, who operate either as contract growers or individual suppliers only in the informal market, as explained by Nkukwana (2018). Poultry constitutes a significant subsector within the cattle industry. It persistently bolsters the economy by generating work possibilities for rural and semi-urban residents, providing accessible protein supplies for the expanding population, and offering sources of income for millions in South Africa. Kleyn and Ciacciariello (2021) assert that the poultry industry has evolved to meet the heightened demand for affordable, safe goods by enhancing its efficiency. Poultry possesses numerous competitive advantages over alternative sources of animal protein from a consumer standpoint. These encompass convenience, uniform product quality, the lack of religious restrictions, a favourable image (white meat), economical production, a steady influx of novel products, and cost-effectiveness.

In addition to its significance as a food source and a major contributor to the national Gross Domestic Product (GDP), the poultry business plays a vital role in creating employment opportunities across both formal and informal sectors. Over 80% of its establishment comprises Small, Medium, and Micro Enterprises (SMMEs), as articulated by Bounds and Zinyemba (2018). Poultry farming is seen as a poverty alleviation approach in South Africa and is a crucial element of the agricultural economy, serving multiple purposes such as food production, nutritional enhancement, income generation, savings, and fulfilling social and cultural roles (Rahman *et al*., 2020). Employment opportunities are diminishing daily due to accelerated population increase. Commercial poultry farming serves as a significant source of revenue and employment, promoting self-sufficiency (Roy's Farm, 2020). Poultry farming is a prevalent and profitable enterprise. In South Africa, there is significant demand for chicken meat, presenting an opportunity for individuals in rural regions to establish poultry farming businesses, as noted by SME South Africa (2024).

Poultry meat and its by-products continue to be the most economical and readily available source of protein for millions in South Africa. The increasing demand for chicken meat and eggs presents numerous chances for small-scale farmers to transition to commercial production within the local chicken sector

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(Mncwango, 2025). Poultry farming, as noted by Bounds and Zinyemba (2018), may serve to mitigate rural unemployment and poverty. The success of such projects depends on farmers obtaining technical and financial support, with practical training seen as the most effective type of instruction. A little poultry farm situated in Mangqukela village, Eastern Cape, South Africa, received economic support from the Eastern Cape Rural Development Agency (ECRDA) in 2022, according to Ryan (2025). The ECRDA's funding facilitated the growth and expansion of the small-scale business's activities. The business owner states that her enthusiasm for chicken farming began while she was helping her grandmother manage her backyard poultry business.

Enterprise upgrading in African Contents (Challenges encountered)

Approximately 2.5 billion individuals rely on small-scale agriculture worldwide (FAO, 2013), a significant number of whom exist beneath the poverty threshold, estimated at 1.90 USD per day (WHO, 2020). The viability and profitability of small-scale poultry farms are jeopardized by escalating feed costs, the importation of less expensive broiler meat, increasing electricity tariffs, and challenges in accessing finance and markets, as articulated by Ramukhithi *et al*. (2023). Small-scale chicken farms, as examined by Rahman (2021), are vital for the socio-economic advancement and nutritional needs of rural and peri-urban households, serving as a source of income for resource-constrained regions. Consequently, prioritizing small-scale poultry farms is essential. However, inadequate management, disease outbreaks, market volatility, financial accessibility, and various other issues generally influence the sustainability of this developing industry in South Africa. Financial resources are crucial for the sustainable development and viability of small poultry farms (Msomi & Olarewaju, 2021; Levin, 2023). Access to external capital is essential for enhancing start-up enterprises, and emerging SMEs in the poultry sector serve as a significant means to address issues such as equitable income distribution and unemployment (Fatoki, 2014).

Despite their ability to contribute to sustainable economic development, small poultry farms frequently encounter difficulties in obtaining the requisite financing for expansion and capitalizing on new opportunities. Moreover, access to funding for small poultry farms is restricted, especially for businesses functioning within the informal sector (Huang *et al.,* 2020). Restricted loan availability for small poultry farms, as noted by Zondi *et al*. (2025), is affected by a confluence of supply and demand factors. Market defects, such as knowledge asymmetries, are common

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on the supply side. Small poultry farms frequently lack the extensive financial documentation necessary for banks to assess credit applications, hindering lenders' ability to evaluate their creditworthiness which forms a strategic management alignment (Abraham & Schmukler, 2017; Zondi *et al.,* 2025).

Conventional lending practices often necessitate collateral to aid banks in evaluating and mitigating credit risk; however, numerous small poultry farms do not possess adequate collateral (Jaabi, 2018; Abraham & Schmukler, 2017; Huang *et al.,* 2020). Furthermore, SMEs frequently possess inadequate high-quality financial data (Huang *et al*., 2020). In South Africa, primary barriers hindering the formal financial system from providing credit to small enterprises comprise insufficient investment capital, inadequate collateral, and deficient financial records (Asah *et al*., 2020). Demand-side issues encompass the prevalent low financial literacy among small poultry business proprietors, as observed by Fatoki (2021). Additional demand variables encompass internal obstacles that lead to the failure of newly founded micro-entrepreneurs, including inadequate management experience, insufficient staff training, and a deficiency in operational abilities (Fatoki, 2014).

The management style of small-scale poultry farms is a crucial factor in determining commercial success or failure. If entrepreneurs cannot devise effective strategies to address misalignments, mitigate dangers, or capitalize on available opportunities, the business will continue to struggle or, worse, face closure. In contrast to major businesses, the proprietor of this small chicken farm predominantly makes decisions independently, and there is a tendency for business to fail owing to insufficient management abilities, as noted by Jayasekara *et al*. (2020). According to Kalane (2015), managerial and financial factors are primary contributors to small business failures, with respondents noting a deficiency in business, financial management, and marketing skills. The deficiency in business and management competencies was also a significant factor contributing to the collapse of SMEs. Moreover, Kalane's study emphasized that educational qualifications and managerial skills significantly influence the success or failure of small firms. According to Kuttner *et al.* (2023), small-scale poultry businesses frequently struggle to establish sufficient accounting systems due to resource limitations. For example, these tiny businesses frequently lack awareness and comprehension of the significance of accounting information. Moreover, small-scale poultry farms face issues related to access to infrastructure and machinery. Elevated input expenses, including feed and pharmaceuticals, provide a further obstacle, alongside restricted access to extensive markets and transportation (Ryan,

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2025). Lastly small-scale producers, however, faces numerous challenges which include limited access to formal markets, high feed costs, disease management and inadequate technical knowledge. These challenges will necessitate adaptive and innovative management approaches.

3. Research Methods

This research employs a qualitative methodology design in which the researchers were the principal instrument of data collection and analysis (Creswell, 2020). This methodology facilitates the analysis and elucidation of the strategic management process which varies from one small-scale farmer to one small-scale farmer. Qualitative methods primarily focus on pictures and arguments to comprehend prevalent assumptions and analyse human (Busetto *et al.,* 2020). The qualitative research method is ideal for this study as it facilitates the exploration of research problems that cannot be quantified. It facilitates the examination of challenges encountered by small-scale poultry farm owners and the analysis of factors hindering business growth and their implications for the sustainable development of the rural economy in South Africa (Kim *et al.,* 2017). Furthermore, employing a qualitative approach for this study yields a more comprehensive knowledge of the phenomena and elucidates the informal sector's long standing, complex strategic management implementation process from a unique perspective Dynamic Capability Theory for which little or no specific literature exits. A case study methodology is utilized at informal small-scale poultry farmers in Mafikeng, North West Province. This township was chosen due to its small-scale poultry farmers population's propensity to accommodate numerous Black and historically underprivileged citizens. The Mahikeng local municipality comprises 35 wards, encompassing 103 villages, six townships, and several suburbs. Roughly 75% of the region is rural (Ekobi, 2022). The predominant demographic of the Mahikeng Local Municipality comprises individuals from historically marginalized groups, exhibiting a poverty rate of 41.4% and a youth unemployment rate of 47.1% among those aged 15 to 34. Moreover, most households in the region depend on external economic activities, especially state support, for their survival (Mahikeng Local Municipality, 2019).

A non-probability judgmental sampling technique was employed to identify small-scale farmers engaged in poultry farming. Altinay *et al*. (2016); Creswell *et al*. (2016) and Romney *et al*. (1986), determined that samples comprising as few as 12 participants can yield highly accurate information with a confidence level of 0.999, if they have a substantial level of expertise in the relevant field of study

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resulting in the selection of twelve informal sector small-scale poultry farmers for the study. Purposive sampling was chosen for its capacity to enhance respondent involvement and facilitate follow-up inquiries, so yielding comprehensive insights into the research topic. Saunders *et al*. (2016) assert that "purposive sampling necessitates the application of judgment to select cases that will most effectively facilitate the answering of your research question(s) and the achievement of your objectives." Therefore, the chosen technique is pertinent to our investigation.

Data were collected through semi-structured interviews. Rutledge and Hogg (2020) assert that semi-structured interviews facilitate comprehensive discussions with a limited number of participants, allowing researchers to dedicate considerable time to each individual in a conversational approach. Semi-structured interviews were conducted with twelve respondents, at which saturation was achieved. The interview discussion guide was produced based on essential research inquiries derived from an extensive literature review. The guide was deliberately designed with open-ended questions to elicit comprehensive responses from participants, as advised by Kallio *et al*. (2016). These small-scale poultry farmers are managed by individuals or small collectives, functioning within the informal sector, characterised by limited capital investment and lack of access to formal funding, which plays a bigger role in strategic management implementation (Nkwinika, 2023). Note-taking and audio recording were employed to capture the verbatim dialogue during the interview session. Thematic data analysis was employed to examine the qualitative data gathered from respondents via semi-structured interviews using Atlas-ti and subsequently undergone thematic analysis, as described by Braun and Clarke (2023), which is a method for identifying, examining, and reporting patterns within the data, facilitating a comprehensive comprehension of the participants' experiences. Central themes emphasized the informal small-scale poultry farmers sector's role in fostering rural economic development. Excerpts from the respondent's transcripts were utilized to provide thematic material, aiding in the summarization of findings and the formulation of conclusions (See Figure 1 on Appendix).

Study Area

This study was conducted in the Ngaka Modiri Molema District Municipality, North West Province, South Africa (see Figure 2 below). Its origins to the beginnings of the British Colonial era of the late nineteenth and early twentieth centuries in Africa. It lies close to the Bostwana border, about (240km) west of Johannesburg. It has a population of up to 354 504, according to the Municipality

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of Mahikeng (Stats, 2022) and it has a population growth rate of approximately 1.90%. Study map attached at Appendix. Figure 2.

Ethical considerations

The study adhered to the stipulations of the Protection of Personal Information Act (Act 4 of 2013) (POPIA), and non-identifiable responses would be securely maintained in a password-protected file on Google Drive. The study received ethical approval (NWU-00668-24-A4) from North-West University.

4. Empirical Results and Discussion of Findings

Demographic profile of respondents

Demographic information is a crucial component of research investigations, as they delineate the qualities and characteristics of the target group, so facilitating comprehension of the study problem. The study captured demographic details such as age, gender, and work experience. The following subsections present these demographic details and their relevance to the study. As revealed in Table 1, participants aged 18 to 25 constituted 17% of the sample, 26 to 30 years constituted 25% of the sample, 31 to 35 years constituted 33%, and 36 and above constituted 25% of the sample. This means that although participants came from a wide and diverse age background, enhancing the comprehension of the research problem from different age groups, most participants were in the middle age group. The study revealed that males made up a larger portion of the gender distribution, accounting for 58% of the participants. This figure is against the 42% composition of females. The study revealed that participants possessed a diverse range of work experience, which was crucial for effectively understanding the matter under investigation. While 25% had experience of less than 5 years, 42% constitute the big percentage between 6 and 10 years, and 33% have more than 11 years. All the participants were owners of the business. The spread was considered suitable for a balanced understanding of the views, opinions, and experiences of individuals towards the research problem. In terms of the business sector distribution, all participants were from the poultry business sectors.

Results

Applying dynamic capabilities theory to small-scale poultry farming highlights the importance of adaptability in a volatile environment. Based on the dynamic capability theory small-scale poultry farmers in South Africa rural economics must actively gather information through joining cooperatives and extension services

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which will aid in positioned to act early in order to strategical position their market to overcome the sensing which is recognizing the opportunities and threats in the environment. This section indicates two main themes were identified in the study, each with links to research objectives. These themes are related to (1) explore barriers of strategy implementation experienced by small-scale farmers in the poultry industry in South Africa; (2) Assessing the strategic importance of this business sector to the development of a rural economy and (3) Exploring business strategic management backing needed by small-scale farmers operating within the informal sector. The themes and their related sub-themes were expanded and informed from the data in support them. An analysis of the results in relation to current literature is provided, evaluating the parallels and contrasts between the themes and prior studies.

What are the challenges encountered by small-scale poultry farmers on strategic management?

Discussion based on how limited financial can have an influence on the operation of the business. Most small poultry farm owners agreed that limited financial resources have an impact on their business operations and potential growth. A few participants strongly felt that:

"…limited finance hinders business operations because we operate with limited budget that is mainly is finances from their personal funds and at times retained profits. These funds are directly used to manage the operations of the business such as buying chicken feeds, chicken medication, and overall overhead costs such as paying labour, electricity and many more".

In support, one respondent mentioned that:

poultry farming is a lucrative business due to the high rate of reproduction, eggs, and the constant demand from the community for its poultry products like the affordable meat and eggs, however due to financial constraints it has limited business growth and expansion. There are many obstacles the business is facing but one major reason is because the business is not registered as a result it has limited access to formal capital…".

Participants underlined that access to formal financial markets is crucial for business expansion and sustainable development. Owusu et al. (2021) assert that access to finance enhances the probability of growth for small enterprises. Numerous studies indicate that insufficient financial resources hinder the

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performance and growth of small businesses, obstructing the introduction of many innovative products and services into the market (Owusu et al., 2021). Conversely, the informal nature of small-scale poultry farms results in a deficiency of quality financial data, hindering the formal financial sector's ability to extend credit to these farmers due to insufficient investment capital, inadequate credit management systems, and overall poor financial records. Strategic management that small-scale poultry farmers must consider to promote access to affordable finance policy which is the establishment of government-backed credit guarantee schemes, encourage partnership between financial institutions and farmer cooperatives and expand agricultural microfinance programmes.

Credit management policy that affects business operations

Seizing the stage of acting on dynamic capability theory once opportunities or threats are identified poultry small-scale farmers must act decisively. Small-sale farmers must consider diversifying income for example livestock and crop production. Entering new contract farming or new distribution channels. Establish rural poultry collection centres which will reduce post-harvest losses. The poultry industry is important to the rural communities as it provides nutritious foods, and it support food security for families and communities. On strategic management this stage often depends on access to knowledge and training, availability of credit. However, due to small-scale poultry farms inadequate credit management this has resulted in a negative impact on business operations. One respondent indicated:

"… because my business is deeply embedded in the communities and I often extend credit to customers by selling them chickens and eggs on credit. However, this same customer will not meet their credit obligations, and this impacts negatively on my business cash flow and ultimately business profitability. Furthermore, this bad debt, or unstable cash flow will impact the business's ability to operate and grow. I will often request traditional council intervention to resolve these matters, as it is a more cost-effective approach compared to going to small claims court."

This lack of credit management policy for the business as a result of irregular credit profiling of customers, unclear payments terms, and failure to collect overdue payment can significantly affect the liquidity of the business which result into strategic failure. This financial instability not only can lead to difficulties in paying suppliers and employees but ultimately hindering the business's ability to operate and grow.

Inadequate marketing strategies

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This discussion point concerns the marketing of the business and gain access to customers. In response, all respondents revealed they had a challenge in marketing the poultry products and had limited access markets, in particular local markets. The one responded mentioned that her poultry farm had a full range of domestic breeds including chickens, ducks, turkeys, and geese.

"the local market prefers chicken meat, while the international market prefers duck meat. However, it's important that I have access to local markets and market products to restaurants or supermarkets. Also, preferably sell this product directly to consumers from the farm and access larger markets…".

What is the role of strategy formulation of small-scale poultry farms in rural economic development

Alleviating rural unemployment and poverty

This is where long-term resilience is built which is the third stage of reconfiguring the transforming stage. Poultry significantly contributes to poverty alleviation and should be incorporated into any policy designed to enhance rural lives. Appropriate policies and investments can effectively address the challenges encountered by small-scale poultry farmers, yielding substantial economic and social advantages, as demonstrated by Mack et al. (2005). This involves investing in new poultry farming technology, forming cooperatives to market access and enhance on changing labour allocation with households and the strategic management implication is that poultry farmers who can reorganize their resources repeatedly outperform those who stick to traditional practices. One respondent remarked:

"I worked in agricultural chicken production in Mahikeng on a fixed-term contract. The experience I gained there has been invaluable, as I now run a successful farm in Ramatlabama. The profits from my farm operations have allowed me to renovate our house and cover school fees, stationery, and uniforms for my grandchildren. Additionally, I supply the rural community during events such as funerals, cultural gatherings, and weddings. However, a challenge I face is that I finance the business out of my own pocket, using funds that are also needed for household activities. This is there only source of income we are receiving as there is high unemployment rate in the community, so this business is operated and managed by myself, children, and grandchildren…"

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The respondent further mentioned that with the funds obtained from the poultry farm they managed to pay-off for her child's tuition fees as she graduated with a degree in agriculture. And because there is lack of employment in the Mahikeng local municipality, she is assisting in managing the farm with the technical skills obtained from the formal educational program which affects strategy implementation. Conversely, the few respondents indicated that poultry farm business required access to formal capital to expand and grow. As indicated by Owusu et al. (2021) access to finance increases the likelihoods of small businesses growth. Due limited employment opportunities in Mahikeng local municipality, small poultry farms could serve as an alternative to improve the livelihoods of families and as a result reduce poverty in rural communities.

Business support needed by small-scale poultry farmers

Small-scale poultry farms are essential for rural economic development and employment creation in South Africa. Finance is crucial for the sustainable development and viability of this industry. Access to external capital is essential for enhancing start-ups, while established farm enterprises serve as a significant means to address issues such as unemployment and poverty, as indicated by Zondi et al. (2025).

Discussion based on whether their farms required financial assistance to enable growth and sustainable development. All the respondents indicated their need finanacial support. Further, they mentioned that because their business was not registered and operating in the informal sector they could not obtain support from government and private businesses. One respondent indicated that:

"*they intended to register their business because this will assist in their farm obtaining support from government development agencies or private businesses, as they needed financial support to continue operating and growing. Poultry farming is a lucrative business but requires funds to pay for the overhead costs such as buying feeds, covering expenses for medication, water, electricity, labour…*".

A few mentioned that they had attended provincial government workshop that is centred around disseminating information about government support programmes but could not be assisted. Small-scale poultry farms are essential for rural economic development and employment creation in South Africa. Finance is crucial for the sustainable development and viability of this industry. Access to external capital is essential for enhancing start-ups, while established farm

enterprises serve as a significant means to address issues such as unemployment and poverty, as indicated by Zondi et al. (2025).

5. Recommendations and limitations

For policymakers and agriculture planners they is need of strengthening information systems which will be boost in sensing, improve access to credit and inputs which will enable seizing and supporting cooperatives and trainings programs to facilitate reconfiguring in order to fully implement the dynamic capability theory. Recommendations to the small-scale farmers they must invest more in learning and networks, encourage public private partnership, set up agriculture universities which will enhance research and innovation as supported by Gurgu *et al*. (2024) in their innovation study. The need for diversify production and incomes streams and stay flexible rather than locked into poultry only. Dynamic capability theory shows that the success of small-scale poultry farmers is not just about resources but about their ability to continuously adapt, innovative and transform under pressure. Strategic management will help to improve access to affordable credit, strengthen veterinary and extension services, gives support to local feed production and encourage the farmer cooperatives and training.

Applying dynamic capabilities theory to small-scale poultry farming highlights the essentials of adaptability in a volatile environment. Farmers who develop strong sensing capabilities can anticipate market shifts, infrastructure development and disease outbreaks. Seizing capabilities enable them to act on these insights, while transforming capabilities ensure long-run resilience.

Moreover, the development of dynamic capabilities is influenced by external factors such as government support, access to training, and infrastructure. Policies aimed at strengthening these areas can enhance the strategic management of small-scale farmers. Agricultural planners must enhance market integration and create value chain development by establishing rural poultry collections, facilitating contracts between retailers and farmers, promote digital marketing platforms and give support to local slaughtering and processing facilities.

This study has two main limitations. Firstly, it only sampled farmers that are headquartered in the North West Province of South Africa, which provides insight into local viewpoints on strategy translation and its affordances for implementation. Other organisations in different locations may have different operational methods and views, which could be beneficial to study in this regard. Therefore, a future research option could be to include more organisations to

compare their viewpoints on strategy translation and its affordances for implementation.

Secondly, the number of poultry farm owners interviewed exceeded that of employees involved in the strategic management process. Since much of the legwork for strategy translation and implementation is generally undertaken by senior employees, the number of participants in this segment should be increased in future studies to obtain a more holistic view of their experiences in this regard.

6. Conclusion

This study demonstrates that dynamic capabilities theory provides a valuable framework for understanding and improving the strategic management of small-scale poultry production in South Africa. This study proposed and highlighted the need for informal business sector lacking quality financial data to prevent the formal sector from extending finance to small-scale farmers that include insufficient investment capital, inadequate credit management systems, and overall inadequate financial records. Additionally, challenges related to marketing, such as limited market access and poor branding, together with infrastructure further hinder profitability and scalability. Weak institutional support, lack of education and training which will cause risk aversion on strategic management implementation because of vulnerability. The study emphasises the need for targeted financial support, marketing training, and strategic management interventions to ensure the long-term sustainability of small-scale poultry enterprises. Market participation sensing which is the identifying price premiums, a targeting niche marketing which is seizing and reconfiguring improving storage, logistics and packing which is the branding. As a result, the small-scale businesses must have separate personal and business banking accounts that will highlight business transactions and how the business operates. Business and personal finances might aid a business owner in achieving a greater understanding of their company's cash flow and financial well-being. Finance is crucial for the expansion of small poultry farms; nevertheless, difficulties such as market access and the development of business skills must also be addressed. Businesses can insure their assets and equipment to safeguard against risks, and they can also utilise insurance to attract investment and mitigate financial exposure. Technological adoption on sensing is to create an awareness of mobile poultry farming tools, seizing using mobile apps for market information and reconfiguring the digital tools into daily operations of the business this will help in tracking input cost. In South Africa small-scale poultry farmers, does not just come from having birds, capital, and or land it comes from the ability to continuously

sense changes, seize opportunities and reconfigure operations in a highly uncertain environment.

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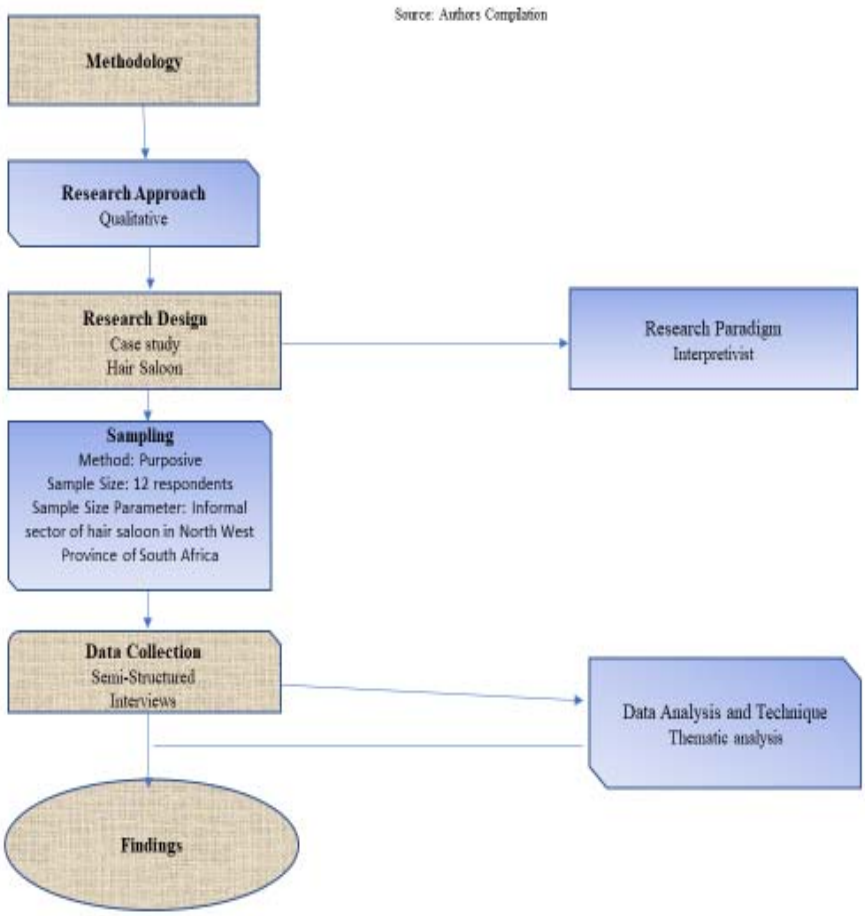
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Appendix

Figure 1: Research flowchart



Source (s): Authors` compilation

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Figure 2 Study area Map



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SOCIAL MEDIA INFLUENCE ON STUDENTS' ACADEMIC PERFORMANCE: EMERGENCY REMOTE TEACHING (ERT) EXPERIENCE FROM EDUCATIONAL MANAGEMENT PERSPECTIVE

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Abstract

Social media (SM) addiction and distraction have been observed as a big challenge to students' academic performance (SAP) at the University of

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Ibadan (UI). During the COVID-19 pandemic, these issues were resolved with the use of emergency remote teaching (ERT). Based on this, the research looked at how SM affected SAP during the institution's ERT period. The study design used was a descriptive survey. Between 100 and 400 students from the Department of Adult, Library, Archival and Information Studies, Health Education, Educational Management, Guidance and Counselling, Special Education, and Teacher Education at UI's Faculty of Education made up the sample. From the departments that were sampled, 400 students were selected at random. Twenty-three (23) items on the SM Influence on SAP Scale (r=.80) comprised the questionnaire utilised in the study. Descriptive statistics such as frequency counts and simple percentages were used to examine the data at a significance level of 0.05. The results showed that most pupils have used WhatsApp (WA) and Telegram (TG), with 96 (24.0%) and 15 (15.0%) having done so. Similarly, the majority of the students, 71 (71.0%) and 96 (24.0%), used Google (G) and Google Scholar (GS) for project writing. In addition, the survey discovered that a significant percentage of the students, 96 (24.0%) and 144 (36.0%), spent all day and at least 5 hours a day on SM, while the purpose of engagement recorded 352 (88.0%), 332 (83.0%) and 272 (68.0%); Most of the students utilised social media for academic, social, and informational objectives. Finally, it was discovered that 272 (68.0%) and 244 (61.0%) of learners agreed that SM had improved their learning and had emerged as the most significant information source for their studies. The study recommended that the institution's management organise conferences, seminars, and symposia addressing the influence of SM and the Internet on academic pursuits, scholarships, grants, and job searches, as well as the significance of utilising various social networking tools for enhancing students' educational engagement.

Keywords: *social media influence, students' academic performance, emergency remote teaching, Department of Adult Education, University of Ibadan*

JEL Classification: I23; O31.

1. Introduction

Student Academic Performance (SAP) is determined by various factors and lies with a given institution. An average educational institution would identify all possible ways of ensuring maximum performance of students in their learning activities. There are various activities in which students engage that, most times, determine their different levels of performance. Students' academic achievement (SAA) in the form of expertise, abilities, perspectives, and ratings in academic courses given by the students is often used to quantify SAP. SAP is quickly

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becoming the primary indicator of the efficacy of higher education (Husaini & Shukor, 2022). Learning is improved when students are aware of the mastery expectations of their courses and degree programmes, which is one of the reasons why AA students take "centre stage" (Hou *et al*., 2024). Colleges and universities are increasingly being requested to not only outline the learning objectives of their students but also to provide proof that those objectives are being met (Bok, 2020). Therefore, enrolment and graduation rates are not the only indicators of success for the majority of higher education institutions. There is also the need to document how well students have met the learning objectives linked to the degrees they are receiving (Muibi, 2017).

According to some educational theorists, the SAA statement's main purpose is to direct students' learning, which improves their capacity to meet all of the degree programme's objectives (Negash, Eshete & Hanago, 2022). To put it another way, these theorists contend that students use the SAA statements to help them learn the course material and to help them concentrate on the important aspects of the course. Compared to an uninformed student, an informed student has a higher chance of achieving the desired results. At the UI during the COVID-19 pandemic, all students were informed about the introduction of emergency remote teaching (ERT) to continue learning. During this period, the institution's Learning Management System (LMS) was deployed, and training of facilitators was also put in place. Due to the COVID-19 pandemic-related state of emergency in several countries, ERT has experienced a rapid and unexpected shift from traditional classroom teaching to remote learning (Quadri, Bello & Ukpere, 2025). In terms of design and evaluation tools, this teaching strategy is different from online learning (OL) before the COVID-19 pandemic (Affouneh, Salha & Khlaif, 2020). The outcome shows that institutions of higher learning, parents, instructors, and students were unprepared for the situation. As a result, the unique learning environment was greatly impacted by the usage of developing technologies, which were either entirely online or combined with traditional classroom instruction on campus (Czerkawski & Lyman, 2016). Through innovative capabilities that allowed students and teachers to interact both synchronously and asynchronously, these technologies transformed student engagement for learning (Khlaif & Farid, 2018). Both students and instructors were astonished and nervous since the transfer was unexpected and unscheduled. Institutions have lately decided to use emerging technologies to switch to an online platform (OP) in order to provide pedagogical functions and inspire learners. During this shift, both instructors and

students utilised new technology for the first time. However, it also paves the path for SM to be included in instruction during this time. Furthermore, Muibi (2023) highlighted that the COVID-19 pandemic forced modern educational practices to take on a new dimension and provided numerous opportunities for teachers and students to integrate digital tools and well-packaged learning materials, such as SM, to facilitate effective remote communication between tutors and students.

At this point, teachers and students began to adapt with the use of ERT and SM in their studies to enable them to cope with the situation brought by the pandemic. It is now essential to examine the concept of SM and its contributions to the development of education. SM is a tool that lets users connect and interact with each other (Boateng & Amankwaa, 2016). People utilise this OP to interact, connect, collaborate, and build or preserve relationships with others for a variety of purposes (Omokhabi *et al*., 2025). SM is an OP that enables users to form online communities or interact with others who share their goals in previous encounters, passions, or personal connections. Accordingly, SM is the exchange of ideas and information between people in networks (Ogedengbe & Quadri, 2020). However, SM connects users through a variety of electronic devices, including computers, iPads, tablets, and Internet-based technology (IBT). Accordingly, SM may be defined as tools that promote global discourse, cooperation, and social contact (Omopo *et al*., 2025). Adigun, Odunola, and Sobalaje (2016) characterised social media (SM) as an internet-based technology (IBT) that enables users to enumerate their connections, explore both their own and others' networks, and create a public or semi-public profile within a platform. Ali, Iqbal, and Iqbal (2016) define SM as a collection of applications, including Facebook (FB), X, WhatsApp (WA), LinkedIn (LI), YouTube, and others, that facilitate interpersonal connections through information exchange in a social networking context. Sweet *et al*. (2020) characterise SM as an ensemble of sites, applications, and online activities that foster interaction, creation of communities, involvement, and exchange. The information above makes it abundantly evident that SM is a way for people to communicate with each other in both ways, enabling anybody with an internet connection to share their thoughts with other SM users.

Consequently, SM has been more widely used as a communication tool, particularly among students. Talaue, Alsaad, AlRushaidan, and AlHagail (2018) assert that social media platforms (SMP) make it easier to get educational and informational materials. In light of the aforementioned, many instructors and

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students utilise SM as a teaching and learning (T&L) tool. In addition, institutions of learning are using SMPs like FB and LI more often to engage with current and potential students and to provide instructional resources (Omokhabi *et al*., 2025). The efficiency of the potential students to connect with their tutors with the use of FB and LI would also assist them to adopt a variety of technologies that would enhance their digital literacy and skills development and provide them with the ability to use learning applications like LMS, Moodle (Mdl), and Zoom (ZM) (Quadri & Muibi, 2024), along with Google Applications such as Google Meet and Google Classroom (GC), and SMA like TG and WA and facilitate their learning effectiveness (Muibi, 2019; Ogedengbe & Quadri, 2020; Omokhabi *et al*., 2025). As a result, SMPs facilitate communication between students, instructors, and communities involved in their education and associated activities. In light of this, many institutions now have groups and accounts on SMPs like FB where staff and students may communicate, exchange resources, and discuss ideas.

On the other hand, not all students engage in continuous SMP interaction for academic reasons (Vandeyarm 2020). This implies that students use SMPs for a variety of reasons. Students' time spent on SM has a somewhat unfavourable correlation with their study times (Omokhabi *et al*., 2925). As stated by Tayo, Adebola, and Yahya (2019), many learners devote significant time each day to SMPs. Young individuals spend about double the amount of time on SM annually compared to the typical person (Rideout, 2018). The dangerous methods of using the Internet support the assertion by Krishna *et al*. (2022) that engaging with SMPs might yield both advantageous and detrimental outcomes. Despite the advantages of SM on student learning and information dissemination, Ogedengbe and Quadri (2020) argue that even while SM is used for educational purposes (EP), students integrate the device into daily life in ways that may diverge from the instructor's intentions. A variety of SM problems in students' academic lives have been documented in the literature so far. Viewing objectionable information, cyberbullying, and online harassment are among the detrimental effects of SM (Omopo, Quadri & Ukpere, 2025).

Teachers, students, and other academic stakeholders have been urged by SM to work together and promote T&L knowledge creation (Boateng & Amankwaa, 2016). Similarly, Muibi (2020) discovered that SM is used for online tests, group discussions, teamwork, and quick access to test results using programs like WA Messenger, Email, Edmodo, Google Forms, and Mdl. In a similar vein, Muibi (2021) observed that students who have access to smartphones and Android

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devices as supplemental support services would have easy access to online course (OC) modules and study guides, facilitating interaction between peers and tutors. This can result in significant educational improvements through platforms like SM and WA, ultimately improving their academic performance (AP). As a result, the adoption of SMPs has benefited people by promoting variety among different individuals and groups, according to Omohkabi et al. (2025). The use of SM has expanded globally. Among the popular SMPs are Facebook, WA, X, MySpace, Instagram, LI, and Google Plus. Institutions and academics are continuously researching SM technologies for cooperation and knowledge creation. These days, SM provides a platform for students to communicate with their instructors, other students, and scholars at higher education institutions throughout the globe.

Academic content production has witnessed a significant impact of social media (ISM) platforms. The usage of SMPs boosts critical thinking, promotes group discussions and creative research, enhances learning possibilities for students, and permits communication outside of the classroom (Mugabekazi *et al*., 2025). Students actively engage in SMPs for remote learning, chatting, blogging, and material sharing on a daily basis using desktop computers, laptops, tablets, and mobile phones (Latif et al., 2019). Students thus devote a large amount of their study time to SM rather than their coursework, which seems to have a detrimental effect on their study time and divert them from their academics (Omokhabi *et al*., 2025).

Vandeyar (2020) emphasise that not all students use SMPs for academic objectives, despite the uniqueness of SM for learning engagement. It was also stated that the development of the internet allowed individuals to acquire a variety of skills related to digital technology literacy and information media. This has also made T&L easy through the use of SM. Studies have shown that most times, among tertiary institution students, they make use of SM for chatting, making friends and engaging in distractive activities daily; some even make use of it for illegal businesses, which actually leads to poor AP (Kouser, 2020). The COVID-19 epidemic has increased the necessity for SM usage for ongoing education. In light of this, the research was conducted to determine how SM affects SAP (SMIoSAP) and their capacity to get, analyse, assess, and convey information while embracing the necessary competencies to satisfy the demands of the global economy. In light of this, the purpose of this study was to bridge the insight gap resulting from the dearth of research on the subject. To ascertain above, goals were developed to direct the research. Consequently, the

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study's specific goals are to assess undergraduates' (UGs') exposure to SM use (SMU), ascertain how much time they spend on SM, ascertain why they use SM, and ascertain SMIoSAP within the organisation.

2. Theoretical Framework

A number of studies have used or altered theoretical frameworks to bolster their e-learning investigations. The best theory for this study was determined to be the Unified Theory of Acceptance and Use of Technology (UTAUT) in combination with the Technology Acceptance Model (TAM). The factors influencing the effective use of SM in higher education were investigated, including perceived utility (PU) and perceived ease of use (PEOU). TAM identifies PU and PEOU as the two fundamental drivers of user acceptance of technological breakthroughs, both of which have a significant impact on people's propensity to adopt information technology. First, PU is a measure of how much students think SM will improve their AP. Students' learning levels may be raised by the usefulness dimension, as it will improve their performance in academic activities. Usage in a variety of academic domains, including business, education, the workplace, and everyday life, is influenced by usefulness (Elkaseh, Wong, and Fung, 2016). Second, PEOU clarifies the extent to which students feel tbhat using SM for academic purposes (APs) does not require additional effort. Other aspects that have been discovered include perceived pleasure, which relates to how much students like utilising SM for APs without any outside pressure.

Perceived enjoyment is the extent to which an individual finds the use of multimedia on demand fascinating and associates it with pleasure (Venkatesh, Morris, Davis, & Davis, 2003). Students' motivation would rise as a result of their happiness and excitement when using SM. Another component is UTAUT's performance expectation (PE), which gauges how much an individual believes using the system will enhance their productivity (Venkatesh *et al*., 2003). Accordingly, the purpose of PE is to find out whether students think that including SM in their coursework would raise their AP. An additional aspect that is related to conduct or intention is social influence (SI). SI indicates how much a person believes important others want them to accept the new framework (Venkatesh *et al*., 2003).

3. Research Methodology

A quantitative research design was used in the study. This kind of design was justified since the researcher did not change the variables. The target group consisted of all UGs in the Department of Adult, Library, Archival and

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Information Studies, Health Education, Educational Management, Guidance and Counselling, Special Education and Teachers' Education, Faculty of Education, UI, with levels ranging from 100 to 400. Using a simple random sampling technique, a sample size of 400 was chosen. The Level of Exposure to Social Media (LESM) Scale, TSSMU Scale, Purpose of Social Media Usage (PSMU) Scale, and SMIoSAP Scale are the four sub-scales of the Social Media Influence on Undergraduates' Academic Performance (SMIUAP) questionnaire that the researchers developed. There were two parts to the questionnaire. First, demographic data such as age (16 to 31 and older), gender, marital status, and academic level were gathered in Session A. The objectives and research questions were addressed in the second section. Strongly Disagree (D) equalled 1, Agree (A) equalled 3, Strongly Agree (SA) equalled 4, and Disagree (SD) equalled 2. A four-point Likert scale was used to evaluate the replies. Participants had to complete a consent form attesting to their desire to participate in the survey before they could do so. The study was approved by the school, and students were given in-person access to the departments that were sampled. They were then given assurances that the information they submitted would be used only for study and that their privacy and identities would be protected.

To guarantee the reliability of the tools used in this investigation, content validity—including face validity—was employed. The items of the instruments were presented in plain language to facilitate respondents' understanding. They were arranged logically and methodically to correspond with the objectives and research topics. To improve validity, the researcher additionally ensured that the instrument's contents aligned with the study's objectives and research questions. The tool was pre-tested by fifty (50) students from different departments within the Faculty of Arts, UI, who were not part of the study's target population. To assess the instrument's dependability, the internal consistency reliability coefficient was calculated using Cronbach's Alpha reliability approach. This approach was used since the questionnaire's questions asked respondents to score their agreement or disagreement on a scale rather than giving correct or incorrect responses. The Cronbach Alpha reliability test yielded coefficients of 0.78 for LESM, 0.81 for TSSMU, 0.76 for PSMU, and 0.83 for SMIoSAP, respectively, suggesting that the instrument is appropriate, adequate, and reliable for the research. The data was examined at the significance level of 0.05 using basic percentages and descriptive statistics of frequency counts.

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4. Results and discussion

The study's findings are summarised here, along with Table 1's original research question:

Research Question 1: What is the level of exposure of students' use of SM for academic activities?

Table 1 shows the result of a frequency count and simple percentage analysis used to determine the degree of exposure.

Table 1: Use of SM for academic activities (N = 400)

Which of the following SM are exposed to	F	%
X	44	11.0
FB	52	13.0
TG	60	15.0
WA	96	24.0
All of the above	148	37.0
Total	**400**	**100.0**

Table 1 shows that 44 responders (11.0%) used X; 52 (13.0%) used FB; 60 (15.0%) of respondents used TG; while WA was used by 96 (24.0%) and the largest proportion, 148 (37.0%) of respondents were using all the mentioned SMPs. This suggests that among learners, WA is the most favoured SMP, followed by TG, as the two are important platforms for knowledge sharing, information management, and collaboration. The table also indicates that a good number of students are exposed to multiple SMPs, which consequently shows their awareness of the relevance of SM in today's digital age.

Research Question 2: To what extent do students utilise SM for project writing?

Table 2: Use of SM for project writing (N = 400)

SMPs	F	%
G	284	71.0
GS	96	24.0
Wikipedia	20	5.0
Total	**400**	**100.0**

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Table 2 shows that 284 participants, or 71.0%, said they used G, whereas 96 (24.0%) admitted utilising GS. This means that students are significantly exposed to both G and GS for their academic writing. This also shows along the same line that digital technologies and IBT are increasingly prominent in supporting flexible learning and overcoming traditional learning constraints.

Research Question 3: How much time do students spend on SM for APs?

Table 3: Time spent on SM for APs (N = 400)

Variables	SA	A	D	SD
I spend all day using SM	96 (24.0%)	192 (48.0%)	88 (22.0%)	24 (6.0%)
I spend at least 5 hours a day on SM	144 (36.0%)	180 (45.0%)	64 (16.0%)	12 (3.0%)
I spend not less than an hour on SM in a day	116 (29.0%)	64 (16.0%)	176 (44.0%)	44 (11.0%)
I only spend a few minutes on SM in a day	48 (12.0%)	48 (12.0%)	160 (40.0%)	144 (36.0%)

SA and A were combined to become Agree, whilst D and SD were consolidated to represent D.

Table 3 shows that almost all the respondents, 324 (81.0%), attested that they spent 5 hours daily on SM for APs, closely followed by 304 (76.0%) who disagreed that they spent a few minutes on SM daily. In addition, about 288 (72.0%) of respondents agreed that they spent all day using SM for APs, while 220 (55.0%) of the respondents spent not less than an hour on SM daily. This implies that the resp least daily for several purposes, including academics.

Resear ondents utilised SM at ch Question 4: What is the level of students' purpose of engagement (PoE) on SM?

Table 4: PoE on SM (N = 400)

Variables	SA	A	D	SD
I use SM as a source of information	188 (47.0%)	164 (41.0%)	32 (8.0%)	16 (4.0%)
I use SM to connect with friends	204 (51.0%)	128 (32.0%)	44 (11.0%)	24 (6.0%)
I use SM for APs	156 (39.0%)	116 (29.0%)	80 (20.0%)	48 (12.0%)
I use SM for independent learning	88 (22.0%)	56 (14.0%)	160 (40.0%)	96 (24.0%)
I use SM for collaborative learning	28 (7.0%)	24 (6.0%)	196 (49.0%)	152 (38.0%)
I use SM simply for entertainment	108 (27.0%)	112 (28.0%)	92 (23.0%)	88 (22.0%)

SA and A were combined to become Agree, while D and SD were consolidated into D.

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Table 4 indicates that a majority of 352 (88.0%) of the respondents confirmed that SM is used to source information, closely followed by 348 (87.0%) of the respondents who disagreed using SM for group education. Similarly, most of the 332 (83.0%) of the respondents agreed that SM is used to connect with friends, while 272 (68.0%) of the respondents affirmed that SM is used for APs. It could be deduced from the analysis that the respondents used the SM for different purposes depending on their choice.

Research Question 5: What is the level of ISM on SAP?

Table 5: ISM on AP (N = 400)

Variables	SA	A	D	SD
SM has become an important information resource for my studies	124 (31.0%)	148 (37.0%)	76 (19.0%)	52 (13.0%)
SM has negatively affected my learning	92 (23.0%)	64 (16.0%)	132 (33.0%)	112 (28.0%)
I am now more capable and independent because of SM.	84 (21.0%)	84 (21.0%)	140 (35.0%)	92 (23.0%)
SM has made me academically more brilliant	76 (19.0%)	108 (27.0%)	100 (25.0%)	116 (29.0%)
SM has depreciated my AP	88 (22.0%)	92 (23.0%)	112 (28.0%)	108 (27.0%)

SA and A were combined to become Agree, whilst D and SD were consolidated to represent D.

Table 5 shows that 272 (68.0%) of the respondents agreed that SM has grown to become an important academic information source. About 244 (61.0%) of those surveyed disagreed with the reality that SM negatively affects their learning, followed by 232 (58.0%) who reported that SM has made them more competent and self-reliant, while 220 (55.0%) also disagreed that SM has reduced their AP. This finding suggests that, except for the first item in Table 5, which indicates that SM has grown important as an information source, the majority of respondents disagreed with almost all of the items assessing the SM effect on AP.

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5. Discussion of findings

The first research question's findings demonstrate how much SM was utilised by students for APs during the institution's emergency remote instruction. The majority of respondents used WA and TG, according to the data. This supports the results of Ogedengbe and Quadri (2020), who reported that over 90% of students in higher education utilise SM sites like FB, Instagram, X, and others. The results corroborate those of Kaya and Bicen (2016), who discovered that students mostly utilised FB and WA. This study supports Susanti and Hantoro's (2022) hypotheses that social interactions underwent a fundamental transformation due to the complex and dynamic character of SM settings. In a similar vein, it marks the beginning of a new era in which students must manage the intricate relationship that exists between their digital and physical identities. It will broaden their social connections and immerse them in a world of ideas, varieties, and conversations that go beyond the confines of their actual experiences. The outcome further corroborates the conclusions of Ogedengbe and Quadri (2020) and Muibi (2022), who illustrated that the utilisation of learning applications such as Mdl, ZM, and LMS, social media applications (SMA) like TG and WA, and Google applications like GC and Meet would enhance learners' education and SAA while aiding them with OC design, virtual assistance, and electronic assessment.

The degree to which students used SM for project writing was shown by the answers to the second study question. The findings indicate that most respondents composed their projects using G and GSs. The findings are in line with other studies by Kolan and Dzanza (2018) and Akakandelwa and Walubita (2018), which showed that WA, FB, X, LI, Web-Blog, and Google Group were all often used for EP every day. Muibi (2024) supports these conclusions by finding that students' learning will be enhanced by using MDL, Blackboard, online libraries, OC modules and study guides, OL for tutor-student and learner-learner interaction, and OL access times. In addition, the scholar expressed that it enables them to utilise SM for academic reasons and get better acquainted with the LMS programme used by the UI during ERT.

Table 3 presents the results of research question three, which showed that respondents agreed they spent more time on SM for academic objectives. This result is in line with that of Talaue, Alsaad, AlRushaidan, and AlHagail (2018), who discovered that students often use SM for one to three hours per day. Additionally, Hashem and El-Badawy (2015) found that whereas 33% of students spend the same amount of time on social media, 50% of students study

for one to three hours per day. Similarly, the study's results showed that UGs mostly utilised SMPs for academic, informational, and socialising reasons. This is due in large part to the importance the UG put on the goals of employing SMPs. This might help to explain how much of an impact the SMPs have on their research.

The results from research question four reported students' PoE on SM. The result showed that the respondents agreed that they use SM as a source of information, connect with friends, for entertainment, etc. Talaue, Alsaad, AlRushaidan, and AlHagail's (2018) study, which discovered that students utilised SMPs to get information for both educational and recreational purposes, was supported by this outcome. The data make it abundantly evident that UGs use SMPs more for socialisation than for APs. The finding also supported Muibi's (2021) results, which showed that students were able to utilise smartphones and Android phones for a variety of reasons, including improving their education via ZM and WA.

Research question five revealed the ISM on SAPs. The findings indicated that although some respondents disagreed, most believed that using SM had become the most important data source for their research. This corroborated the assertion by Ogedengbe and Quadri (2020) that SM sites improve students' AP in addition to re-engaging them with their academics. Similarly, Omokhabi *et al*. (2025) confirmed that students allocate a considerable portion of their study time to SM, hindering their AA.

6. Conclusion

The research concluded that students from UI's Department of Adult and Teachers' Education were exposed to and regularly used SMP, with WA and TG being actively used daily. It was also said that during the COVID-19 pandemic, they used G and GS for EP when emergency remote instruction was implemented. Furthermore, the students acknowledged that they used 5 hours and all day on SM to source information and connect with friends, while spending less time on APs. The behaviour was a result of addiction, distraction and entertainment derived from the use of SM. Consequently, it is sensible to promote a more effective utilisation of SM by students for academic endeavours across all departments and faculties within the university.

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7. **Recommendations**

The study yielded the following recommendations:

1. In order to successfully prioritise, UG should use SM for learning, participate in online conversations, ask faculty members for academic support, download materials for reading and research, and solve scholarly-related difficulties.
2. Students need to allocate their time judiciously and prioritise their academics over engaging in detrimental SMPs or academic activities.
3. Lecturers may use digital educational interaction strategies, tasks, or conversations, particularly about SMPs, to foster students' habitual use of SMPs for APs.
4. Departmental, faculty, and institutional education programs on SM usage should be arranged to inform students about the repercussions of Internet addiction in order to lessen the possibility that they would become victims of the detrimental effects of SM.

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TECHNOLOGY INTEGRATION IN ACCOUNTING EDUCATION: A STUDY OF SOFTWARE UTILISATION AND TEACHING EFFECTIVENESS IN UNIVERSITIES

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Abstract

This study examined the extent of use of software in the teaching of accounting subjects in Business Education Universities in Delta State, Nigeria. It was based on the use of accounting packages, spreadsheet and LMS software, and the effect of lecturer's software competence and institutional support in the use of software and instructional effectiveness. The survey adopted a quantitative cross-sectional design and utilised structured questionnaires to collect data from 120 Business Education lecturers. Descriptive statistics, one-way repeated measures ANOVA, multiple linear regression, simple regression and Pearson's correlation were used to analyse

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the data. The results showed that there was a significant difference between the use of accounting packages, spreadsheet and LMS tools, with spreadsheet being used more than LMS tools. The utilization of software and the pedagogical impact was greatly influenced by the competence of the lecturer as well as institutional support. The paper recommends that lecturers should be empowered with the ability to use software through training, coupled with institutional support, and planned instructional delivery should be put in place for effective integration of software in accounting instruction. To strengthen the instruction, training should be conducted with lecturers on the effective use of software. There is also a need for more solid ICT infrastructure, availability of licensed software, and intentional incorporation of digital technologies in accounting curriculum.

Keywords: *software utilization, accounting education, business education, instructional effectiveness, lecturers' competence, Delta State*

JEL Classification: I23; O30.

1. Introduction

The digital revolution has fundamentally changed the way business and education are conducted and has had a significant impact on the way accounting is taught in the 21st century. (Dedic, et al., 2019; Stojakovic, 2022). Teaching Accounting no longer involves only the manual recording of transactions. Instead, accounting has come to involve analysing, processing, and reporting of financial information using digital technologies and software applications. These trends are particularly significant for Business Education programme students, who are expected to develop both theoretical and digital skills pertinent to their expected workplace. Nigerian educational policy promotes the use of ICT across disciplines, including accounting, as a means of improving the employability of graduates and the quality of teaching (Federal Ministry of Education, 2019; National Universities Commission, 2023). In Delta State, at universities such as DELSU and Dennis Osadebay University, there is clear evidence of changes taking place, such as the adoption of Learning Management Systems (LMS), ICT-supported teaching, and increasing exposure to digital learning environments. Hence, accounting software has become an indispensable element in teaching modern accounting.

There are generally three categories of accounting software used in education, such as specialised accounting packages, Spread-sheet applications, and Learning Management Systems that aid the teaching and learning processes. Examples of Accounting packages include QuickBooks, Sage, and TallyPrime, which assist

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students in executing typical accounting processes such as transactions, reconciliation, payroll management, and financial reports. Spread-sheet applications like Microsoft Excel support accounting in areas such as budgeting, ratio analysis, and financial modelling (Ogundana et al., 2015; Microsoft, 2026; Sage, 2026). Additionally, learning management systems like Moodle enhance teaching and learning by providing an environment where instructors could organise materials, assignments, and feedback in a well-structured format (Moodle, 2026.). Nigerian research has established the role of ICT integration in accounting education as a means of enhancing practical skills and employability and making curriculum content more relevant to the current job market (Ezeani & Akpotohwo, 2014; Okiridu et al., 2023; Iacob et al., 2024). Thus, accounting software can be viewed not merely as a supplementary teaching tool but a critical component of instruction to build competence in accounting practice and to enable learning of international accounting standards.

However, the effectiveness of software utilisation in teaching accounting in Nigeria is constrained by a range of factors, such as lack of ICT facilities in the classroom, inadequate staff training in computer applications, limitations in the accessing accounting software, and absence of stable power and internet connectivity (Ifi & Onokpaunu, 2023; Utebor, 2024). Both instructors and students are often unfamiliar with many advanced software application features, which diminishes the potential effectiveness of ICT-based instruction. There are also concerns related to the assessment of students' performance and academic integrity within the digital learning environments. Overcoming these challenges would require sufficient funding, better training of staff, improvement of curriculum contents and infrastructure, as well as greater commitment from stakeholders. Hence, it is crucial to examine the extent to which software is used in teaching accounting courses to Business Education students in Delta State universities.

1.1 Statement of the Problem

Although the need for digital literacy skills in accounting education is becoming more pronounced, the effective integration of software at universities in Delta State's business education programs has always confronted difficulties. Accounting applications such as QuickBooks, Sage 50, TallyPrime; analytical tools such as Microsoft Excel, and course management systems such as Moodle are potential tools that can be used to enhance the authentic and applied learning of accounting concepts. However, infrastructural deficit and inadequate institutional capacity often restrict their full utilisation (Ezema et al., 2021; DELSU, 2026b). Although most lecturers lack skills in software-enhanced pedagogy, students are more likely

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to overestimate their competence in digital skills (Csernoch et al., 2024; Johnston et al., 2024) and the use of artificial intelligence in testing can jeopardize the reliability of computer-based assessments. The use of under-prepared courses can impede the development of the process-oriented skills that software can promote (Ogunleye et al., 2024; Financial Times, 2025). Combined, these deficiencies point to the fact that the use of a software product by the teacher and student does not necessarily mean that the teacher has more knowledge of accounting or that the student would be more knowledgeable in accounting after graduation. The other problem concerning the application of software in accounting is the absence of conscious mode of accounting teaching software integration in the business education course in schools. Rather than seeing accounting software as a component that should be integrated into a course pedagogy to develop students' proficiencies and ensure they are taught using what is best practices, most Business Education courses view them as add-ons to the lab that, more often than not, are disjointed with accounting courses, thus undermining students' acquisition of employable, industry related software proficiencies. Moreover, this dis-synergy contributes to the inability of graduates to become part of the digitally literate workforce. Hence, there is good reason to explore the essence of accounting software use in Business Education courses, as well as factors deterring its use, and how its use could improve students' learning, in addition to the support's institutions should offer to maximise the learning and working value of accounting software.

1.2 Objectives of the Study

In order to examine the extent, determinants, constraint and pedagogical implication of software use in teaching accounting courses in business education programme of the tertiary institutions in Delta State, the following specific objectives are developed:

1. To compare the level of utilization of accounting packages, spreadsheet applications, and learning management system tools in the teaching of accounting courses by Business Education lecturers in universities in Delta State.

2. To determine the extent to which lecturer software competence and institutional support predict the utilization of software for teaching accounting courses in Business Education programmes in universities in Delta State.

3. To determine whether software utilization significantly predicts instructional effectiveness in the teaching of accounting courses in Business Education programmes in universities in Delta State.

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1.3 Testable Hypotheses

To guide this quantitative study, the hypotheses formulated are presented below in the null form:

1. There is no significant difference in the mean level of utilization of accounting packages, spreadsheet applications, and learning management system tools in the teaching of accounting courses by Business Education lecturers at universities in Delta State.
2. Lecturer software competence and institutional support do not significantly predict software utilization for teaching accounting courses in Business Education programmes at universities in Delta State.
3. Software utilization does not significantly predict instructional effectiveness in the teaching of accounting courses in Business Education programmes at universities in Delta State.

2. Review of Relevant Literature

2.1 Accounting Software

Computer-based accounting software is described as an application that can support, manage, and present accounting data for both professional and educational purposes. In accounting education, these tools serve as surrogates of real-world businesses such as bookkeeping, payroll systems, banking reconciliation, inventory control, and financial reports. Common examples include QuickBooks, Sage Accounting, Tally, and ERP systems that enable users to automate traditional bookkeeping tasks. The study of Ogundana, Ibidunni and Jinadu (2015) asserts that the use of accounting software in accounting education increases value-adding capability of students in terms of bringing theory and practice together in the profession. This observation is supported by Otuya (2021) who concluded that Nigerian accounting practitioners possess more competence in Excel than in the use of other packages such as QuickBooks and Sage accounting.

In the context of accounting education in Nigeria, accounting software is an important component for enhancing employability and professionalism. Research has found that students who received training in accounting packages perform better in banking, auditing and finance jobs (Okiridu et al., 2023). However, the effectiveness of integration of these packages in Nigerian tertiary institutions is still limited due to infrastructural difficulties and inadequate curriculum contents (Ifi & Onokpaunu, 2023). Also, Agboh et al. (2017) affirmed that the application of ICT in business education, especially in teaching accounting, is still inadequate and lacking; while there is a need to update accounting teaching curriculum with these

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accounting packages to ensure global competitiveness. The importance of software applications in accounting education cannot be overlooked.

2.2 Utilization of Software in Teaching

Software utilization in teaching refers to the use of digital resources, applications and platforms to facilitate teaching and improve students' academic performance. Specifically in accounting education, software utilization is defined as the use of accounting packages, spreadsheets, learning aids, simulation models, etc., to deliver instruction, assess learning, and foster practical application of accounting principles and practices. According to Technology Acceptance Model (Davis, 1989), teachers' intention to utilize technology for teaching are mediated by their perception of usefulness and perceived ease of use, which influences their extent of use in practice. Utebor (2024) and Ifi and Onokpaunu (2023) reveal that although the usefulness of the technology tool in teaching has been recognized by lecturers, it has low utilization in Nigeria due to poor access and poor skills.

The effectiveness of software utilization in teaching is evidenced by the improvement of students' engagement, ability to analyse (Gurgu, et al., 2022) and solve accounting problems.

The study of Ojukwu and Chukwudi-Ofoedu (2023) suggests that e-learning and other ICT tools in accounting education increases the quality of education by reducing the time wasted on the delivery of instructions. Agboh (2022) confirmed that integration of ICT into the classroom helps in student-centred teaching approaches, increases student-centred learning as well as enhance students' practical accounting knowledge. However, the success of software utilization is hindered by negative attitudes towards change, lack of adequate infrastructure, and other resources required to ensure sustained implementation in Nigeria. The degree of utilization depends on how teachers utilize the available resources in their practice.

2.3 Microsoft Excel (Spreadsheet Applications)

Microsoft Excel is a popular spreadsheet application used in accounting education for its ability to perform all necessary calculations, analyses and data presentation. In accounting, Excel enables users to prepare the entire set of financial statements (e.g. Income statement, balance sheet, cash flow statement), financial models, financial forecasts, budgets and financial analysis (e.g. Ratio analysis, financial modelling, and cash forecasting). As highlighted by Microsoft (2026), Excel is an efficient application that offers flexible analysis, which is the reason for the increased use of it as it readily supports a wide range of professional tasks including finance. According to Otuya (2021), Excel is the most readily

available technology in the Nigerian higher education institutions, and it is used as the basis for the training of students in the use of computer packages, and it is readily available and affordable.

Empirical studies have confirmed that the use of spreadsheet helps students develop analytical abilities and enhance their accounting knowledge; bridging the gap between theory and practice in accounting education, which contributes to the enhancement of employability skills (Ogundana et al., 2015). Furthermore, Okiridu et al. (2023) affirms that proficient use of advanced Microsoft Excel functions like financial modelling, and pivot tables will improve business education and graduates' employability. Nonetheless, many students and even lecturers are not skilful in advanced Excel features such as pivot tables, financial modelling, and automated reporting, which consequently affect the optimal utilization of software in accounting teaching (Ifi & Onokpaunu, 2023). Software utilization depends on availability and quality of skills acquired.

2.4 Learning Management Systems (LMS)

Learning Management Systems (LMS) such as Moodle can be described as web-based applications that are designed to manage the entire process of learning and teaching in a digital environment by providing lecture materials, assignments, online examinations, feedback and student tracking. In the case of accounting, the LMS software serves as a virtual learning environment where lecturers deliver course materials, upload and download files, conduct online tests, provide feedback to students and monitor students' overall progress (Moodle, 2026.). In Nigeria, the utilization of LMS has greatly increased after the COVID-19 pandemic, which forced many universities and tertiary institutions to embrace online delivery of courses (Ojukwu & Chukwudi-Ofoedu, 2023). Therefore, LMS play a significant role in modernizing accounting teaching.

Research has confirmed that the learning management system increases student engagement, improves overall academic monitoring and supports flexible learning environments. According to Csernoch et al. (2024), students show better academic results and faster recognition of learning difficulties in digital learning environments. It is discovered in the study of Utebor (2024) and Ifi and Onokpaunu (2023) that even in Nigerian institutions of higher learning, where its application has increased since the COVID-19 pandemic, there are still limitations due to poor access to internet and lecturer training on usage, although it serves to support many students. Hence, learning management systems are important in providing an integral part of accounting education as far as learning and teaching methods are concerned, especially in this modern era of advanced technological

innovations.

2.5 Theoretical Review

2.5.1 Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM), presented by Davis (1989), is a leading model that helps in explaining users' acceptance and use of new technology. This model states that a user's intention to use an information system is determined by two factors, namely Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). Perceived usefulness refers to the degree to which a person believes that using a particular system would enhance his or her job performance, while perceived ease of use refers to the degree to which a person believes that using the system would be free of effort. Both perceptions have an influence on the user attitude towards the system, which then affects behavioural intention and system usage. In this study, the software includes accounting software, spreadsheets software and learning management system whose usage and acceptance by lecturers and students are being investigated. The model can then explain why some accounting lecturers use software in teaching while others do not.

In teaching accounting courses for Business Education programs in Delta State Universities, the TAM can provide an explanation on factors affecting usage of software-based learning tools. Lecturers will be encouraged to adopt software tools such as accounting software (QuickBooks, Sage), spreadsheets software (Microsoft Excel) and learning management systems (Moodle) in teaching if they perceive the tools to enhance efficiency in teaching and students' comprehension and reduce the effort of teaching. Limited usage will be observed due to perceived difficulty, lack of training or inadequate ICT infrastructure which affect ease of use and perceived value. Similarly, Nigerian studies show that a positive attitude, competence and the perception of the value of ICT tools greatly contribute to its adoption in education (Ifi & Onokpaunu, 2023; Utebor, 2024). Therefore, TAM is applicable in this study because it covers the use and adoption of new technologies among lecturers and students as well as providing an explanation of how users' perception affects the effective utilization of the software in accounting training.

2.6 Empirical Review and Research Gap

Numerous empirical researchers have validated the significance of using ICT and software in promoting accounting education and improving students learning process at various levels of educational system. Ogundana, Ibidunni and Jinadu (2015) opined that the use of ICT in accounting education helps improve students' competencies in practical aspects of accounting and it reduces the gap between

theory and workplace needs in tertiary institutions in Nigeria. Ezeani and Akpotohwo (2014) opined that the application of ICT in teaching accounting leads to an improvement in teaching effectiveness and enhancement of professional competency for accounting students in tertiary institutions in Ekiti State universities. More recently, Okiridu, Godpower and Kire (2023) reported that the possession of digital accounting software skills (QuickBooks, Sage etc.) enhances students' employability and self-reliance among Business Education graduates of Adamawa State Universities. Outside Nigerian settings, Csernoch et al. (2024) also observed that learning within digital environments enhances students' engagement, analytical skills, and learning performance when integrated into learning environments appropriately. Generally, research evidence confirms that the level of software usage is a significant factor influencing the teaching and learning of accounting.

While the literature is growing, certain gaps can be identified, especially regarding Nigerian university system and specifically Delta State university system. Few studies (e.g. Ogundana et al., 2015; Okiridu et al., 2023) addressed the integration of ICT into accounting education broadly or the employability aspects of accounting graduates; rather they focus on software usage in teaching accounting subjects. Again, studies such as Ifi and Onokpaunu (2023) and Utebor (2024) indicated infrastructural and competency constraints in ICT adoption but did not focus on their direct effect of software utilization in the accounting classroom. Geographical gap also exists as majority of empirical works are conducted in different regions in Nigeria such as Ekiti, Adamawa and South-South colleges of education, and very few research were found amongst Delta State universities. The nature of ICT use in teaching accounting subjects is also treated general, and major tools such as accounting software packages, spreadsheet, learning management system are not separately analysed. The present study therefore tried to fill these gaps by focusing on the utilization of accounting software, excel and LMS in the teaching of accounting courses in Business Education program in Nigerian universities, particularly in Delta State, thereby providing an empirical data from the specific university system.

3. Methodology

This study employed a cross-sectional survey research design. Quantitative design was used to explore lecturers' usage of software for teaching accounting courses in Business Education programme of tertiary institutions in Delta State. This design was adequate as it allows for the administration of a structured questionnaire to lecturers to gather information regarding their utilization of

accounting packages, spreadsheets, learning management systems and factors influencing lecturers' competence and their teaching effectiveness of software and that of the institutions. It also facilitates statistical testing of hypothesis, and comparison between software types in terms of the lecturers' use of them and the extent of predictor variable on teaching effectiveness of software and utilization.

The sample of the study comprises all Business Education lecturers that teach accounting courses in the universities in Delta State. Owing to the fact that the population size was manageable, namely where population size of lecturers is less than 200, a census technique was employed, and where the size of lecturers is more than 200, a stratified random sampling technique was applied to ensure that the sample is not biased by the academic status of lecturers and thereby cover all categories, such as Assistant lecturers, lecturers II, lecturers I and senior lecturers. The sample size of 120 lecturers is sufficient to support intended analyses such as regression and ANOVA (Green, 1991).

The data was collected through a questionnaire designed for the purposes of the study. The questionnaire consisted of four sections which included: the Lecturers' Demographics (age, gender, academic status, and teaching experience); Software Usage (accounting packages like QuickBooks, Sage 50, TallyPrime; spreadsheet software such as Microsoft Excel; and learning management systems like Moodle), which was measured by a 5-point Likert scale, with the scale ranging from never (1) to always (5); Lecturers' Software Competence and Support Provided by the Institutions, that was adapted from scales from previous research (Csernoch et al., 2024; Johnston et al., 2024); and Lecturers' Instructional Effectiveness as determined by students' perspectives on how software use affect their teaching effectiveness, student engagement, and learning outcome using a 5-point Likert scale.

The data were analysed using **SPSS version 28.** Descriptive statistics such as mean, standard deviation, frequency and percentages were calculated for describing the demographic characteristics and levels of software usage across accounting software, spreadsheet software and LMS software. In order to examine the hypothesis regarding differences in levels of software usage a **One-way Repeated Measures ANOVA** was computed. For Hypothesis 2 on the Predictors of Software usage, **Multiple Regression Analysis** was carried out to check whether lecturer's software competence and institutional support was able to predict software usage. Multi-collinearity between the predictor variables was checked. The data assumptions such as normal and linear relationship were also verified. The examination of the **Influence of Software Usage on Teaching**

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Effectiveness under Hypothesis 3 was done using simple regression analysis. **Pearson's Correlation Coefficients** were also computed to measure the strength and direction of relationships among variables in the study.

4. Result Presentation

Level of Software Utilization

Hypothesis 1 stated that: *There is no significant difference in the mean level of utilization of accounting packages, spreadsheet applications, and learning management system tools in the teaching of accounting courses by Business Education lecturers in universities in Delta State.*

A One-way Repeated Measure ANOVA was used to test this hypothesis. Descriptive statistics showed that, spreadsheet applications had highest mean usage M=4.12, SD=0.68, while accounting packages had the second highest mean usage M=3.87, SD=0.72 and LMS tools had the least usage M=3.45, SD=0.81.

Table 1: One-Way Repeated Measures ANOVA for Software Utilization

Source	SS	df	MS	F	p	Partial η^2
Between Software Type	12.54	2	6.27	15.38	<0.001	0.23
Error	48.76	118	0.41			
Total	61.30	120				

Source: **Field Survey, 2026**

Statistical analysis demonstrated that there were significant differences in the average levels of use among the three types of software, $F(2,118) = 15.38$, $p < .001$, partial = .23. Bonferroni adjusted post-hoc tests showed that spreadsheet software was used significantly more than LMS software ($p < .001$) and accounting software was used significantly more than LMS software ($p = .012$).

This confirms that Hypothesis 1 should be rejected.

Predictors of Software Utilization

Hypothesis 2 stated that: *Lecturer software competence and institutional support do not significantly predict software utilization for teaching accounting courses.*

A **multiple linear regression analysis** was conducted with software utilization as the dependent variable and lecturer competence and institutional support as predictors.

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Table 2: Multiple Linear Regression Predicting Software Utilization

Predictor	B	SE B	β	t	p
Lecturer Competence	**0.48**	**0.09**	**0.41**	**5.33**	**<0.001**
Institutional Support	**0.36**	**0.11**	**0.28**	**3.27**	**0.002**
Constant	**0.92**	**0.34**		**2.71**	**0.008**

Source: **Field Survey, 2026**

There was significant result for regression model, F (2, 117) = 22.45, p < 0.001, R = 0.28 and lecturer competence and institutional support explained 28% variance on the dependent variable, software utilization. Both lecturer competence (= 0.41, p < 0.001) and institutional support (= 0.28, p = 0.002) were significant. Hence, hypothesis 2 was also rejected.

Software Utilization and Instructional Effectiveness

Hypothesis 3 stated that: *Software utilization does not significantly predict instructional effectiveness in the teaching of accounting courses.*

Pearson's Correlation and **Simple Linear Regression Analyses** were performed to determine the relationship between software use and instructional quality.

Table 3: Correlation Between Software Utilization and Instructional Effectiveness

Variable	1	2
Software Utilization	1	
Instructional Effectiveness	0.62**	1

Note: p < 0.01 (2-tailed)

Source: **Field Survey, 2026**

The analysis of correlation found a high positive and significant relationship between software use and instructional effectiveness (r = .62, p < .01). The regression analysis showed that software use was a significant predictor of instructional effectiveness (= .62, t = 8.73, p < .001). The percentage of variance explained by the predictor; software use, is 38% (R = .38). The third hypothesis was therefore rejected because there is a significant positive relation between software use and instructional effectiveness.

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5. Discussion of Findings

The study reports empirical findings on the extent of utilization of software in teaching accounting courses to Business Education students in universities in Delta State and the results provide answers to the problem that accounting teaching is to accommodate the transformation to digital accounting practice. The first objective, "assess the extent to which Business Education lecturers utilize accounting packages, spreadsheet applications and LMS tools in accounting courses" was achieved when the one-way repeated measures ANOVA indicated that there was a significant difference in the mean utilization of the three types of software, $F(2,118) = 15.38$, $p < .001$, partial = .23, and the first null hypothesis was rejected. The descriptive result further showed that mean score on the use of spreadsheet application was the highest ($M = 4.12$, $SD = 0.68$), while the use of learning management system tool was the lowest ($M = 3.45$, $SD = 0.81$) and use of accounting packages had the middle score ($M=3.87$, $SD=0.72$). The result of the Bonferroni post-hoc test showed that spreadsheet application is used more significantly than LMS tool and accounting package is used more significantly than LMS tool. This implies that accounting lecturers do not have similar level of utilization of accounting software, as they seem to use what they are familiar with and find easily accessible, such as spreadsheet software than LMS tool in teaching accounting. It also lends support to the assertion of this study that existence of digital tool does not necessarily imply their regular or meaningful use.

The higher usage of spreadsheet applications may be a result of ease of use, flexibility and availability, as well as their relevance in common accounting activities including journal analysis, budgeting, preparation of financial statements, calculation of ratio and graphical presentation of financial information (Microsoft, 2026; Csernoch et al., 2024). Although slightly lower in usage than spreadsheet applications, accounting packages such as QuickBooks, Sage and TallyPrime also play an essential role as students are exposed to accounting tasks such as bank reconciliation, invoicing, billing, inventory control and generation of various accounting reports (Intuit QuickBooks, 2026; Sage, 2026; Tally Solutions, 2025). It is significant that LMS tools' usage is slightly lower than accounting software as LMS systems like Moodle can provide facilities for on-line activities, electronic assessment and feedback, learning resource delivery and learning management (Moodle, 2026). The study therefore concludes that the trend in usage of these tools is not yet an entirely integrated digital learning strategy but instead represents a partly joined-up model and confirms the necessity of a learning architecture, which enables spreadsheet applications, accounting software and LMS tools to

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work together and complement each other rather than exist independently.

In relation to the second objective, the extent to which lecturer software competence and institutional support predict software utilization was investigated, and the result of multiple regression demonstrated that these variables are significant predictors. Lecturer competence, = .41, $p < .001$ and institutional support, = .28, $p = .002$, were found to be significant predictors of software utilization, with these two predictor variables accounting for 28% of variance in utilization, $F(2,117) = 22.45$, $p < .001$. Thus, the second null hypothesis was rejected. It was concluded that the ability of lecturers to effectively utilize software for accounting instruction relies on both the instructor and the institution's capacity to provide appropriate computer facilities and resources. Lecturers with high software competence were found to be able to design authentic accounting exercises, utilize accounting simulations, prompt students through problem-solving activities, and incorporate digital technologies into accounting assignments. Nonetheless, highly competent instructors may fail to realize the benefits associated with technology where, for instance, software licenses are not obtained or renewed on time, the Internet connection is slow, or the computer labs are either unavailable or unequipped with the necessary hardware and infrastructure, or there is insufficient support personnel to ensure all software is functional or electricity supply is stable. Lecturer competence had a larger predictive effect than institutional support; that is, while a lecturer's digital skills were more crucial in using accounting software than his/her institution's ability to provide the said support, support from the institution would still be indispensable to sustain computer-based accounting education (Johnston et al., 2024; Ezema et al., 2021).

The third objective of the study investigated the link between software use and instructional effectiveness, and it proved that there was a high and positively significant relation between software use and instructional effectiveness. The result of Pearson correlation indicated that software use has a significantly positive correlation with instructional effectiveness ($r = .62$, $p < .01$), simple regression indicates that software use has a significant predictor of instructional effectiveness (= .62, $t = 8.73$, $p < .001$), explaining 38% of the variance of instructional effectiveness. Thus, null hypothesis three was rejected. This implies that with effective use of software by lecturers, instructional effectiveness on accounting will be made to be more engaging, practical and professional oriented. It establishes that students master accounting course content by engaging with actual accounting processes such as data entry, report writing, recording of accounting entries and bank reconciliation by using the different types of accounting software such as

Intuit QuickBooks, Sage, and Jayasekara et al., 2025 accounting software (Intuit QuickBooks, 2026; Sage, 2026). From the analysis of all three hypotheses, it can be seen that software use among the different types is not at par, lecturer competence and institutional support do influence the software use; and the use of software has a high and significant impact on instructional effectiveness. Practical recommendation of this study is that universities ought to strategically promote the use of spreadsheets, accounting packages and LMS tools in the teaching and learning of accounting by training lecturers, provision of accounting software and functional computer laboratory, adequate and reliable internet facility, effective technical support and curriculum-oriented assessment (e-assessment) of students on software use, and these should be incorporated into accounting courses. Hence, it is evident that instructional effectiveness on the use of accounting software in teaching is both an individual and a system responsibility, which necessitates strong lecturer competence and institutional support.

5.1 Implications of the Study

The findings of this study have implications on the teaching accounting in Business Education programmes in Delta State Universities. This finding of great differences in the use of accounting packages, spreadsheet and LMS shows that students are exposed to different levels of digital competencies needed in the practice of accounting today, hence there is the need for deliberate integration of software in course delivery rather than supplementary component. Lecturer's competence level with accounting package, spreadsheet and LMS are highly related with the utilization of software, so there is the need for enhancement of lecturers' digital competencies through continuous professional development, so that they could set real-world context, applied tasks in accounting with the aid of software, simulating workflow on computer, and use digital tools to promote students' engagement and learning experience (Johnston et al., 2024; Csernoch et al., 2024).

Institutional support with appropriate computer infrastructure, provision of license software, functional computer laboratory, and reliable internet and ICT policy are necessary for the effectiveness of the software utilization in accounting courses and it was shown to strongly predict utilization. Thus, it can be inferred that the positive predictor influence of the software utilised to the instructional effectiveness suggests that intentional utilisation of software would improve instructional effectiveness. Accordingly, universities' support, including curriculum, lecturer and facilities should be in order for effective use of software for instruction, to produce graduates who can apply accounting principles using modern digital-driven infrastructure in accounting practice (Intuit QuickBooks, 2026; Microsoft, 2026; DELSU, 2026b).

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6. Conclusion

The study concludes that there is a significant variability in software usage, but where there is higher software use, the quality of instruction is high. The fact that accounting packages, spreadsheets, and LMS tools are not consistently applied by lecturer revealed that the use of software is still ad hoc, and systematic effort should be made to ensure that it is consistently adopted across the board. Lecturer's competence in software use is the single most significant factor that determined the level of usage, which implies that the human aspect of software implementation determines how it can be used effectively to teach, simulate authentic learning experiences, and engage students. Institutional support is also found to significantly determine software use, which makes ICT infrastructure and policy the key institutional factor.

However, when integrated coherently into teaching practices and within supportive institutions, software significantly impacts quality of instruction. The poor utilization of this tool within a logical pedagogical and institutional structure might create an education system where lecturers lack the skills required to create a virtually driven accounting classroom, thereby students gain only theoretical knowledge, which reduces their marketability and teach-readiness. Improving software usage should, therefore, be a top priority for accounting education in Nigerian universities to close the gaps between curriculum, professional practice, and digital skills agenda.

6.1 Recommendations

Following the findings from the study, and for an improvement in software-supported accounting instruction in the tertiary institutions in Delta State, the following recommendations are worth considering:

1. **Integrated Software Application:** An organized teaching model must be put in place where Accounting Software Packages, Spreadsheet Packages and Learning Management Systems (LMS) are integrated through the accounting course.
2. **Lecturers' Professional Training:** Lecturers should continuously be given training on the usage of accounting software, the skill of using spreadsheet for accounting problems, effective usage of the LMS for course development, and digital assessment techniques.
3. **Adequate Institutional Support:** Access to legally licensed software, operational computer labs, reliable internet connection and steady electricity should be provided for efficient software use.
4. **Curricular Integration:** Accounting courses and examinations should be

designed in such a way that accounting software is used in a way that emulates real life business tasks, fostering an approach of problem-solving and also assesses procedural skills.

5. **Policy and Monitoring:** Develop ICT policies and monitoring procedures that facilitate responsible use of software, discourage academic dishonesty, and monitor the impact of digital technology use in teaching.

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COMPUTER SELF-EFFICACY AND READINESS TO USE QUICK RESPONSE CODES BY LIBRARY PERSONNEL IN UNIVERSITIES: AN EDUCATIONAL MANAGEMENT FOCUS

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Abstract

This study examined computer self-efficacy (CS-E) and readiness for QR code application/use by library personnel in universities in Ibadan (LPUiI), Oyo State. The descriptive design survey was employed for this investigation, which is a complete enumeration approach. Consequently, all ninety-five (95) library staff (LP) at the institutions considered for this research formed the sample. A questionnaire was utilised to help gather the data, which was then presented using descriptive statistics. There were more female respondents (58%), bachelor's degree holders (5%), married respondents (73%) and those who were aged between 31 and 40 years of age (56%) among respondents. The level of CS-E of LP was low (= 2.83), as it was observed that the

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respondents cannot manage to handle challenging computer issues (= 3.29). The respondents mentioned that it was not simple for them to attain their computing objectives (mean = 3.44). It was also found that the respondents cannot solve most computer programmes; if required, effort was applied (= 3.56). However, respondents can find a way to get what they want if their computer is acting up (2.44). The level of library personnel in university libraries in Ibadan to adopt QR code applications in their libraries was low, as the mean scores tilted to the disagreement scale (= 2.83). Most noted problems with the usage of QR codes by LPUiI were disregarded (= 2.67). The research found that the adoption of QR codes by LPUiI was low, as well as their CS-E, while problems continue. It was recommended that the LIS professional association should have periodic meetings and conferences on how to improve members' CS-E and make them familiar with QR code usage for easy library work processing. Library and university management should make LP a priority by constantly assessing their respective capacity needs and encouraging them to participate in capacity-building programmes so as to improve their CS-E. Also, capacity-building training, such as seminars on coding, software, links, and teleconferencing, can be done periodically.

Keywords: *computer, QR codes, library personnel, readiness, self-efficacy, use, universities*

JEL Classification: O330; I230.

1. Introduction

The increased pace of developments in information and communication technology (ICT) has brought a radical change in the working and delivery of services in academic libraries around the globe. Modern university libraries (UL) are not only limited to conventional print-based library services (LS) but are also expected to make use of modern technology that has the potential to improve LS in a technology-based higher educational environment. Among these new technologies that have received widespread attention are Quick Response Codes (QR Codes), Artificial Intelligence (AI) which have emerged as a powerful tool for easy access (Quadri, Aikulola, & Ukpere, 2025); (Balogun et al,2025).

Smartphones can scan QR codes, a kind of barcode that looks like a tiny white square with black geometric forms. A wide range of digital information, including websites, virtual catalogues, electronic resources, social media (SM) sites, and training materials, may be stored and accessed using QR codes, which are two-dimensional bar codes. The implementation of QR codes in the library

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environment allows the seamless search for information, as well as improving the visibility of the services provided in the libraries. But the effective application and utilisation of QR codes in UL largely depend on the skill levels, confidence and willingness of the library workforce to apply computer-based technologies. At the heart of this theory is the notion of computer self-efficacy (CS-E), an individual's belief in one's capability to effectively complete tasks utilising computers and computer-based technologies (Das & Das, 2021). The QR code was developed for rapid decoding of its information. It can accommodate far more information than a standard barcode. A QR code may encode a unified resource locator (URL), a telephone number, an SMS message, a V-card, or other textual content. However, it has been discovered that the CS-E of the LP is a factor that can determine or influence the LP's readiness to use QR codes (RUQRC) in the library. Without CS-E on the part of the LP, using computers to deliver LS to library users is impossible.

Computer self-efficacy has emerged as a key influential factor for technology acceptance, innovation adoption and efficient service provision in libraries. Library staff members (LSM) with high levels of CS-E tend to be more open to innovation, embrace technology-based service delivery (SD) and adopt innovative technologies such as QR codes for use in the normal running of the library. Low CS-E and engagement may result in inadequate technology adoption, suboptimal utilisation of technology-based services, and worse quality of services provided by the library (Bello & Bokoh, 2021).

The pace at which technology has been incorporated into libraries at Nigerian universities has been quite inconsistent, particularly in the private and governmental colleges in the state of Oyo's metropolis of Ibadan. Although it has been observed that some institutions have adopted the use of technology in the form of electronic platforms and resources, it is apparent that the use of new technology, such as QR codes, is still low (Eguavoen & Adeyemi, 2012; Akinde & Adetimirin, 2017; Fakunle, Bakare & Adeyeye, 2022). Against this background, this study examines CS-E and RUQRC by library personnel in universities in Ibadan (LPUiI), Oyo State. By exploring these variables, the study seeks to provide empirical evidence that will inform capacity-building programmes (CBP), policy formulation and strategic planning aimed at enhancing technology-driven library SD in Nigerian universities.

1.1 Statement of the Problem

A plethora of mobile applications, including QR code scanners, RedLaser, Barcode Reader, and Norton Snap, have emerged due to the advancement of

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intelligent, web-enabled mobile devices. Users can investigate QR codes using these applications. Libraries can contain hundreds to thousands of times more information with great reading speed because of the use of QR code technology. Furthermore, it provides substantial capacity for data storage and transport, along with 360-degree readability. Numerous libraries in industrialised countries currently employ QR codes for promotion, publicity, and advertising. They are also used by others to provide connections to virtual tours of library areas, directions, and succinct information. It is vital to highlight that CS-E indicates an individual's belief rather than their actual skill set. Prior study has neglected to analyse the modest deployment of QR codes in libraries from the aspect of library personnel's customer service experience and preparation.

Notwithstanding the apparent advantages linked to the use of quick response codes (UQRC) in libraries, initial research and visits to several universities in South-West Nigeria indicated that QR codes are not utilised. The UQRC in these libraries is minimal. The limited implementation of QR codes in UL in Nigeria may be ascribed to CS-E and the preparedness for the use and utilisation of the technology in the library. This research aimed to examine CS-E and preparedness for QR codes. application: A case study of the universities in Ibadan (UiI), Oyo State, Nigeria.

1.2 Research Questions

The following questions relate to the research:

1. What is the level of CS-E of LP to utilise QR codes in UL at universities in Ibadan (UiI), Oyo State?
2. What is the level of LP's readiness for the application of QR codes in UL in UiI, Oyo State?
3. What is the level of QR code usage among LP in UL in UiI, Oyo State?
4. What are the perceived challenges associated with the use (PCAWU) of QR codes in UL?

2. Literature review

CS-E perceptions have been regarded as a significant motivator for librarians in adopting technology. In fact, a UK-based case study by Inskip (2017) indicated that librarians were confident in dealing with computer malfunctions, adjusting to new technology, or even dealing with unexpected technological glitches. This can be attributed to the high levels of CS-E, which were associated with staff development, administrative, human resources support and exposure to state-of-the-art technological advancements in the library setting (Quadri, Salami

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& Ukpere, 2025). This highlights the significance of a positive environment that can develop technological expertise among library staff. Similarly, a case study by Mbakwe (2010) explored the transformation that has occurred within the library professions, confirming that today, librarians are no longer book guardians but have expanded to become information literacy (IL) educators and facilitators for digital access. The case study emphasised that staff need high levels of CS-E to carry out additional tasks. This highlights that facilitators such as QR code technology, digital technology, or any technology that might be adopted by librarians who believe in the technology's application to their mandate have an increased possibility for successful adoption.

On the contrary, findings from Nigeria show a clear contrasting scenario. Ademodi and Adepoju (2010) suggested that CS-E of library employees within developing nations is low. This was cited to be low due to inferior infrastructure related to ICT, an inability to access training related to ICT and an inability by respective institutions to develop employees. It was assumed that this resultant low confidence would slow down librarians' enthusiasm towards adopting new technologies. In line with this assumption, another study by Shidi and Nwachukwu (2015) assessed digitisation skills among employees within libraries at a state level, namely at Benue State and identified that most study participants did not possess basic and advanced computing skills. In this study, it was concluded that low CS-E is an immense hurdle within digitisation projects and novel SD within academic and digital libraries. Oyedokun *et al*. (2018) further emphasised that, although most employees possess basic word processing skills, they possess low skills pertaining to novel information technologies.

The link between CS-E and computer use has also been investigated within the realm of IL and SM. Oyedipe and Popoola (2018) evaluated IL skills among LSM within higher institutions in southwestern Nigeria (HISWN). It was observed that there was low usage of social media platforms (SMP) for job-related tasks. The low usage was attributed to poor skills in ICT, a lack of organised training and a lack of support within institutions. This study implies that low CS-E not only impacts specific computer tools but also general computer usage among LSM. In another study, Decker (2014) evaluated blog usage among LSM within the United States. Although this study recognised blogs as effective tools within current awareness services, information dissemination within libraries and engaging users, it observed that skills within blog usage among librarians were low. Decker (2014) concluded that having digital tools at one's disposal does not automatically translate to effective usage

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without skills and confidence.

Readiness for the adoption of new technologies is intimately connected to the ideas of perceived EUPU. The need for ongoing capacity building (CB) for librarians was highlighted by Ugwu and Ekere (2010) in a study on training needs for digital library projects (DLP) in Nigeria. According to the study, the librarian needs to take the initiative to seek training, as the budget for training in the institutions might not be adequate. The research indicated that the use of cutting-edge technology in the library necessitates the collaborative efforts of both the person and the organisation. Cobblah (2015), in a study on CB and SD in the UL in Ghana, found that most of the library staff had not taken part in any formal training programmes, workshops and seminars. Lack of formal training for the librarian was identified as a major reason for the librarian not being ready to adopt new technologies. This study is important, as in developing countries, training opportunities for professionals might not be frequent and available. Ezejiofor (2018), in a study on the effect of CB on the librarian's SD in Nnamdi Azikiwe University (NAU), Awka, Nigeria, found that most of the librarians were able to develop ICT-related skills through attending conferences rather than through hands-on training and formal training programmes. Even though the conferences were a source of theoretical knowledge, they were not adequate. The study revealed that most librarians acquired ICT skills primarily through conference attendance rather than hands-on training or structured programmes. While conferences provided theoretical exposure, they were insufficient for developing the practical competencies required for technology adoption. This constraint was recognised as a key impediment to the successful adoption of digital advances in libraries.

The transition from barcode reader software to the usage of QR codes is an indicator of the rising dependence of contemporary libraries on online services. Adeniji and Babalola demonstrated the shift towards online services in their 2012 study, emphasising that LS globally are exhibiting a shift from conventional services to online services. This study by Adeniji and Babalola emphasises the need for library staff development globally, especially considering the rapidly changing world of technology. Another study by Tait et al. (2016) emphasised the impact of staff self-efficacy on the use of computer technologies in UL. They demonstrated that LSM who believe in their computer capabilities are likely to actively participate in internet services, completely eliminating the need for many conventional LS. This further emphasises the relationship between staff self-efficacy and the need for services such as the

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UQRC. A research by Ugwu and Idoko (2016) investigated the impact of internet connection on the use of printed resources in school libraries in Nigeria. They determined that the internet is an essential element of contemporary library SD. Nonetheless, their results underscore the need for staff personnel to demonstrate requisite online abilities.

Some studies illustrate the challenges that contribute to the adoption of technology in libraries. Notably, Shidi and Nwachukwu (2015) found that though CBP, such as workshop and seminar training, is available in libraries, its effectiveness is hindered by inconsistent contributions and a lack of constant training. Likewise, Ademodi and Adepoju (2010) found that low contributions from professional bodies and a lack of institutional training are factors that hinder the technological advancement of librarians. Overall, it appears that while the international library community becomes increasingly more tech-advantaged, many ULs in developing countries continue to struggle against low CS-E and low readiness and adoption of cutting-edge technologies such as QR codes. There appears to be a lot of empirical research underpinning this study to focus and address this issue among university library (UL) staff working in Ibadan, Oyo state.

2.1 Theoretical framework

The Technology Acceptance Model (TAM), established in 1989 by Davis, Bagozzi, and Warshaw, underpins this study. The Technology Acceptance Model (TAM) is a theoretical framework used throughout time to describe, explain, and forecast user behaviour regarding information technology (IT). Although TAM was propounded to understand the factors militating against computer technology acceptance and use in an organisation (Ramayah 2006). TAM was among the generally employed ideas when it comes to the adoption and utilisation of technology by humans. It was established by Saade, Nebede and Tan (2007) that TAM individuals' behavioural intention to use (IBIU) is really determined by technology usage. According to Davis *et al*. (1989), opinions on an IBIU IT system are greatly influenced by perceived utility (PU) and perceived ease of use (PEU).

Davis (1986) defined PU as the extent to which a user feels that employing an innovation would boost their work efficiency. PEU refers to the extent to which a user feels that the implementation of a system would involve minimal effort. In line with the present study, the components were operationalised as follows:

PU is characterised as the amount to which library professionals believe that the introduction of a system will boost their research utilisation and the quality

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of resource usage.

PEU is defined as the extent to which LP thinks that effort in utilising a system will boost the UQRC in the library. As a result, an individual's IBIU and acceptance of IT are directly impacted by the two frameworks.

3. Methodology

A descriptive survey approach was adopted in the study. Descriptive research design, as stated by Popoola (2012), demands the methodical and scientific collecting of data or information from a population or its sample, employing personal interviews, opinion surveys, direct observation, or a mix of these approaches. A descriptive survey design delineates the kinds and quantity of data to be gathered, the methods of data collecting, the sampling techniques to be used, and the statistical analysis tools to be utilised, while generalising the results to the study population. Babbie (2017) noted that the descriptive survey study design is the optimum methodological strategy for researchers wanting to obtain original data to describe a population that is too broad for direct observation. The population of this study consists of LP in seven ULI, which are Kenneth Dike Library (University of Ibadan - UI), Dominican UL, Olatunde Odeku Library (University College Hospital), Koladaisi UL, Lead City UL, The Olanrewaju Library (Precious Cornerstone University) and The First Technical UL. The total population for this study is 95.

Table 1: Population of the Study

S/N	Name of Institution	No of Librarians	No of Para-Professional
1.	Kenneth Dike library, UI	32	30
2.	Dominican UL, Samonda Ibadan	2	2
3.	Olatunde Odeku Library, University College Hospital	4	3
4.	Koladaisi UL, Onidundun Ibadan.	1	0
5.	Lead City UL, Toll gate Ibadan.	13	0
6.	The Olanrewaju Library, Precious Cornerstone University, Old Ife Road, Ibadan.	2	1
7.	The First Technical UL, Lagos-Ibadan expressway, Ibadan.	2	3
	Total	**56**	**39**

Source: Personal visit to the listed institution

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All the above-listed institutions' libraries will participate in the study as indicated in table 1. The entire population also known as total enumeration approach was utilised in the investigation. Consequently, all the ninety-five (95) LP at the institutions mentioned above formed the sample of this research.

Validity and reliability

Validity is the degree to which any measuring technique or instrument succeeds in defining or quantifying what it is supposed to measure, or how true the findings are. Reliability is the degree to which two sets of scores from the same instrument are constant across time and accurately reflect the whole population being studied. The Department of Library, Archival and Information Studies, Faculty of Education, UI, designated specialists inspected and evaluated the research instrument to confirm and assure its validity. The data was evaluated using Cronbach's alpha to determine the instrument's dependability.

Research instrument

The tool for gathering data was the questionnaire. The researcher administered the questionnaire. The participants received instructions on how to fill out the questionnaire. Ninety-five copies of the questionnaire were sent to the selected employees, and the filled-out copies were promptly collected. The data gathered were analysed and interpreted. Descriptive and inferential statistical approaches were used to analyse the data. Descriptive statistics comprising frequency count, percentage, mean, and standard deviation were employed to better analyse, summarise, and illustrate the data—especially the sociodemographic aspects of the respondents—and to satisfy the research aims. The Statistical Package for the Social Sciences (SPSS) was used to analyse the survey data.

Response rate

Altogether, ninety-five (95) copies of questionnaires were administered and retrieved among the LP in the selected institutions, giving a response rate of 100 percent.

Demographic indices of the respondents

This section displays the demographics of the responders. This is seen in Table 2.

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Table 2: Distribution of Gender of the participants

Gender		**Frequency**	**Percent (%)**
	Male	40	42.1
	Female	55	57.9
	Total	95	100.0
Age Category (Years)		**Frequency**	**Percent (%)**
	Less than 20	14	14.7
	21-30	22	23.2
	31-40	53	55.8
	41-50	6	6.3
	Total	95	100.0
Educational Background		**Frequency**	**Percent (%)**
	ND	6	6.3
	NCE	12	12.6
	HND	10	10.5
	Bachelor Degree	49	51.6
	Masters Degree	18	18.9
	Total	95	100.0
Marital Status		**Frequency**	**Percent (%)**
	Single	15	15.8
	Married	69	72.6
	Widow	3	3.2
	Separated	5	5.3
	Divorced	3	3.2
	Total	95	100.0

Table 2 indicates that half of the respondents (55.8%) are within the age range of 31 to 40 years. The age range of 21 to 30 makes up 23.2% of the responses. 6% are aged 41 to 50. The upper age range for this research is 31 to 40 years. It is evident that over half (57.9%) of the participants in this research are female. The remaining 42.1% are male responses. Therefore, the highest number of participants in this study is female. Moreover, half of the respondents (51.6%) had a bachelor's degree, according to the educational background data. The remaining are master's degree holders (18.9%), HND (10.5%), NCE (12.6%) and OND (6.3%) holders respectively. Therefore, the highest educational background participants for this study are Bachelor's degree holders. Table 4.2 demonstrates that the majority of study participants (72.6%) are married. The remaining are singles (15.8%), separated (5.3%), widows (3.2%)

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and divorced (3.2%) respectively. Therefore, the highest marital status for this study is married.

4. Result

Answer to Research Questions

Research Question One: What is the level of CS-E of LP to use QR codes in ULI, Oyo State?

Table 3: CS-E of LP to use QR codes in UL?

Key: Strongly Agree (SA) = 1, Agree (A) = 2, Disagree (D) = 3, Strongly Disagree (SD) = 4, Frequency (F), Percentage (%), Mean ($\bar{x}$), Standard Deviation (St. D).

S/N	Statement	SA (F)	SA (%)	A (F)	A (%)	D (F)	D (%)	SD (F)	SD (%)	$\bar{x}$	St. D
	General computer skills										
1.	I can always able to tackle complex computer issues (DCP) if I strive hard enough.	5	5.3	12	12.6	28	29.5	50	52.6	3.29	.88
2.	I can figure out a way to obtain what I want even if my computer is "acting up."	26	27.4	25	26.3	20	21.1	24	25.3	2.44	1.14
3.	I can easily achieve my computing objectives.	8	8.4	5	5.3	19	20.0	63	66.3	3.44	.93
4.	I am certain that I could cope effectively with unforeseen computer incidents.	13	13.7	10	10.5	26	27.4	46	48.4	3.10	1.06
5.	If I put in the required effort, I can solve the majority of computer	8	8.4	25	26.3	62	65.3			3.56	.64

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	applications.										
6.	Because I can depend on my skills, I am able to maintain composure while dealing with computer issues.	11	11.6	23	24.2	18	18.9	43	45.3	2.97	1.08
7.	When faced with a technical issue, I can often come up with many solutions.	6	6.3	24	25.3	14	14.7	51	53.7	3.15	1.01

S/N	**Scanning skills**										
1.	I can scan and upload documents easily	22	23.2	23	24.2	14	14.7	36	37.9	2.67	1.20
2.	I can use scanners to convert hardcopy to softcopy for electronic storage and use	16	16.8	22	23.2	12	12.6	45	47.4	2.90	1.17
3.	I can install and use scanning apps such as CS Scanner on my phone or use the online version	18	18.9	22	23.2	8	8.4	47	49.5	2.88	1.21
S/N	**Hardware use skills**										
1.	I perform printing, editing and retrievals effortlessly	20	21.1	28	29.5	10	10.5	37	38.9	2.67	1.19
2.	I am confident in handling barcode devices such as barcode scanners, POS scanners,	15	15.8	20	21.1	12	12.6	48	50.5	2.97	1.16
3.	I can connect both wired and wireless barcode	9	9.5	34	35.8	9	9.5	43	45.3	2.90	1.09

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	scanners to my computer										
4.	I can dismount barcode scanners from my computer without damaging them	8	8.4	50	52.6	37	38.9			2.30	.62
S/N	**QR codes skills**										
1.	QR codes are images	35	36.8	60	63.2					2.63	.48
2.	QR codes lead to an information page on the internet or databank	4	4.2	35	36.8	56	58.9			2.54	.57
3.	I need a QR code scanner before I can access the content of the QR code	2	2.1	43	45.3	50	52.6	0	0	2.50	.54
4.	I need to place the QR code scanner on the QR code to access it	2	2.1	43	45.3	50	52.6	0	0	2.50	.54
5.	I can place the QR code scanner anywhere on the page that contains the QR code and it will work	6	6.3	46	48.4	43	45.3	0	0	2.38	.60
	Weighted mean									**2.83**	

SA = 1, A = 2, D = 3, SD = 4. Decision Rule: $\bar{x}$ = 1.00 – 1.75 is Very High, $\bar{x}$ = 1.76 – 2.5 is High, $\bar{x}$ = 2.51 – 3.25 is Low and $\bar{x}$ = 3.26 – 4.00 is Very Low

Mean Score Range	Decision Interpretation
1.00-1.75	SA
1.76-2.50	A
2.51-3.25	D
3.26 -4.00	SD

The first research question aimed at determining the level of CS-E of LP to use QR codes in ULI, Oyo State, Nigeria. The variable was measured based on

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four sub-constructs. These are general computer skills, scanning skills, hardware use skills and QR code skills. The majority of the participants were strongly opposed to the bulk of the questions evaluating their overall CS-E, as Table 3 demonstrates. Table 3 revealed that over half of the respondents strongly disagreed that they could solve DCP (52.6%), that they could easily accomplish their computer goals (66.3%), that they were confident enough to handle unforeseen computer events (48.4%), that they could remain composed when faced with computer difficulties (45.3%), and that they could find multiple solutions when faced with multiple computer problems (53.7%). Therefore, there is a strong indicator that the overall computer abilities of the respondents are poor.

A large number of the participants expressed significant disagreement with the three statements evaluating the notion, similar to their responses about scanning skills. There is strong disagreement with the statements that say 'I can scan and upload documents easily' (37.9%), 'I can use scanners to convert hardcopy to softcopy for electronic storage and use' (47.4%) and 'I can install and use scanning apps such as CS scanner on my phone or use the online version' (49.5%). Thus, the scanning skills of the LP in UL are low. In terms of hardware use, Table 3 showed that most respondents were unable to easily print, edit, and retrieve information (38.9%) were unable to connect wired and wireless barcode scanners to computers (45.3%) and were unconfident when using barcode devices like bookmark scanners and point-of-sale scanners (50.5%).

The fourth construct assessing the level of CS-E at LPUiI is QR code proficiency. Table 3 indicates that a majority of respondents opposed the assertions that QR codes direct users to an information page on the internet or databank (58.9%), that a QR code scanner is necessary to access QR code contents (52.6%), and that a QR code scanner must be positioned on the code prior to reading it (52.6%). Nonetheless, a significant proportion of respondents agreed that QR codes are pictures (63.2%) and that they may include a QR code scanner on the site containing QR codes to get the embedded information (48.4%). Table 3 indicates that the level of CS-E among LPUiI is mostly low, as most respondents expressed disagreement with all affirmative statements assessing CS-E.

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Research Question Two: What is the level of LP's readiness for the application of QR codes in ULI, Oyo State?

Table 4: Level of LP's readiness for the application of QR codes in UL

Key: SA = 1, A = 2, D = 3, SD = 4, F, %, Mean ($\bar{x}$), St. D.

S/N	Statement	SA (F)	SA (%)	A (F)	A (%)	D (F)	D (%)	SD (F)	SD (%)	$\bar{x}$	St. D
	Perceived ease of use										
1.	I find QR codes facile for work completion.	8	8.4	39	41.1	48	50.5	0	0	2.42	.64
2.	I plan to augment the UQRC in the future.	4	4.2	8	8.4	18	18.9	65	68.4	3.51	.82
3.	Using QR codes does not require new training	2	2.1	12	12.6	17	17.9	64	67.4	3.50	.79
4.	QR code usage instructions are self-explanatory	4	4.2	5	5.3	20	21.1	66	69.5	3.55	.78
S/N	**Perceived usefulness**										
1.	Because using QR codes at the library is affordable, I am open to doing so.	21	22.1	23	24.2	19	20.0	32	33.7	2.65	1.16
2.	I am eager to employ QR codes to perform jobs more rapidly	10	10.5	16	16.8	10	10.5	59	62.1	3.24	1.07
3.	I am willing to use QR codes (WUQRC) to boost my performance at work I am willing to utilise QR codes to raise my job productivity	2	2.1	20	21.1	8	8.4	65	68.4	3.43	.89

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4.	I'm open to using QR codes to improve my efficiency while providing LS.	11	11.6	23	24.2	18	18.9	43	45.3	2.97	1.08
5.	Because using QR codes at the library is affordable, I am open to doing so.	6	6.3	24	25.3	14	14.7	51	53.7	3.15	1.01
	Weighted mean									**3.15**	

SA = 1, A = 2, D = 3, SD = 4. Decision Rule: $\bar{x}$ = 1.00 – 1.75 is Very High, $\bar{x}$ = 1.76 – 2.5 is High, $\bar{x}$ = 2.51 – 3.25 is Low and $\bar{x}$ = 3.26 – 4.00 is Very Low

Mean Score Range	Decision Interpretation
1.00 – 1.75	SA
1.76 – 2.50	A
2.51 – 3.25	D
3.26 – 4.00	SD

The second research question, which measured the level of LP's RUQRC in ULI, Oyo State, Nigeria, was answered in Table 4. The PEU and the PU (EUPU) question items were adapted to measure the variable. It was revealed that the majority (50.5) disagreed that QR codes are easy to use in accomplishing library tasks. Equally, there was strong disagreement with the assumption that the LP will be WUQRC in the future (68.4%), that using QR codes does not require new training (67.4%) and that using QR codes is self-explanatory (69.5%). This means that the LP in this study do not perceive the UQRC to be easy.

Concerning the PU of QR codes, Table 4 reveals that a significant proportion of individuals are reluctant to utilise QR codes in their libraries (33.7%), are disinclined to employ QR codes to enhance work performance (68.4%), are unwilling to use QR codes for expediting task completion (62.1%), are not prepared to adopt QR codes to improve their work (53.7%), and are averse to using QR codes for boosting productivity (45.3%). The foregoing indicates, just like the PEU, that the PU of QR codes among LPULI (LPULI) is low. This translates to the fact that the level of preparedness of LP to adopt QR codes is low.

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Research Question Three: What is the level of QR code usage among LP in UL in universities in Ibadan, Oyo State?

Table 5: Level of QR code usage among LP in UL

Key: SA = 1, A = 2, D = 3, SD = 4, F, %, Mean ($\bar{x}$),St. D.

S/N	Statement	SA (F)	SA (%)	A (F)	A (%)	D (F)	D (%)	SD (F)	SD (%)	$\bar{x}$	St. D
	My library has and uses the following types of QR codes										
1.	Generate a QR code linking to the library's website.	22	23.2	23	24.2	14	14.7	36	37.9	2.67	1.20
2.	Create a QR code for the library application.	16	16.8	22	23.2	12	12.6	45	47.4	2.90	1.17
3.	Include connections to our SMP inside the QR code.	18	18.9	22	23.2	8	8.4	47	49.5	2.88	1.21
4.	SMS Alert and MOPAC	20	21.1	28	29.5	10	10.5	37	38.9	2.67	1.19
5.	E-mail and phone numbers	15	15.8	20	21.1	12	12.6	48	50.5	2.97	1.16
6.	Reference and Library Resources	9	9.5	34	35.8	9	9.5	43	45.3	2.90	1.09
7.	Wi-Fi access and Geo-location	8	8.4	50	52.6	37	38.9	0	0	2.30	.62
8.	Events and URLs	35	36.8	60	63.2	0	0	0	0	2.63	.48
	Frequency of use										
1.	Create a QR code linked to the library's website using the provided URL.	4	4.2	35	36.8	56	58.9	0	0	2.54	.57
2.	Generate a QR code for accessing our library	2	2.1	43	45.3	50	52.6	0	0	2.50	.54

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	application.										
3.	A QR code contains connections to our SMP.	2	2.1	43	45.3	50	52.6	0	0	2.50	.54
4.	SMS Alert and MOPAC	6	6.3	46	48.4	43	45.3	0	0	2.38	.60
5.	E-mail and phone numbers	8	8.4	39	41.1	48	50.5	0	0	2.42	.64
6.	Reference and Library Resources	4	4.2	8	8.4	18	18.9	65	68.4	3.51	.82
7.	Wi-Fi access and Geo-location	2	2.1	12	12.6	17	17.9	64	67.4	3.50	.79
8.	Events and URLs	4	4.2	5	5.3	20	21.1	66	69.5	3.55	.78
9.	X	21	22.1	23	24.2	19	20.0	32	33.7	2.65	1.16
10.	We print QR codes on pamphlets and brochures and place them in strategic places in our library for users to access them.	10	10.5	16	16.8	10	10.5	59	62.1	3.24	1.07
	Purpose of use										
1.	Make book search easy for readers	11	11.6	23	24.2	18	18.9	43	45.3	2.97	1.08
2.	Provide instant access to reading material	6	6.3	24	25.3	14	14.7	51	53.7	3.15	1.01
3.	Promote your library efficiently (e.g., QR Code for new information about the library and its services)	22	23.2	23	24.2	14	14.7	36	37.9	2.67	1.20
	Weighted mean									**2.83**	

SA = 1, A = 2, D = 3, SD = 4. Decision Rule: $\bar{x}$ = 1.00 – 1.75 is Very High, $\bar{x}$ = 1.76 –

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2.5 is High, $\bar{x}$ = 2.51 – 3.25 is Low and $\bar{x}$ = 3.26 – 4.00 is Very Low

Mean Score Range	Decision Interpretation
1.00-1.75	SA
1.76-2.50	A
2.51-3.25	D
3.26 -4.00	SD

The level of usage of QR codes is the third research question for this study. This is measured by the types, frequency and purpose of QR codes. As presented in Table 5, seven out of the eight items measuring the types of QR codes used were disagreed with. The majority of respondents expressed strong disagreement regarding their UQRC for various purposes: as a website link on the library website (37.9%), as an app code (47.4%), as a connection to SM handles (49.5%), for SMS alerts or MOPAC (38.9%), for email and phone numbers (50.5%), and for links to reference and library resources (45.3%). However, the respondents stated that Wi-Fi access and geolocation QR codes are available as a type in their libraries (52.6%) and events and URLs (63.2%).

The frequency of use showed that not all the QR code types are used frequently. As revealed in Table 5, none of the QR codes is attested to by the majority of the respondents as being used frequently. The respondents clearly did not utilise QR codes for facilitating book searches for readers (45.3%), ensuring immediate access to reading materials (53.7%), or effectively promoting the library (e.g., QR codes for new information regarding the library and its services) (37.9%). Therefore, the consistency of lower levels in types, frequency and purpose of UQRC in ULI showed that QR code usage is not popular and accepted in the libraries.

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Research Question Four: What are the PCAWU of QR codes in UL?

Table 6: PCAWU of QR codes in UL

Key: SA = 1, A = 2, D = 3, SD = 4, F, %, $\bar{x}$, St. D.

S/N	Attitude scale	SA (F)	SA (%)	A (F)	A (%)	D (F)	D (%)	SD (F)	SD (%)	$\bar{x}$	St. D
1.	Lack of trained and skilled manpower	16	16.8	22	23.2	12	12.6	45	47.4	2.90	1.17
2.	Inadequate QR code infrastructure in libraries	18	18.9	22	23.2	8	8.4	47	49.5	2.88	1.21
3.	Insufficient familiarity with global norms and experience	20	21.1	28	29.5	10	10.5	37	38.9	2.67	1.19
4.	Lack of awareness of CBP	15	15.8	20	21.1	12	12.6	48	50.5	2.97	1.16
5.	Lack of an appropriate QR code policy in the library	9	9.5	34	35.8	9	9.5	43	45.3	2.90	1.09
6.	Inadequate capacities and QR code skills of LP	8	8.4	50	52.6	37	38.9	0	0	2.30	.62
7.	Inactive role of the Professional Association to encourage CB of LP	35	36.8	60	63.2	0	0	0	0	2.63	.48
8.	Poor internet connectivity	4	4.2	35	36.8	56	58.9	0	0	2.54	.57
9.	Lack of understanding of library patrons' usage of technology	2	2.1	43	45.3	50	52.6	0	0	2.50	.54
10.	Lack of understanding of library patrons' usage of technology	2	2.1	43	45.3	50	52.6	0	0	2.50	.54
	Weighted mean									**2.67**	

SA = 1, A = 2, D = 3, SD = 4. Decision Rule: $\bar{x}$ = 1.00 – 1.75 is Very High, $\bar{x}$ = 1.76 – 2.5 is High, $\bar{x}$ = 2.51 – 3.25 is Low and $\bar{x}$ = 3.26 – 4.00 is Very Low

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Mean Score Range	Decision Interpretation
1.00-1.75	SA
1.76-2.50	A
2.51-3.25	D
3.26-4.00	SD

Table 6 illustrates the findings of the PCAWU of QR codes in ULI, Oyo State, Nigeria. It was found that the majority of the challenges did not pose a threat to LPULI's adoption of QR codes. The majority of participants disagreed that the scarcity of an educated and competent workforce constituted a risk (47.4%). Equally, the majority of the respondents disputed that the QR code infrastructure in the libraries is insufficient (49.5%) and they also disagreed strongly that the absence of CB programmes is a problem (50.5%). The result in Table 4.8 showed that the lack of an appropriate QR code policy in the library is a problem (45.3%).

However, insufficient exposure to international standards and experience poses a challenge, as the combined percentage of respondents who strongly agree and agree reached 50.6%. Furthermore, respondents indicated that the inadequate capacities and QR code proficiency of LP (61% - combined strongly agree and agree) and the passive role of the Professional Association in promoting CB of LP (100% - combined strongly agree and agree) were identified as primary issues hindering the utilisation of QR codes. Moreover, inadequate internet connection (58.9% disagreed), insufficient understanding of the technology among library users (52.6% disagreed), and occasional malfunctioning of codes owing to decoder compatibility issues (52.6% disagreed) were not considered as obstacles to QR code utilisation at ULI, Oyo State, Nigeria.

5. Discussion of Findings

The level of CS-E of LPULI, Oyo State

The study found a low level of CS-E among LP, as they cannot solve DCP, do not find reaching their computer goals easy, do not have confidence to deal with unplanned computer events, are not calm when facing computer difficulties and cannot find several solutions when confronted with several computer problems. This thus corresponds to the fact that there is clear evidence that the overall computer abilities of the respondents are poor. It was also demonstrated in this investigation that the scanning abilities of LPUiI are poor. The LP cannot scan

and upload documents easily, cannot use scanners to convert hardcopy to softcopy for electronic storage and use and cannot install and use scanning apps such as CS scanner on my phone or use the online version. Thus, the scanning skills of the LP in UL are low.

The hardware use skills were also found to be low. The respondents cannot perform printing, editing and retrievals effortlessly, cannot connect both wired and wireless barcode scanners to computers and are not confident in handling barcode devices such as bookmark scanners, POS scanners, etc. This study also established that QR code skills were low. The respondents do not know that QR codes lead to an information page on the internet or databank, that a QR code scanner is required before QR code contents can be accessed and that the QR code scanner needs to be placed on the code before it can be read. The level of CS-E among LPUiI was found to be low.

The results went against the findings of Inskip (2017) on CS-E by UK librarians and Quadri and Ogedengbe (2020), who confirmed that the role of LP has shifted from book/information keepers to IL teachers and that the identification and UQRC and CS-E have synergy so that the PU among the LP will use the computer when they believe it will improve their SD.

The results, however, fell in conformity with the investigations of Oyedipe and Popoola (2018), who investigated the IL abilities of LP in HISWN. They claimed that the use of SM for job performance was inadequate. According to Decker (2014), in a study on the use of blogs by LP for SD in America, Decker (2014) noted that library blogs are a good medium for vital information distribution about library operations, current awareness services and new technology, but the use of skills was low. While Oyedokun *et al*. (2018) found that almost all of the LP had good computer skills, including word processing (MS Word), but not advanced IT skills, Shidi and Nwachukwu (2015) found poor capabilities when examining the digitisation skills required by LP in Benue State, Nigeria. They concluded that an overwhelming number of personnel do not have computing skills. Also, Ademodi and Adepoju (2010) stated that LP in developing countries generally have low CS-E skills, which the findings in this study further established.

The level of LP readiness to apply QR codes in ULI, Oyo State

The study found that the perceived EUPU was found to be low, thereby depicting low RUQRC in ULI, Oyo State, Nigeria. This is owing to the poor ranking of the things measuring the scales. LPULI do not feel that QR codes are simple to use in fulfilling library duties and that they will not be WUQRC in the

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future, as they also believe that using QR codes does not need additional training and that using QR codes is self-explanatory. These views are inaccurate since the usage of QR codes needs specific, continual training. This means that the LP in this study do not perceive the UQRC to be easy. It was also found that the PU of QR codes was low. They have no intention of using it in their libraries, are not using WUQRC to improve work performance, are not using WUQRC to accomplish more tasks quickly and are not ready to use QR codes to enhance their work or increase their productivity. The foregoing indicates, just like the PEU, that the PU of QR codes among LPULI is low. This translates to the fact that the level of preparedness of LP to adopt QR codes is low.

This study contradicts the earlier findings of Ugwu and Ekere (2010). In the study, which focused on the training needs of librarians for DLP in Nigeria, it was observed that LP should seek to exploit different CB courses to develop themselves, as the expenditure of training programmes may be too expensive for the employer to manage. Cobblah (2015) researched CB and its impact on SD in UL in Ghana and concluded that the majority of the LP had never participated in formal certificated education programmes and workshops/seminars. Ezejiofor (2018) investigated the impact of CB and associated concerns on librarians' SD in NAU, Awka, Nigeria, and indicated that LP acquired their skills by participating in conferences. The author concluded that these are the limits to the use of IT in libraries by LP. This research further validated these assumptions.

The level of QR code usage among LPULI, Oyo State

This study found that the level of usage of QR codes was low since the readiness to use was low as well. QR codes are not used by libraries as links to their websites, app codes, SM handles, SMS alerts, MOPAC, email addresses, phone numbers, or links to library materials and references. It was also found that all the QR code types are not used frequently, as the respondents attested that none of the QR codes are used frequently, while the QR codes are not used for the purpose of making book searches easy for readers, providing instant access to reading materials and promoting the library efficiently (e.g., QR codes for new information about the library and its services). This study established consistency of lower levels in types, frequency and purpose of UQRC in ULI.

There is a disconnect between the findings and the global trend of using technology in libraries. Several pieces of empirical evidence support this. Adeniji and Babalola (2012) noted that library staff development in Nigerian institutions is shifting from traditional models to digital and online formats on an international scale. Tait et al. (2016) investigated the impact of CS-E on

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university libraries in the United Kingdom, asserting that the capabilities of the internet and its application are substantially supplanting traditional LS with new LS. Ugwu and Idoko (2016), in their study on the impact of online resources on printed content in educational institution libraries in Nigeria, found that the internet has become exceedingly vital in SD.

PCAWU of QR codes among personnel in ULI, Oyo State

The primary problems identified in this research hindering the UQRC in ULI were insufficient exposure to worldwide norms and experience, limited capabilities and QR code proficiency of LP, and a passive role of the Professional Association in promoting CB of LP. This finding contrasts with the results of Shidi and Nwachukwu (2015), who indicated that the CB programmes engaged in by the LP included five primary activities: Workshops, seminars, self-directed learning, accredited programmes, staff retraining, and online development courses demonstrate that these CBP were more accessible and economical. Library administration frequently organises seminars and staff retraining at minimal or no cost, rendering them cost-effective.

5.1 Summary of the findings

1. The level of CS-E of LPUiI was low.
2. Both PEU and PU were determined to be low, indicating a diminished RUQRC at ULI, Oyo State, Nigeria.
3. There was a low level of QR code usage among LP in ULI.
4. The primary problems identified in this research hindering the UQRC in ULI were insufficient exposure to worldwide norms and experience, poor capabilities and QR code proficiency of LP, and the passive role of the professional organisation in promoting CB of LP.

6. Conclusion

The study concludes that CS-E readiness for QR code application and use by LPUiI was generally low. It is anticipated that increased participation of LP in CB programmes, such as QR code creation conferences and other ICT-related training, would boost staff ICT capabilities. The creation of ICT infrastructure, including computer centres, combined with integrated ICT training programmes enacted by library and university administrations, would ensure optimum utilisation of resources, skills, and capacities. Consequently, it will promote the progression of QR code development for library applications. Library and Information Science professionals at UM might foster this by taking more

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proactive roles in shaping policies for the enhancement of QR Codes in libraries and facilitating sustainable development via QR Codes in library settings. Also, CS-E should be more emphasised among the personnel so as to improve library efficiency.

7. Recommendation

The following are the recommendations for this study:

1. LP and UM should strive to create library QR code so as to make library processes more efficient, such as e-borrowing of books, e-reading, e-research and a host of others.
2. LIS professional association should have periodic meetings and conferences on how to improve members' CS-E as well as make them familiar with QR code usage for easy library work processing.
3. The library and UM should make LP a priority by constantly assessing their respective capacity needs, and encourage them to participate in CB programmes so as to improve their CS-E. Similarly, CB trainings such as seminars on coding, software, links and teleconferencing can be done periodically.
4. There should be a rise in conferences where LP may get knowledge on current and optimal practices in the field.
5. LM should seek grants to mitigate inadequate library financing to improve effective SD.
6. Universities should strive to provide sufficient financial resources to libraries to augment value-added services in alignment with the digital era.
7. LM must provide sufficient and up-to-date ICT facilities and a conducive atmosphere for successful SD.

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INVESTMENT PORTFOLIOS AND SOLVENCY IN THE INSURANCE SECTOR: AN EMPIRICAL ANALYSIS OF RISK MANAGEMENT STRATEGIES

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Abstract

This study empirically examines the investment portfolios and solvency positions of insurance companies operating in the Algerian market in 2024. Drawing on official data from the Algerian Ministry of Finance covering 22 direct insurance companies, the analysis maps portfolio composition, calculates investment yields and solvency ratios, and constructs a risk-return matrix to reveal each firm's strategic positioning. Total placements reached 464.1 billion DZD in 2024, of which 57% concentrated in government bonds. The average investment yield stood at 6.7%, while the average solvency margin covered 172% of technical provisions. Eleven of the 22 companies failed to reach the 100% threshold when solvency margins are measured against provisions, signaling structural fragility beneath the aggregate stability. The study places these findings within the broader literature on Solvency II, risk-based capital, and asset-liability management, and compares Algeria's trajectory with peers across emerging markets. The results indicate that investment scale and quality influence solvency, though underwriting discipline remains the dominant determinant under the current rules-based regulatory regime. The paper concludes with policy recommendations targeting regulatory modernization and gradual portfolio diversification.

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Keywords: *insurance solvency; investment portfolio; risk management; Solvency II; emerging markets*

JEL Classification: *G22; G11; G28; G32*

Introduction

Insurance companies occupy a dual role in any economy. They absorb risk on behalf of policyholders, and they recycle the premiums collected into financial markets as institutional investors. Both functions rest on a common foundation: the insurer must remain solvent. That capacity to meet long-term obligations to policyholders determines whether an insurance company serves its social purpose or becomes a source of systemic fragility.

In the market studied here, total premiums reached 172 billion DZD in 2024, a 5.17% increase over 163.54 billion DZD in 2023 [MoF, 2025]. Non-life business accounted for 87.49% of total volume, driven principally by motor (41.60%) and property damage (40.14%) lines. The life segment, at 21.52 billion DZD, grew at 14.52%, outpacing non-life growth by a considerable margin. Within life, group employee benefits rose 29.35%, signalling corporate demand for coverage rather than household savings behaviour. Despite this growth, the penetration rate stays below 1% of GDP, reflecting a structurally underdeveloped market by international standards [Lester, 2011]; [Almi et al., 2024].

The investment portfolios of these insurers are shaped by regulatory requirements that prioritise security and liquidity over return. Government bonds account for 57% of total placements, reflecting both regulatory mandates and the absence of alternative long-duration instruments in the domestic capital market. This conservative allocation generates modest but stable yields and underpins solvency margins that, at the aggregate level, appear robust. The sector's total solvency margin grew by 7% to 263.2 billion DZD in 2024, standing at approximately 11.4 times the regulatory minimum [MoF, 2025]. Yet this figure masks significant heterogeneity across firms.

The central question this paper addresses is: how do insurance companies in this emerging market manage the trade-off between investment return and financial solvency, and what does the 2024 data reveal about the sector's structural vulnerabilities? The question matters because international regulatory developments, particularly the Solvency II framework implemented in the European Union, demonstrate that linking capital requirements to actual risk profiles changes insurer behaviour in ways that rules-based regimes cannot

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anticipate or prevent [Braun et al., 2015]. The market studied is not yet subject to such a framework, but the pressure to modernise its solvency regime is growing.

This paper makes the following contributions. First, it provides a detailed, company-level empirical analysis of the 2024 insurance sector using official regulatory data. Second, it situates these findings within the established literature on solvency regulation, portfolio optimisation, and asset-liability management. Third, it compares the market's trajectory with emerging-market peers to draw actionable lessons for regulators and firm executives. The paper is structured as follows: the next section reviews the theoretical and empirical literature; the methodology section describes the data and analytical approach; results and discussion follow; a comparative section benchmarks the market internationally; and the conclusion offers policy recommendations.

Literature Review

Solvency Frameworks: From Rules to Risk

Traditional solvency regulation measured an insurer's financial soundness through simple ratios of capital to premiums or claims. These approaches provided a floor but lacked sensitivity to the actual risk profile of each firm. The shift toward risk-based capital frameworks reflects a recognition that identical premium volumes generate vastly different risk exposures depending on product mix, investment strategy, and operational quality [Lorent, 2010].

The Solvency II framework, implemented across the European Union, represents the most comprehensive articulation of this risk-based philosophy. It is structured around three pillars: quantitative capital requirements calibrated to a 99.5% Value-at-Risk threshold over a one-year horizon (Pillar 1); governance and risk management requirements including the Own Risk and Solvency Assessment, or ORSA (Pillar 2); and public disclosure obligations intended to strengthen market discipline (Pillar 3) [Rey, 2022; Lorent, 2010]. Research on the framework's implementation consistently documents its impact on insurer investment behaviour, with capital charges for equities and volatile assets creating incentives to shift portfolios toward higher-quality fixed-income instruments [Heinrich et al., 2018; Braun et al., 2015].

For emerging markets, the adoption of Solvency II-inspired frameworks presents both promise and difficulty. The Malaysian Risk-Based Capital Framework, introduced in 2009, offers one regional precedent, combining standardised formulas with proportionality provisions that account for smaller market size and less sophisticated risk modelling capacity [Zaidi et al., 2018]. The

solvency regime studied here calculates minimum margins as a percentage of premiums or claims, with fixed capital floors, a structure that provides macro-level stability but cannot capture concentrations of underwriting, market, or operational risk that would be captured by a risk-sensitive regime [Sid et al., 2025].

Investment Portfolio Theory in an Insurance Context

Insurance investment management differs from standard portfolio theory in one critical respect: the liabilities are not optional. An insurer must hold assets sufficient to pay claims when they fall due, regardless of market conditions. This constraint transforms portfolio optimisation into an asset-liability management problem rather than a pure return-maximisation exercise [Laurent, 1998].

König et al. (2008) established the direct relevance of portfolio management decisions to solvency measurement, demonstrating that investment choices feed into capital requirement calculations in ways that cannot be managed separately from liability considerations. Chen et al. (2023) extended this logic with a bi-level optimisation model that jointly determines insurance product design and investment allocation, showing that integrated approaches consistently outperform sequential optimisation in both solvency and profitability outcomes.

Braun et al. (2015) examined how Solvency II's standard formula imposes implicit constraints on portfolio efficiency. Their results show that risk-based capital charges create a wedge between the efficient frontier identified by classical mean-variance optimisation and the frontier accessible to a solvency-constrained insurer. The effect is largest for asset classes that attract high capital charges, notably equities and real estate, and smallest for high-quality government bonds, which is precisely the allocation pattern observed in the market studied here.

The interaction between investment strategy and solvency is also mediated by liquidity. Insurers must maintain sufficient liquid assets to meet unexpected claim surges, particularly in non-life lines where claim timing is uncertain. This constraint is especially binding in markets where secondary markets are thin and asset liquidation at short notice carries significant cost, a condition that characterises the domestic financial market today [MoF, 2025].

Risk Management in Emerging Market Insurance

Enterprise risk management in insurance is not merely a compliance exercise. When implemented genuinely, it reshapes how boards and management teams understand the sources and dimensions of financial risk. Alouache et al. (2021) documented the effectiveness of prudential regulation in driving risk management improvement among insurers in the market studied, while Sharma (2022)

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emphasised the role of board-level oversight and director duties in ensuring that formal governance structures translate into substantive risk culture.

Local empirical work has expanded rapidly since 2023. Krache et al. (2024) analysed a panel of 12 property-liability companies from 2018 to 2021 and identified underwriting results as the dominant predictor of solvency ratios, with investment return failing to achieve statistical significance in models based on technical provisions. Lazli and Bouakkaz (2024) used an ARDL model on quarterly data and found that catastrophic and underwriting risks negatively affect short-term profitability, while liquidity and retention ratios exert positive short-run effects. Sid et al. (2025) evaluated a domestic insurer against Solvency II quantitative requirements over 2017–2021 and found solvency capital ratios consistently exceeding 500%, reflecting the conservative capitalisation norm in the sector, though the authors caution that existing rules do not capture all risk categories that Solvency II would.

Poufinas and Siopi (2024) provide the most directly applicable cross-market evidence. Studying 88 EU insurance groups under Solvency II, they established that portfolio asset allocation, specifically the mix between government and corporate bonds, the share of property, and equity exposure, significantly influences solvency capital ratios. Their findings suggest that as the market studied transitions toward risk-based regulation, investment decisions will become more directly consequential for regulatory capital.

Theoretical Background: Methodology and Data

Data Sources

The primary data source is the official 2024 activity report of the national insurance sector, published by the Ministry of Finance [Ministère des Finances, 2025]. This report provides company-level financial data for all active direct insurance companies as of the fiscal year ending December 2024. The dataset covers 22 direct insurers. The national reinsurer and specialised public bodies were excluded from certain comparative analyses to preserve sample homogeneity.

Supplementary evidence was drawn from academic studies identified through systematic searches of major databases using eight distinct search groups targeting solvency determinants, investment strategies, risk management practices, and regulatory frameworks relevant to the market and its MENA peers. A cross-country dataset covering 13 emerging-market jurisdictions was used for the comparative analysis, drawing on available regulatory disclosures and market reports.

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Variables and Indicators

Table 1 summarises the key variables extracted from the regulatory report and the indicators derived from them. Three indicators are central to the analysis. The Investment Yield is calculated as Financial Income divided by Total Placements, measuring the return generated by each firm's portfolio. The Solvency Margin to Provisions Ratio divides the regulatory solvency margin by total technical provisions, providing a measure of how thoroughly capitalisation covers policyholder liabilities. Firms falling below 100% on this ratio face potential vulnerability even if they satisfy the legal minimum, which is computed on a different basis (premiums or claims). The Asset Coverage Ratio divides admitted assets by regulated commitments to assess asset adequacy across the balance sheet.

Table no. 1. Key Variables for Analysis

Category	Variable	Description	Source
Investment	Total Placements	Total value of the investment portfolio	MoF, 2025, p. 33
	Portfolio Allocation	Breakdown into categories (gov. bonds, real estate, etc.)	MoF, 2025, p. 32
	Financial Income	Revenue generated from the investment portfolio	MoF, 2025, p. 36
Solvency	Solvency Margin	Capital held above technical provisions, per regulatory definition	MoF, 2025, p. 38
	Technical Provisions	Total provisions set aside to cover policyholder liabilities	MoF, 2025, p. 23
	Regulated Commitments	Sum of all technical and regulated provisions	MoF, 2025, p. 42
	Admitted Assets	Assets admitted by the regulator to cover regulated commitments	MoF, 2025, p. 43

Source: Ministère des Finances (2025). Rapport d'Activité des Assurances — 2024.

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Analytical Approach

The analysis proceeds through four steps. First, descriptive statistics characterise market-wide portfolio composition and solvency positions. Second, comparative analysis across three segments — public companies, private damage insurers, and private personal insurers — identifies segment-level differences. Third, a risk-return matrix plots each firm's investment yield against its solvency margin-to-provisions ratio, revealing four distinct strategic clusters. Fourth, findings are benchmarked against 13 emerging-market jurisdictions using available regulatory data.

Because the data are cross-sectional for a single year, the analysis cannot establish causal direction. Interpretations are informed by longitudinal panel evidence from Krache et al. (2024) and Lazli and Bouakkaz (2024), who used multi-year data, and by the broader cross-country evidence cited in the literature review.

Results

Market Overview: Growth with Structural Concentration

The insurance market recorded total premiums of 172 billion DZD in 2024, a 5.17% increase over 163.54 billion DZD in 2023 [MoF, 2025]. Non-life business accounted for 87.49% of total volume, dominated by motor and property damage lines. The life segment, at 21.52 billion DZD, grew at 14.52%. Market concentration remains high. The four largest players hold the majority of market share. Public-sector companies dominate overall premium volume, reflecting the historically state-led financial sector [Guemmaz, 2023]. Table 2 details the market breakdown.

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Table no. 2. Insurance Market — Key Metrics, 2024

Segment	Volume (billion DZD)	Change (%)
Total Market	**172.00**	**+5.17%**
Non-Life (Damages)	150.48	+3.96%
— Motor	71.55	+6.96%
— Property Damage	69.04	+2.72%
— Marine	7.39	–13.69%
— Agricultural Risks	2.34	+16.98%
— Credit	0.16	+101.28%
Life (Persons)	**21.52**	**+14.52%**
— Group Employee Benefits	—	+29.35%
— Life-Death	—	+8.14%

Source: Ministère des Finances (2025).

Investment Portfolio Composition

Total financial placements reached 464.1 billion DZD in 2024, a 10% increase from the prior year [MoF, 2025]. The portfolio is heavily concentrated in government bonds and Treasury securities, which account for 57% of the total. Term deposits contribute 16%, real estate 15%, and equities a marginal 7%. This allocation reflects both regulatory requirements and the limited availability of alternative instruments in the domestic capital markets.

Table no. 3. Investment Portfolio Composition, 2024

Asset Class	Share (%)	YoY Change
Government Bonds / Treasury Securities	**57%**	**+14%**
Term Deposits	16%	—
Real Estate	15%	—
Equities / Securities	7%	—
Other Assets	5%	—
Total (billion DZD)	**464.1**	**+10%**

Source: Ministère des Finances (2025), p. 32–33.

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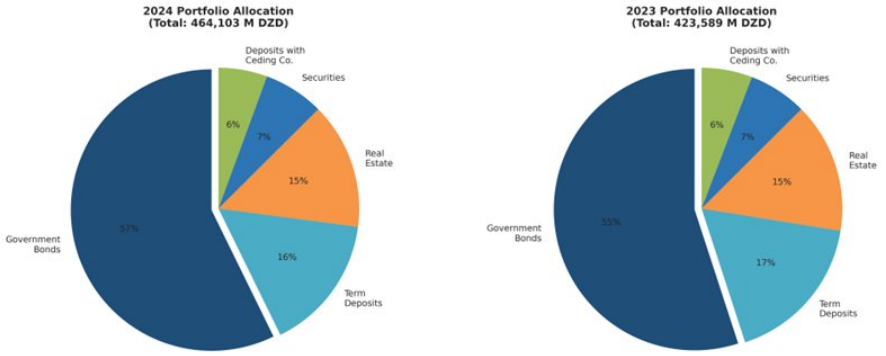


Figure no. 1. Investment Portfolio Structure, 2024 vs. 2023 (Total: 464,103 M DZD vs. 423,589 M DZD)

Source: Ministère des Finances (2025).

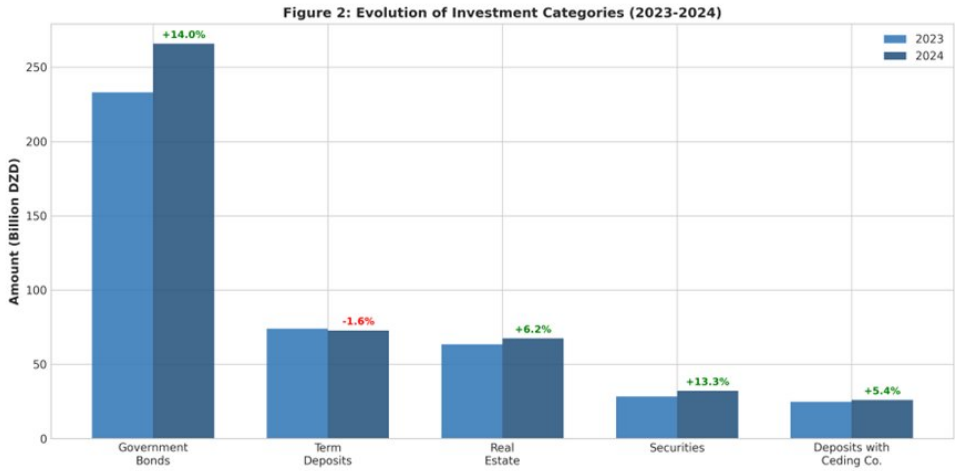


Figure no. 2. Evolution of Investment Categories, 2023–2024 (Billion DZD)

Source: Ministère des Finances (2025).

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Government bond holdings grew by 14% year-on-year, accelerating relative to the overall 10% portfolio growth rate. One large public portfolio exemplifies the market pattern: 78% in Treasury bonds, 7% in bank deposits, 12% in real estate, and 3% in participations and equities, with an average yield of 5.9% on total placements of approximately 84.6 billion DZD [MoF, 2025]. The concentration in sovereign instruments provides predictable cash flows that align with short- and medium-term liability maturities. However, it concentrates the sector's exposure to sovereign yield and fiscal conditions. If public finances deteriorate, the portfolio's safety assumption weakens at the same moment that the broader economy contracts, a procyclical risk that risk-based frameworks are specifically designed to capture [Hancu, 2014; Braun et al., 2015].

Investment Yield: The Cost of Conservatism

The average investment yield across the 22 direct insurance companies was 6.7% in 2024. Dispersion around this average is substantial. One firm reported an exceptional yield of 27.7%, the result of a 150% year-on-year increase in financial income. At the lower end, yields fell to 2.8% and 3.4%. Public companies, which hold the largest individual portfolios, generally reported below-average yields, consistent with their conservative mandates and regulatory constraints. Figure 3 illustrates the full distribution across all companies.

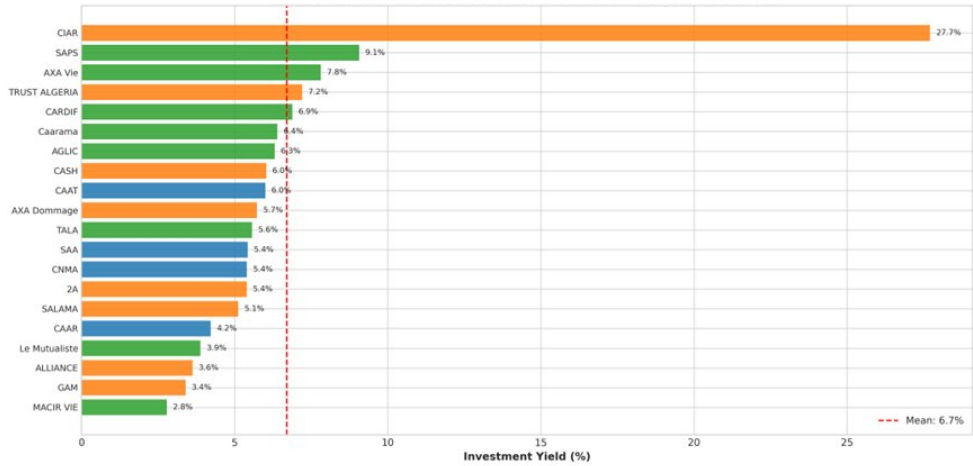


Figure no. 3. Investment Yield by Company (Financial Income / Total Placements, 2024)

Note: Red dashed line = market mean (6.7%). Source: Ministère des Finances (2025); own calculations.

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From the Solvency II literature, this yield dispersion is expected. Braun et al. (2015) showed that capital charges for higher-risk assets push insurers toward lower-yield, lower-volatility instruments. Insurers in the market studied face no explicit capital charge for holding equities beyond the regulatory asset allocation floor, yet they hold minimal equities regardless. The regulatory floor and prevailing risk culture converge on the same conservative outcome. The practical consequence is a sector that generates stable but modest investment income that cannot compensate for underwriting losses in weaker years.

Solvency Analysis: Aggregate Strength, Company-Level Fragility

At the aggregate level, the solvency position appears strong. Total solvency margins reached 263.2 billion DZD in 2024, representing 11.4 times the regulatory minimum and covering 172% of sector-wide technical provisions. The bifurcated market structure becomes visible at the company level. When solvency margins are measured against technical provisions rather than the regulatory minimum, 11 of the 22 direct insurers fall below the 100% threshold. This includes major public companies (93%), mid-sized private firms (61%), and smaller players (49%).

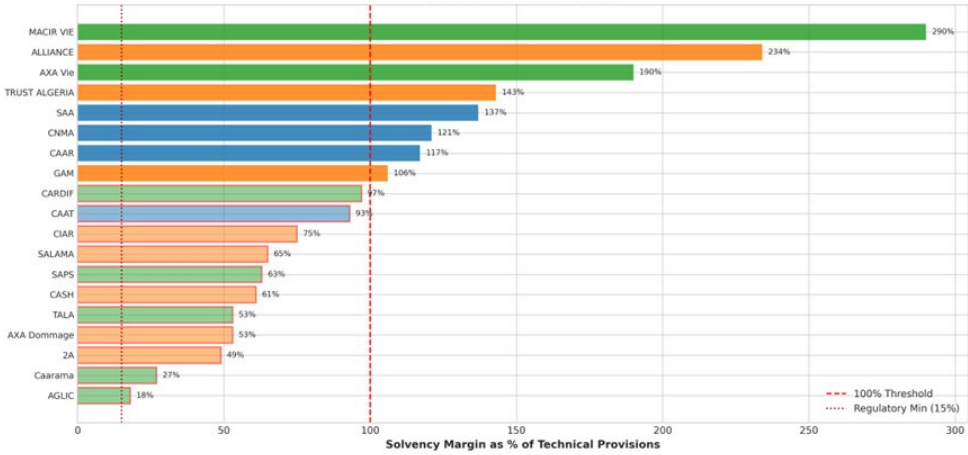


Figure no. 4. Solvency Margin Relative to Technical Provisions (2024) — Excl. outlier at 1,447%

Note: Red dashed line = 100% threshold; black dotted line = 15% regulatory minimum. Source: Ministère des Finances (2025); own calculations.

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These firms satisfy the legal minimum because that minimum is computed on a different basis, but their thin capitalisation relative to their liability base represents genuine vulnerability to underwriting shocks, investment losses, or regulatory recalibration. Table 4 presents the risk-return positions for selected companies.

Company	Solvency / Provisions (%)	Investment Yield (%)	Strategic Quadrant
Company A	234%	3.6%	Low Yield / High Solvency
Company B	1,447%	3.9%	Low Yield / High Solvency
Company C	290%	2.8%	Low Yield / High Solvency
Company D	190%	7.8%	High Yield / High Solvency
Company E	75%	27.7%	High Yield / Low Solvency
Company F	61%	6.0%	Low Yield / Low Solvency
Company G	93%	6.0%	Low Yield / Low Solvency
Company H	49%	5.4%	Low Yield / Low Solvency
Company I	137%	5.4%	Near-Median / Adequate
Company J	143%	7.2%	Near-Median / Adequate
Sector Average	**172%**	**6.7%**	**Conservative**

Source: Ministère des Finances (2025); own calculations. Solvency margin expressed as percentage of technical provisions. Company names anonymised.

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The risk-return matrix in Figure 5 visualises the full distribution. Four strategic clusters emerge. The Low Yield / High Solvency cluster contains firms with very high solvency-to-provisions ratios (up to 1,447%). These companies prioritise capital preservation over return but generate insufficient income to support growth or product innovation. The High Yield / High Solvency space is approached by a single life insurer (190% solvency, 7.8% yield), representing the sector's closest approximation to efficient capital deployment. The Low Yield / Low Solvency cluster is the most concerning: several firms populate this space. Their low profitability constrains internal capital generation precisely when their thin solvency margins most require it. The High Yield / Low Solvency cluster contains one firm whose 27.7% yield is exceptional but whose solvency margin covers only 75% of provisions, making the strategy unsustainable unless profits are immediately capitalised.

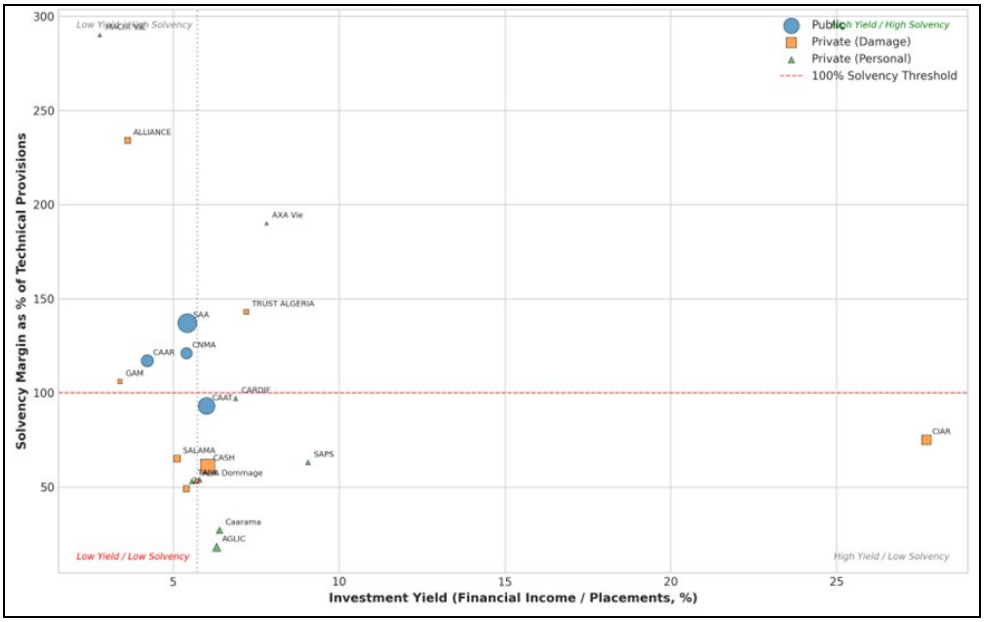


Figure no. 5. Risk-Return Matrix — Investment Yield vs. Solvency Position (2024)

Note: Bubble size = Total Placements. Source: Ministère des Finances (2025); own calculations.

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Determinants of Solvency: What the Evidence Shows

Table 5 synthesises the empirical evidence on solvency determinants from local and internationally relevant studies. The dominant finding from Krache et al. (2024) is that underwriting results drive solvency margins more than investment returns. When investment yields cluster in a narrow band around 6–7%, the variance in solvency outcomes comes from underwriting discipline, retention ratios, and claims management. This finding implies that regulatory efforts focused solely on investment rules will not resolve the solvency fragility of firms in the Low/Low quadrant. Those firms need improved underwriting discipline, better risk selection, and capital reinforcement. Conversely, investment strategy becomes more consequential for solvency once a risk-based framework is adopted, because portfolio choices would feed directly into SCR calculations [Poufinas & Siopi, 2024].

Table no. 5. Empirical Determinants of Solvency — Evidence Summary

Factor	Direction of Effect	Key Reference
Underwriting results	Strong positive	Krache et al. (2024)
Own-retention ratio	Positive (net premium basis)	Krache et al. (2024)
Investment income / placements	Positive (elasticity ≈ 0.38)	MoF (2025); Poufinas & Siopi (2024)
Technical provisions (size)	Positive	Lazli & Bouakkaz (2024)
Catastrophic risk	Negative (short-term profitability)	Lazli & Bouakkaz (2024)
Claims / compensation paid	Negative	Krache et al. (2024)
Leverage	Negative	Poufinas & Siopi (2024)
Portfolio bond share	Positive for solvency, reduces yield	Poufinas & Siopi (2024); Braun et al. (2015)

Source: Synthesised from Krache et al. (2024); Lazli & Bouakkaz (2024); Poufinas & Siopi (2024); MoF (2025); Braun et al. (2015).

Discussion

The Conservative Investment Trap

The structure of the insurance investment portfolio is a rational response to existing regulatory and market conditions. Government bonds offer sovereign

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credit quality, regular coupon income, and regulatory eligibility. In a market where corporate bond issuance is limited, equity markets are thin, and infrastructure debt instruments are absent, the choice of asset class is constrained rather than strategic. Yet the outcome, a 57% concentration in a single asset class, creates concentration risk of a different kind: the insurer's investment portfolio performs exactly as poorly as the sovereign debt market does under stress.

The literature on Solvency II implementation in Europe offers a relevant parallel. Heinrich et al. (2018) documented that European insurers shifted toward government bonds following Solvency II's imposition of capital charges on equities, a shift that was rational at the firm level but created systemic exposure to sovereign risk at the market level. Insurers in the market studied have arrived at the same destination through a different path, regulatory mandates rather than capital incentives, but the systemic implication is similar. Bouchetara (2018) made the same observation in the context of domestic banks, finding that conservative sovereign-heavy portfolios pass stress tests under normal conditions but face correlated losses under adverse macroeconomic scenarios.

Schlütter et al. (2023) demonstrated that responsibly oriented portfolios, when properly constrained by solvency requirements, can reduce risk concentration without sacrificing yield equivalence. Green bonds, infrastructure financing instruments tied to the energy transition, and corporate paper from state-owned enterprises could expand the investment frontier without violating the regulator's security-first mandate.

Risk Management Practices: Compliance vs. Capability

The 2023–2024 amendments to the insurance law introduced requirements for risk committees, governance controls, and ORSA-like self-assessment processes. Alouache et al. (2021) found that prudential regulation improves risk management practices among insurers, though the effectiveness depends on the depth of supervisory follow-through. Sharma (2022) cautioned that formal governance structures produce limited benefits without genuine board engagement and risk culture.

The firms in the Low Yield / Low Solvency quadrant illustrate this gap. Their solvency vulnerability is not primarily a function of poor investment choices. It stems from underwriting exposures and provision practices that are not adequately capitalised. No governance reform changes this without also changing how risks are priced, retained, and reserved. High reinsurance cession rates — one firm ceded approximately 88% of gross premiums in certain lines — provide a partial substitute for strong balance sheets. The central reinsurer's role in catastrophe

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pooling and large-risk reinsurance reduces net exposure for individual firms. However, high cession rates also reduce net premium income and the capital generated internally from underwriting profit. Firms that rely on cession to manage risk without improving underwriting quality remain structurally dependent on the reinsurance market, a dependency that creates its own counterparty concentration risk [MoF, 2025].

The Path Toward Risk-Based Solvency

The case for transitioning toward a risk-based solvency framework is supported by both the domestic evidence and the international literature. The current rules-based approach sets a floor but cannot distinguish between two firms with identical premium volumes but radically different risk profiles. A Solvency II-inspired framework would expose these differences by requiring capital commensurate with actual exposures, including underwriting, market, credit, and operational risk. For firms currently holding excess capital relative to their risk profile, this would release capital for productive use. For firms in the Low Solvency cluster, it would clarify the true magnitude of the capital deficit.

The implementation challenge is real. Braun et al. (2015) showed that Solvency II's standard formula imposes implicit constraints that can reduce portfolio efficiency for firms that lack the modelling sophistication to demonstrate that their actual risk is lower than the formula assumes. For small insurers, internal model approval is not a realistic near-term option. A proportionate phased implementation, beginning with enhanced data collection and risk reporting, followed by simplified RBC calculations, and eventually full SCR-style requirements, would avoid the compliance burden while building regulatory and company-level capacity [Laas, 2014; Gorter & Bikker, 2011].

Within the North African region, certain peers have begun phased transitions toward Solvency II-inspired frameworks. Their experience, observed through available regulatory disclosures and market reports, suggests that a multi-year capacity-building period is essential before any formal SCR-style requirements are imposed. The market studied can incorporate these lessons before committing to a parallel path.

Comparative Analysis: Emerging-Market Benchmarking

Placing the market within a broader emerging-market context illuminates both its relative strengths and the distance to best practice. The cross-country dataset covers 13 jurisdictions across five regions. The market's solvency ratio of 145% falls below the regional average for North Africa (152.8%) and all other regional groupings, as shown in the figures below.

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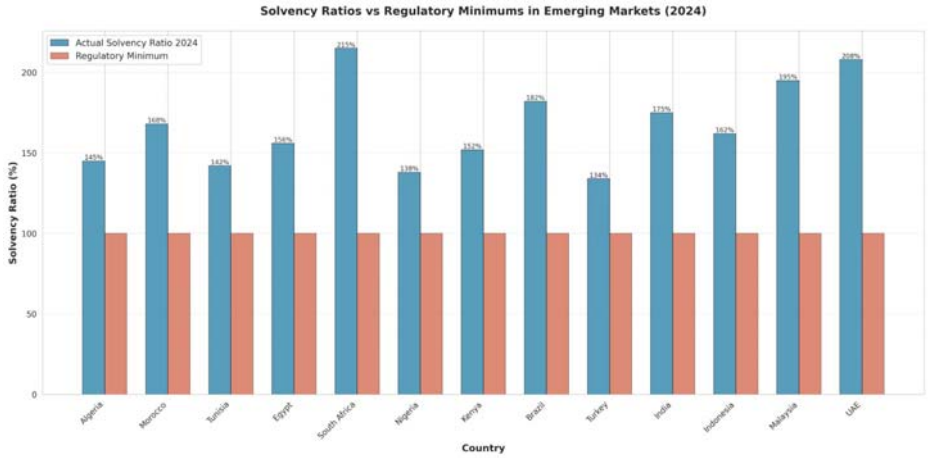


Figure no. 6. Solvency Ratios vs. Regulatory Minimums in Emerging Markets (2024)
Source: Cross-country regulatory disclosures and market reports; own compilation.

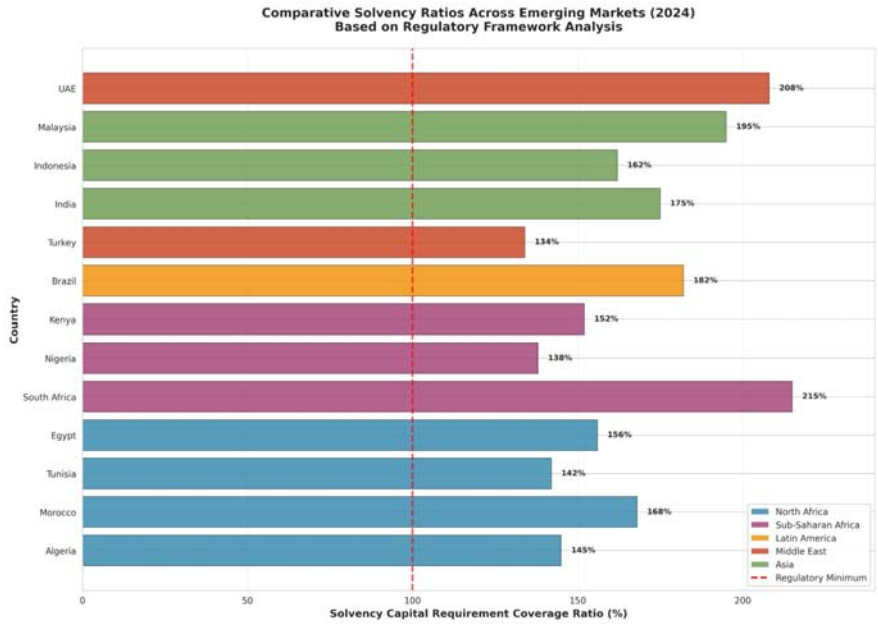


Figure no. 7. Comparative Solvency Capital Requirement Coverage Ratios Across Emerging Markets (2024)
Source: Cross-country regulatory disclosures; own compilation.

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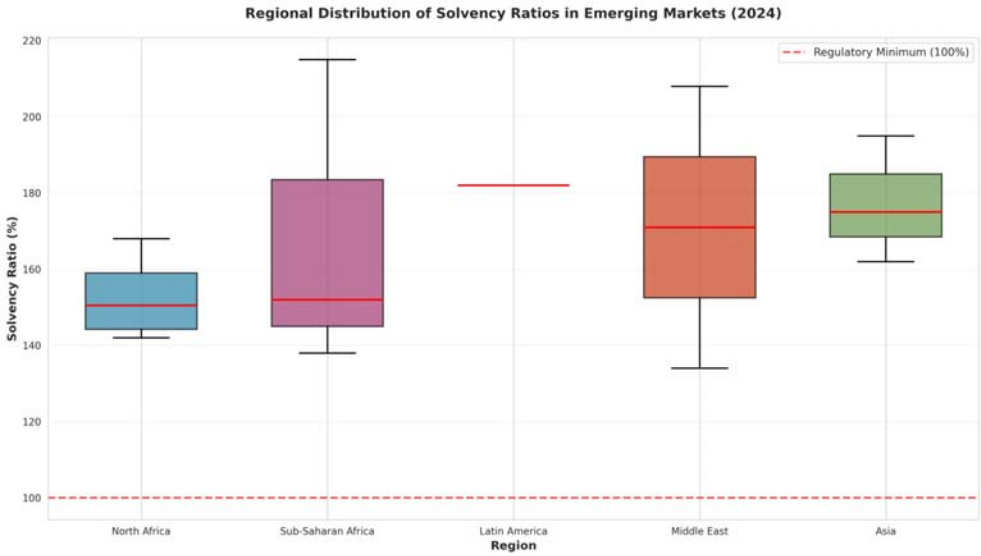


Figure no. 8. Regional Distribution of Solvency Ratios in Emerging Markets (2024)

Note: Red dashed line = 100% regulatory minimum. Source: Cross-country regulatory disclosures; own compilation.

Table 6 summarises key comparative metrics. Nominal solvency buffers, 300 to 500% of the regulatory minimum for most firms, appear favourable in absolute terms. However, the comparison is complicated by methodological differences. GCC markets use risk-sensitive SCRs calibrated to actual exposure distributions, whereas the market studied computes its minimum on a simpler premium-or-claims basis. When solvency is measured against technical provisions rather than the legal minimum, the sector average of 172% is more comparable, and the 11-of-22 firms below 100% would attract supervisory attention under most RBC frameworks.

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Table no. 6. Emerging-Market GCC Peer Comparison, 2024

Metric (2024)	Market Studied	GCC Markets	MENA Trend
Premium Growth	+5.2% (172 bn DZD)	8–31%	+5–9% real
Solvency Approach	Rules-based (high buffer)	SCR/RBC hybrid	Mixed, GCC leading
Coverage Ratio	300–500%+ of minimum	150–250%+ SCR	Resilient BCAR
Investment Style	Sovereign-heavy	Diversified (equity/RE)	Investment-driven ROE
AM Best FSR Outlook	Stable (B / B+)	Mostly Stable / Positive	Positive overall
ERM Maturity	Developing	Advanced (GCC)	Improving

Source: AM Best MENA Insurance Market Report (2024–2025); Ministère des Finances (2025); cross-country regulatory disclosures.



Figure no. 9. Solvency Ratios by Country and Risk Classification (2024)

Note: Colour scale reflects solvency ratio intensity. Source: Cross-country regulatory disclosures; own compilation.

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The regional picture shows Asia producing the highest average solvency ratios (177.3%), followed by Latin America (182.0% for Brazil alone), the Middle East (171.0%), Sub-Saharan Africa (168.3%), and North Africa (152.8%). At 145%, the market studied sits at the lower end of the North African cluster, which also includes Tunisia (142%) and Egypt (156%). The standard deviation within North Africa is 11.8, the lowest of any region, indicating a group of markets that share similar regulatory conservatism but also similar constraints on capital efficiency.

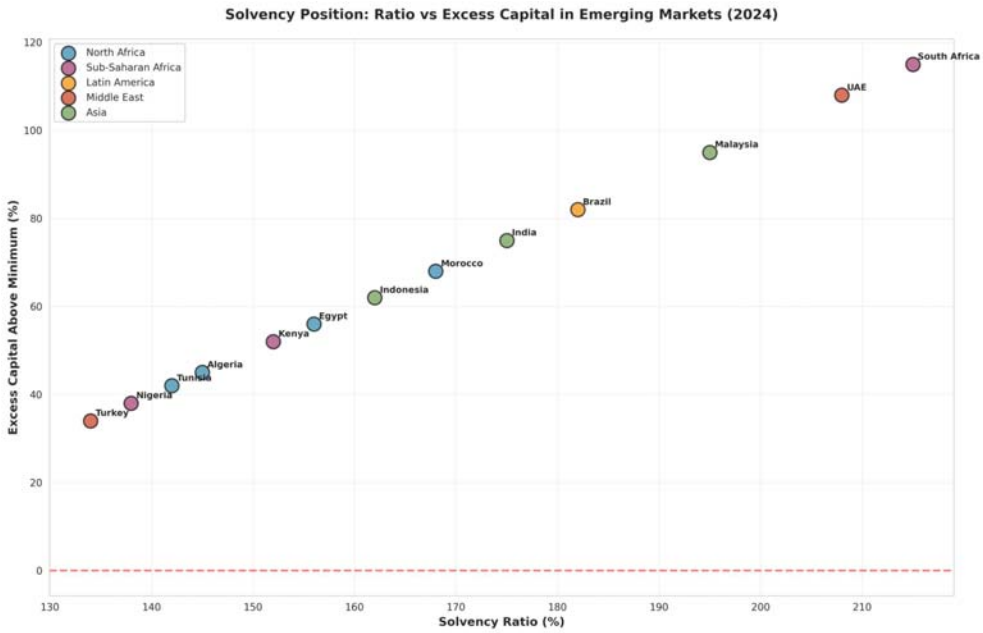


Figure no. 10. Solvency Position — Ratio vs. Excess Capital in Emerging Markets (2024)

Source: Cross-country regulatory disclosures; own compilation.

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Summary Statistics: Solvency Ratios by Region (2024)

Region	Mean Ratio (%)	Min Ratio (%)	Max Ratio (%)	Std Dev	N Countries
Asia	177.3	162.0	195.0	16.6	3
Latin America	182.0	182.0	182.0	nan	1
Middle East	171.0	134.0	208.0	52.3	2
North Africa	152.8	142.0	168.0	11.8	4
Sub-Saharan Africa	168.3	138.0	215.0	41.0	3

Figure no. 11. Summary Statistics — Solvency Ratios by Region (2024)

Source: Cross-country regulatory disclosures; own compilation.

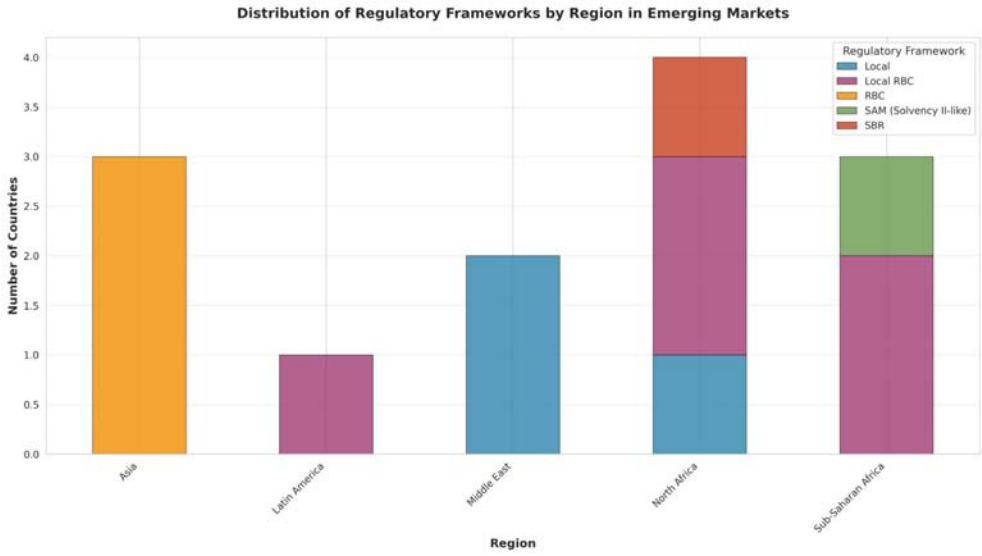


Figure no. 12. Distribution of Regulatory Frameworks by Region in Emerging Markets (2024)

Note: RBC = Risk-Based Capital; SBR = Solvency-Based Regulation; SAM = Solvency Assessment and Management. Source: Cross-country regulatory disclosures; own compilation.

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Figure 12 reveals that North Africa retains the highest proportion of purely local or local-RBC frameworks among all regions, with three of four countries operating under non-Solvency II approaches. Sub-Saharan Africa leads on regulatory sophistication through South Africa's SAM framework, a direct adaptation of Solvency II. Asian markets cluster around RBC frameworks (Malaysia, India, Indonesia). This regulatory typology explains much of the variation in investment portfolio diversification: markets with more sophisticated frameworks tend to have insurers that diversify more broadly, because the framework itself makes portfolio risk-return trade-offs transparent.

Investment portfolios across GCC markets are considerably more diversified, holding a mix of equities, listed bonds, real estate, and inter-company holdings, with investment income a primary driver of profitability. The 6.7% average yield in the market studied, while stable, cannot generate the capital surplus needed to absorb underwriting losses in poor years or fund organic capital growth as premium volumes expand. ERM maturity follows a similar gradient. GCC supervisors have invested in stress-testing infrastructure, internal model review capability, and Pillar 2 governance requirements that push insurers toward genuine risk culture rather than formal compliance. The 2023–2024 insurance law upgrades in the market studied are a positive step, but supervisory capacity to enforce ORSA-equivalent requirements across 22 direct insurers remains under development.

Conclusions

The 2024 data tell a consistent story. The market grew by 5.17% to 172 billion DZD. Total placements reached 464.1 billion DZD, with 57% concentrated in government bonds. The average investment yield was 6.7%, and aggregate solvency margins covered 172% of technical provisions. These figures suggest a stable, conservative sector. The company-level evidence introduces important qualifications: eleven of 22 direct insurers fail to cover their technical provisions from solvency margins alone, and no insurer currently clearly occupies the high-yield, high-solvency quadrant that would indicate genuinely efficient capital deployment. The sector bifurcates between over-capitalised, low-yield firms and under-capitalised firms whose low profitability prevents internal capital accumulation. The empirical literature confirms that investment performance influences solvency, but underwriting discipline dominates under the current rules-based regime.

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These outcomes carry clear implications. For regulators, the priority is a phased transition toward risk-based solvency: a first phase focused on enhanced data collection and risk reporting; a second introducing simplified RBC calculations alongside the existing regime; and a third moving to full SCR-style requirements calibrated to domestic market data rather than imported European parameters. Supervisory attention should concentrate on firms in the Low Yield / Low Solvency quadrant through enhanced monitoring, capital-adequacy dialogues, and, where warranted, mandated capital plans. Investment regulations should be gradually relaxed, subject to prudential safeguards, to allow greater access to corporate bonds, infrastructure instruments, and diversified international assets, supported by the development of a deeper domestic corporate bond market.

For insurance companies, firms in the Low Yield / Low Solvency quadrant must address a dual constraint: better underwriting risk selection and pricing on one side, and marginal portfolio diversification on the other, shifting 5–10 percentage points from government bonds to higher-yielding instruments without crossing prudential limits. Where internal capital generation is insufficient, capital injections or mergers should be evaluated. Over-capitalised, low-yield firms should deploy excess capital into products such as life savings, microinsurance, and agricultural coverage that improve returns while serving underinsured populations.

Several questions remain open for future research. First, panel data spanning 2015–2024 across all insurers would enable econometric identification of the causal relationship between portfolio diversification and solvency stability, controlling for underwriting-cycle effects. Second, a detailed calibration exercise for a domestic RBC framework, using local loss-distribution data and market-risk parameters, would give regulators an empirical basis for setting capital requirements. Third, the experience of Takaful operators presents a regulatory-design challenge regarding how solvency requirements should be adapted for profit-and-loss-sharing structures [Ahmed, 2022]. Finally, regional panel analysis comparing North African and Sub-Saharan African markets under matched methodologies would provide a cleaner basis for regulatory convergence planning.

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AUDIT ATTRIBUTES AND FINANCIAL REPORTING QUALITY OF DEPOSIT MONEY BANKS

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Abstract

This focus of this paper was on the relationship between audit attributes and the financial reporting quality of deposit money banks in Nigeria because of the sensitivity of high-quality financial reporting to financial report users in decision making and the economy as whole. The paper identified audit fees, audit firm independence, audit specialization, audit size as the basic proxies of audit attributes which were the independent variables to explain the quality of financial reporting of deposit money banks during 2014–2024 with reference to discretionary accrual. The study made use of an ex-post facto research design with population size of 20 banks wherein 13 banks were purposively selected for the period under review. Data collected for this study was analysed using descriptive statistics and structural equation modelling and it was found that the main variables audit fees, audit firm independence, audit specialization, and audit size have positive and significant impacts on financial reporting quality. It was concluded that audit fees, audit firm independence, audit specialization, audit size enhances financial reporting quality and it was recommended that there is need for regulatory bodies and management to place strong emphasis on the independence of audit firms without prejudice in all facets of its activities.

Keywords: *audit attributes, audit fees, audit independence, audit specialization, financial reporting quality, deposit money banks.*

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JEL Classification: G32, H 83, M 42

1. Introduction

Audit quality is often related to the competence and independence of auditors as being able to detect material misstatements and being prepared to issue appropriate audit reports to reflect their findings (Adedokun et al., 2022). This explains why financial reporting quality is critical not just for end-users, but also for the economy as a whole because it has an emotional influence on the financial and investment choices. The purpose of financial reporting is to provide accurate, relevant, and trustworthy information to all consumers of accounting information. For stakeholders and external users, the financial report remains one of the unique and consistent sources of accounting information. The quality of financial accounts is required, consistent, and informative, and influences economic decisions (Shen & Hsiang-Lin, 2007). Therefore, audit attributes have been identified right from the Eron case as one of the determinants of financial reporting quality. The same issue can be inferred from the recent cases of Skye bank plc and Diamond bank plc in which the directors are granting illegal loans to themselves and their cronies in clear violation of the Companies and Allied Matters Act (2004) as amended (Oyetunji, 2017).

Gardi et al. (2023) emphasizes the pivotal role of financial reporting quality in instilling confidence among stakeholders in banks' financial reports and bolstering their optimism about the prospects of banks. Farouk and Hassan (2014) assert that the attainment of quality financial reporting hinges largely on the external audit's support for both financial reporting quality and the continued viability of an organization. External auditors not only review financial statements and opine on reporting quality but also evaluate a company's sustainability into the foreseeable future. Kabajeh et al. (2012) highlight the significance of the audit report as an essential informational tool for various stakeholders in organizations. Despite its informational value, the lack of independence among external auditors poses a challenge for banks and other organizations (Adeniyi, 2025).

Numerous studies have investigated the effect of audit attributes on financial reporting quality in advanced economies have been undertaken, including (Adeniyi, 2025; Rabab'ah, Al-Sir, & Alzoubi, 2017; Mwangi, 2018; Bratten, Causholli, & Omer, 2019; Eyenubo, Mohamed, & Ali, 2017; & Kalabeke, Sadiq, & Keong, 2019), with substantiated conflicting and mashed up observations, but very few scholars have analyzed the study on the impact of audit attributes on financial

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reporting quality, the period covered by some of the prior research in Nigeria creates a gap. For instance, the work of Umaru (2014), examined audit attributes and financial reporting quality in Nigeria of listed building materials firms, and the period covered (2002-2011) and Usman Aliyu (2014), examined the effect of audit attributes and financial reporting quality of quoted food and beverages firms in Nigeria, and the period covered (2008-2013). Moreover, because a lot of actions occurred between 2016 and 2017, these periods might be considered out of date, this includes the Central Coalition's introduction of the Treasury Single Account (TSA), which has had a considerable impact on the operations of several banking institutions that rely largely on Government Agencies as clients. Additionally, the Nigerian economy was in a terrible slump during this time. As a result, most of these research conclusions might not even be trusted and the differences in the domain of the studies necessitate a replication of the study.

It was on the basis of the foregoing and with the goal of resolving various deficiencies found in the financial reporting quality of Nigeria's listed deposit money banks from 2014 to 2024. As a result, the study's main goal is to examine the implications of audit attributes on the financial reporting quality of Nigeria's listed DMBs, with specific goals of looking into the impact of audit committee independence, audit committee expertise, and audit tenure on the financial reporting quality of Nigeria's listed deposit money banks (Adeniyi, 2025). Therefore, set out examine relationship between audit fees, audit firm independence, audit specialization, audit size and financial reporting quality.

2. Literature Review

2.1 Conceptual Review

This part would address important basic or proxies of audit attributes and financial reporting quality which is represented by discretionary accrual in the literature.

2.1.1 Audit Attributes

Efiong et al. (2022) identified audit fees, audit firm independence, audit specialization, and audit size as audit attribute variables measurement. Audit attributes refer to the characteristics or qualities of an audit that impact its effectiveness, quality, or outcome.

2.1.1a Audit Fees

Audit fees are the compensation paid to auditors for conducting an audit. The audit fee is not static and it varies based on certain factors according to Yayangida et al. (2023) such as client size and complexity (larger, more complex companies pay more); audit scope and risk (Higher risk or more extensive audits cost more);

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auditor expertise (Specialized auditors or big firms may charge more); location (fees vary by country/region due to local market conditions); regulatory requirements (compliance with standards impacts fees). According to Chersan et al. (2012), audit fee refers to the payments made to the auditor for provided audit services. Industry specialist auditors, as defined by Usman and Ugoh (2023), possess extensive training and experience concentrated in a specific industry, resulting in a high level of audit knowledge. Fees are often negotiated between the company (via audit committee) and the auditor while the Financial Reporting Council of Nigeria (FRCN) provides guidelines.

2.1.1b Audit Independence

Audit independence is characterized by an auditor's unbiased mental attitude in decision-making throughout the audit and financial reporting process i.e. audit independence is the freedom from bias, personal relationships, and financial interests that allows auditors to conduct objective examinations. It is crucial for maintaining the credibility of financial reporting, ensuring that stakeholders such as investors and regulators trust the accuracy of an organization's financial statements (Okolie, 2014). There are two dimensions to this namely independence in fact and independence in appearance. By independence in fact, it means the auditor's actual state of mind; being completely objective, impartial, and free from conflicts of interest or undue influence while independence in appearance means How the auditor is perceived by the public. Even if an auditor is impartial in fact, the appearance of a conflict (e.g., a close personal relationship with a CEO) can severely damage the credibility of the audit.

2.1.1c Audit Specialization

Audit specialization is the expertise an auditor develops in a specific industry or operational niche (e.g., oil and gas, healthcare, or IT). It drives higher audit quality and compliance through deep knowledge of sector-specific regulations, financial risks, and industry standards (Yayangida et al., 2023). Typically, larger audit firms are equipped with skilled and experienced audit personnel, technological capabilities, and greater resources compared to smaller audit firms, thus enhancing the quality of the outcome of audit activities. It is about an auditor's expertise in a specific industry or sector, enabling them to provide higher-quality audits. It also helps in the areas of deeper risk assessment, regulatory compliance, and efficiency as well as credibility, and improved audit quality (Adeniyi, 2025; Daferighe & George, 2020).

2.1.1d Audit size

The size of an audit firm plays a crucial role in ensuring the quality and timely completion of audit tasks. It is often referred to the scale or scope of an audit

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engagement, often measured by client size, audit hour, complexity, and number of locations. It has impact on resources, risks and fees (Usman & Ugoh, 2023). Emmanuel and Emem (2020) asserted that there is a big difference in audit quality between large audit firms and small audit firms

2.1.2 Financial reporting quality

This has been defined by Baxter and Cotter (2007) as "the clarity through which financial reports transmit information about the company's activities, particularly its working capital, it aims to educate financiers." Financial reporting quality, according to some academics, is defined as “the magnitude whereby the financial statements give truthful and unbiased insight into the fundamental performance and business position” (Nicolae, 2023; Zubair, 2016). The study adopted financial reporting quality(FRQ) as a proxy using discretionary accruals (DACC) derived from modified Jones (1991) model as supported by (Nicolae, 2023; Dechow, 2013; Umobong & Ibanichuka, 2017). It is also internal auditor or of the external auditor from parties that may have a financial interest in the business being audited. It ensures that auditors do not have any financial interest in the firms in which they are auditing (Usman & Ugoh, 2023).

Financial reporting quality pertains to the precision and pertinence of a company's reported financial information, reflecting how accurately the financial statements portray the economic reality of the organization and the usefulness of the information for stakeholders in decision making (Gardi et al., 2023; Nicolae, 2023). Quality financial reporting fosters transparency, resulting in well-founded annual reports through thorough reporting (Kalagbor, Amah & Evwienure, 2021). Literature has proposed various measures of Financial Reporting Quality (FRQ), including metrics like earnings aggressiveness, accrual-based indicators, value relevance, and loss avoidance. Deschow et al. (2010) underscored that earnings features encompass aspects such as persistence, smoothness, meeting target expectations, discretionary accruals derived from accrual modeling, and timely recognition of losses.

In a nutshell, it refers to the accuracy, transparency, and reliability of a company's financial statements. Financial reporting quality refers to the accuracy, transparency, and reliability of a company’s financial statements. High-quality reports correctly reflect the firm's true economic performance, comply with accounting standards like IFRS, and empower stakeholders to make informed economic decisions (Olowookere et al., 2022). Reliable reporting forms the bedrock of trust between a company and the capital markets. High-quality reports mitigate information asymmetry between management and shareholders, reduce

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the cost of capital, and accurately predict a firm's future cash flows. Conversely, poor quality damages market confidence, invites regulatory scrutiny, and leads to misallocated resources (Gardi et al., 2023; Nicolae, 2023).

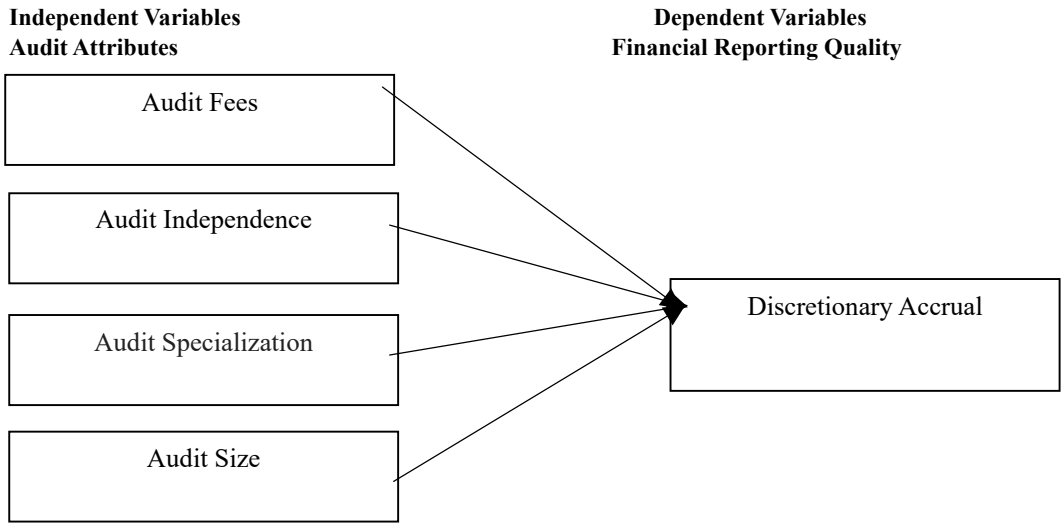


Fig 1: Conceptual Framework

3. Methodology

An ex-post facto research design was adopted for this study, concentrating on thirteen (13) listed banks on the Nigerian Exchange Group (NGX), out of a total of 20 listed Nigerian banks as at 31st December, 2024. 13 firms were selected based on availability of the examined variable in annual report of the banks. The sample size comprised thirteen banks chosen through purposive sampling. The study spanned a decade, from 2014 to 2024, utilizing data extracted from the annual reports of the banks. 2014 was used because it preceded the year after the adoption of IFRS. Descriptive and structural equation modelling were employed for data analysis.

3.1 Measurement of Variables

For the independent variables, audit attributes were measured by audit fees AUF, audit specialisation (AUSP), audit independence (AUI), and audit size (AUS) while the dependent variable which was financial reporting quality (FRQ) was measured by discretionary accrual (DAC).

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4. Results

Table 1: Descriptive Statistics – Audit Attributes and Financial Reporting Quality

Variables	Observed	Mean	standard Dev.	minimum	maximum
AUF	135	0.2107	0.0507	0.0035	0.2176
AUSP	135	0.6370	0.1854	0	0.3333
AUI	135	0.5336	0.1074	0.0465	0.9623
AUS	135	0.6328	0.1334	0.1667	0.5000
FRQ	135	0.5232	0.0702	0	1

Source; Researchers' Computations (2026)

On average, the financial reporting quality score stands at 0.5232, showing moderate consistency with a standard deviation of 0.0702. Scores range from 0 to 1, reflecting variability in financial reporting quality among the sampled deposit money banks. This variability holds implications for stakeholders like investors and regulatory bodies. Audit fees, averaging at 2.107 with a standard deviation of 0.0507 suggest relative stability within banks, despite some variability. Likewise, the audit specialization which was 0.6370 with standard deviation of 0.1854 and score range is within 0 and 0.3333. The average audit independence score of 0.5336. suggests a moderate level of independence among auditors, with the wide range 0.0465 to 0.9623 indicating moderate reliability in deposit money banks. Similarly, audit size averages 0.6328 with a standard deviation of 0.1334. This variable displays a broad range of values, potentially suggesting diversity in the scale or complexity of audits conducted by the examined deposit money banks.

Table 2: Correlation Analysis

VARIABLES	AUF	AUSP	AUI	AUS	RFQ
AUF	1				
AUSP	0.5378*	1			
AUI	0.4265*	0.7623*	1		
AUS	0.6582*	0.5443*	0.3242*	1	
FRQ	0.3412*	0.7441*	0.6623*	0.5381*	1

Correlation is significant at the 0.01 level (2-tailed)

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Table 2 highlights important associations between the independent variables and dependent variable. FRQ shows a strong positive and significant correlations with all the independent variables i.e. for audit fees r = 0.3412, for audit specialization r = 0.7441, for audit independence r = 0.6623, for audit size r = 0.5381. Overall, the correlation matrix validates the conceptual framework by demonstrating that key audit attributes and firm characteristics are logically and statistically related to variations in financial reporting quality. Although the relationship between audit fees and financial reporting quality is very weak suggesting that degree of influence of audit fees on financial reporting quality may be somewhat.

Table 3: Structural Equation Modelling Table

Variables	Relationship	Beta	Std. Error	t-value	p-value	R^2	Decision
1	ADF-> FRQ	0.154	0.061	2.525	0.041	0.649	Accept
2	ADSP-> FRQ	0.372	0.705	4.244	0.048		Accept
3	ADI-> FRQ	0.263	0.103	2.604	0.024		Accept
4	ADS-> FRQ	0.619	0.164	3.774	0.005		Accept

Source: Publishers' Computations (2026)

The structural equation modelling table presents the outcomes of analyzing the impact of audit attributes on financial reporting quality. The examined audit attributes included audit fees, audit specialization, audit independence, and audit firm size. The study revealed that audit fees, audit specialization, audit independence, audit firm size, and firm size positively and significantly influence the financial reporting quality of deposit money banks in Nigeria. More precisely, the beta coefficients (β) for audit fees, audit specialization, audit independence, and audit firm size were 0.154, 0.0372, 0.263, and 0.619, respectively. The variables exhibited t-statistics of 2.525, 4.244, 2.604, and 3.774, all with p-values below 0.05, signifying statistical significance. The p-value for all the audit attributes indicates statistical significance in the findings. $\boldsymbol{R^2}$ shows that 65% of variance in the financial reporting quality is accounted for by audit attributes.

4.1 Discussion of Findings

Financial reporting quality is influenced by various factors which includes audit attributes as evident in the outcome of the study i.e. audit attributes contribute to higher quality financial reporting. This aligns with prior research by Emmanuel and Emem (2020) and Ogungbade, Adekoya, and Olugbodi (2021), which also

identified a positive and significant relationship between and among audit specialization, audit independence, audit firm size and financial reporting quality. The result was also corroborated by Emmanuel and Emem (2020) and Ogungbade et al. (2021) while Yayangida et al. (2023) and Nicolae (2023) supported the weak relationship between audit fees and financial report quality.

5. Conclusion and Recommendations

Considering the findings from the analysis as interpreted and discussed, the paper concluded that audit attributes such as audit fees, audit specialization, audit independence, audit firm size have thee propensity and tendency to improve financial reporting quality of listed deposit money banks in Nigeria. Therefore, in line with the conclusion drawn from the study findings, recommendations are made

1. that there is need for regulatory bodies and management to place strong emphasis on the independence of audit firms without prejudice in all facets of its activities.
2. that the regulators in banking sector should consider mandatory professional qualification in order to strengthen the skill and audit independence.
3. that audit independence should focus on how to ensure that financial reporting quality demonstrates an accurate and balanced viewpoint of the financial report so as not to deceive all the various users of accounting information.

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GENERATIVE AI IN PUBLIC INTERNAL AUDIT: OPPORTUNITIES, RISKS AND PROFESSIONAL JUDGMENT IN THE AGE OF ALGORITHMIC ASSURANCE

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Abstract:

Generative artificial intelligence (GenAI) offers new ways to support the planning, execution, reporting, and follow-up of public internal audit engagements. This article examines these opportunities alongside the risks they create for the quality of audit evidence and the exercise of professional judgment. It adopts a documentary and conceptual approach, drawing on recent academic publications, professional standards, and descriptive statistics reported in surveys conducted by internal audit organisations and professional service providers. The article does not present an original survey or findings from an audit engagement. Published survey results are used to describe reported AI adoption and areas of application; they are then interpreted in relation to the tasks of public internal audit. The author develops a stage-by-stage synthesis of potential GenAI uses and the verification required before generated outputs may inform audit work. The analysis indicates that GenAI can help auditors organise information and prepare preliminary analyses, but its outputs may be incomplete or inaccurate and cannot constitute audit evidence by themselves. Credible assurance

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continues to depend on traceable sources, sufficient and reliable evidence, and the auditor's documented professional judgment.

Keywords: *generative artificial intelligence; public internal audit; professional judgment; audit evidence; algorithmic assurance*

JEL Classification: M42; H83; O33

1. Introduction

Generative artificial intelligence (GenAI) is expanding the range of tasks that can be supported by digital tools in professional work. A GenAI system can summarise lengthy texts, compare documents, draft questions, and propose ways of presenting complex information. These capabilities are relevant to internal audit because an engagement often requires the auditor to examine procedures, decisions, records, reports, and explanations originating from several organisational structures. Recent academic work describes possible GenAI applications throughout the internal audit process, while also emphasising that their integration depends on organisational arrangements, appropriate controls, and the auditor's ability to evaluate the resulting outputs (Anica-Popa et al., 2026; Eulerich & Wood, 2025).

The question is particularly significant for public internal audit. Public auditors assess processes connected with the use of public resources, compliance with applicable requirements, and the effectiveness of institutional controls. An efficient way to organise documents may help the auditor devote more attention to relevant risks and the causes of identified weaknesses. However, speed and fluent wording do not establish the accuracy of a statement. A generated summary may omit a qualification in a procedure, rely on an outdated document, or present an apparent discrepancy without understanding the institutional context. Research on AI adoption in auditing identifies the interaction between technological outputs and human judgment as a practical challenge rather than an issue resolved by the availability of the technology (Kokina et al., 2025).

Interest in AI needs to be distinguished from implementation and from the technology category measured. The IIA's 2025 Pulse communication describes GenAI use in internal audit activities as rising from 15% in the preceding survey to 40% in 2025 (Internal Audit Foundation, 2025). The earlier 2024 survey, based on 448 senior internal audit professionals in North America, also reported that more than 40% were researching future AI use (Internal Audit Foundation, 2024). Separately, AuditBoard surveyed 376 internal audit leaders in August 2024 and reported that only 4% of functions had made substantial progress in implementing GenAI in any audit area (AuditBoard, 2025). Researching use, reporting use and substantial implementation are different measures. These results describe the respondent groups and are not adoption estimates for Romanian public institutions.

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In this article, algorithmic assurance refers to audit assurance supported by algorithmic tools, including GenAI, while the auditor retains responsibility for evidence and conclusions. It does not mean autonomous assurance issued by an algorithm. Auditing an AI system is a separate activity: the present focus is the auditor's use of GenAI when examining institutional processes and records.

Against this background, the article asks: **Under what conditions can GenAI improve the efficiency of public internal audit without weakening audit evidence, professional judgment, or auditor accountability?** Its objective is to identify useful applications across the audit process, examine the associated risks, and clarify where the auditor must verify information and exercise independent judgment.

The study adopts a **documentary and conceptual approach**. It examines recent academic literature, the *Global Internal Audit Standards*, and descriptive findings from surveys published by the Internal Audit Foundation, AuditBoard, and Wolters Kluwer. The author did **not** conduct these surveys and does **not** present empirical findings from an audit engagement. The statistical results remain attributable to the organisations that collected and reported them. The article's contribution is the author's synthesis of those sources for the specific context of public internal audit, including a proposed sequence of verification steps and an illustrative public-sector scenario. This distinction allows the article to draw on published evidence while making clear which conclusions are interpretations proposed by the author.

2. Literature Review

2.1. GenAI applications and the limits of efficiency evidence

Recent literature approaches AI-assisted auditing through task demonstrations, organisational adoption studies and accounts of professional practice. Gu et al. (2024) develop the concept of AI co-piloted auditing, in which human auditors collaborate with foundation models across selected tasks. The contribution is a model of collaboration and demonstrations of technological potential. It does not establish that AI outputs can replace audit evidence or that comparable gains will occur in every institutional setting. This distinction is important for public audit, where an apparently useful output must be assessed against the engagement objective and applicable criteria.

Eulerich and Wood (2025) demonstrate ways in which ChatGPT and GenAI can support the internal audit process. Their task-oriented approach helps identify where generated summaries, questions and draft communications may be useful. Emett et al. (2025) provide a complementary account of ChatGPT use within Uniper's internal audit function. The first contribution illustrates possible applications; the second situates implementation within one company. Neither design warrants a general estimate of effectiveness in Romanian public institutions.

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Together, they support examining GenAI at the level of the task rather than assuming that an entire audit engagement can be automated.

Kokina et al. (2025) examine AI adoption in large public accounting firms and emphasise practical challenges as well as opportunities. Their field evidence concerns a different audit setting and AI more broadly. It is relevant to organisational readiness and interaction with human judgment, but must be distinguished from demonstrations of GenAI in internal audit. Anica-Popa et al. (2026) address emerging AI technologies through an internal audit integration framework and assessment model. Read together, these contributions indicate that adoption requires organisational arrangements in addition to tool availability. They do not provide measured outcomes for the DCMB scenario considered here.

A related discussion in Annals of Spiru Haret University. Economic Series examines AI in financial management, including operational efficiency, risk management, ethical concerns and human–AI cooperation (Andronie & Dijmarescu, 2025). This broader financial-management perspective provides context for the present article's economic interest in the use of professional time and institutional resources. Its conclusions are not evidence of GenAI effectiveness in public internal audit. The present analysis narrows the question to how potential preparation gains can be pursued while retaining the verification required for credible assurance.

2.2. Professional judgment, evidence and governance

A second stream concerns the decisions made after a model produces an answer. Schafer (2026) discusses GenAI with internal audit practitioners and considers implications for policy, research and practice. Such practitioner-based discussion informs the questions that audit functions should examine; it does not establish a causal effect on audit quality. The co-piloted approach proposed by Gu et al. (2024) similarly leaves a need to specify what the auditor must evaluate independently. Technological assistance and professional responsibility therefore need to be analysed together.

Sugahara and Kano (2026) offer experimental evidence that ChatGPT advice can influence accounting-related ethical judgments. Their participants were accounting students at Japanese universities, rather than practising public internal auditors. The study supports concern about reliance on AI advice while limiting the population to which its findings apply. Compared with task demonstrations and practitioner accounts, this behavioural evidence addresses another part of the problem: a generated response may shape the user's reasoning even when a human remains formally responsible f or the decision.

Professional guidance supplies criteria for responding to these concerns. The IIA's Global Internal Audit Standards require skepticism and relevant, reliable and sufficient information to support engagement results (IIA, 2024). The NIST GenAI risk profile identifies risks including confabulation and privacy harms (Autio et al.,

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2024). These documents provide normative and risk-management foundations, not evidence that a proposed workflow improves performance. For Romanian public entities, that professional discussion must be situated within Law No. 672/2002 on public internal audit and the general norms approved by Government Decision No. 1,086/2013, as amended (Parliament of Romania, 2002; Government of Romania, 2013). The international guidance is used here as a professional reference alongside the national framework.

2.3. Research gap and the article's contribution

The reviewed sources agree that AI may assist selected activities, but their evidence differs in technology, research design and institutional setting. Demonstrations show possible uses; a company case illustrates implementation; adoption studies describe organisational experience; behavioural experiments examine influence on judgment; standards specify professional requirements. These distinctions prevent a pooled claim that GenAI necessarily saves time or improves assurance. Professional surveys add information about reported use and expectations, but cannot fill that evidential gap.

The gap addressed by this article is the practical translation of those contributions into a traceable verification sequence for public internal audit. Within the reviewed material, there is no validation of the specific workflow proposed here for a Romanian cultural institution. The article consequently contributes a conceptual synthesis, rather than claiming the first treatment of human–AI collaboration or an empirically proven method. It links potential assistance at each audit stage to the auditor's source checks, corroboration and documented reasoning, and uses a hypothetical administrative file to show why an apparent discrepancy may be accepted for further testing or rejected. This framework provides propositions for later evaluation: efficiency should be measured together with verification effort, unsupported statements and the quality of working papers.

3. Methodology and Source Selection

The study uses a focused narrative review and conceptual synthesis of audit and accounting research published mainly in 2024–2026, supplemented by original professional survey reports, the IIA's Global Internal Audit Standards, Romanian public internal audit legislation and the NIST GenAI risk profile. Academic studies are used to compare applications, organisational conditions and judgment risks; surveys provide descriptive adoption indicators; standards and legislation establish the professional and institutional context. These source categories serve different purposes and are not treated as equivalent empirical evidence. Selection is purposive, based on direct relevance to GenAI-assisted audit tasks, evidence, verification or professional judgment; the review does not claim exhaustive coverage or a reproducible systematic-search protocol. No meta-analysis, original

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survey, institutional-record analysis or causal test is undertaken. Survey results retain their source-specific population, date and technology category. The author organises the synthesis by audit stage and distinguishes generated suggestions, verified evidence and supported conclusions. The DCMB scenario in Section 7 is wholly hypothetical. Tables 2, 4, 5 and 7 and Figures 2, 4 and 5 are proposed analytical devices, not validated models.

4. Generative AI in the Public Internal Audit Process

The audit process provides a practical framework for examining what GenAI can and cannot do. Potential applications differ between planning, fieldwork, reporting, and the follow-up of recommendations. Moreover, **AI** and **GenAI** must not be treated as interchangeable measures in survey results: some professional studies ask about artificial intelligence in general, while others address generative tools specifically. Table 1 records the source and scope of each statistic used in this section.

Table 1. Published descriptive evidence relevant to AI and GenAI in internal audit

Source and scope	Reported indicator	Result
Internal Audit Foundation (2025); retrospective comparison with the preceding Pulse survey	Using GenAI in internal audit activities in the preceding survey	15%
Internal Audit Foundation (2024); 448 North American professionals	Researching future AI use	More than 40%
Internal Audit Foundation & Wolters Kluwer (2024); 924 respondents; international survey	Novices or beginners in GenAI use	76%
Same study	Organisations partially or fully implementing GenAI	50%
Same study	Organisations with an organisation-wide GenAI policy	17%
AuditBoard (2025); 376 internal audit leaders	Substantial implementation progress in any audit area	4%
Internal Audit Foundation & AuditBoard (2026); 373 North American audit leaders	Expect AI use to increase in the following year	83%

Source: Author's compilation of results published by the organisations named in the first column. The author did not collect the survey data. Surveys differ in sample, date, wording, and definition of AI; percentages must be interpreted within their original studies.

The data support a cautious interpretation. They show professional interest and reported uses, but they do not measure the quality of GenAI-generated audit work. In particular, the contrast between the 50% reporting partial or full organisational GenAI implementation and the 17% reporting an organisation-wide policy in the Internal Audit Foundation–Wolters Kluwer study raises a governance question. It does not establish that any specific organisation used GenAI without adequate

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controls; answering that question would require an investigation of its actual policies and practices (Internal Audit Foundation & Wolters Kluwer, 2024).

4.1. Planning the engagement

Planning requires an understanding of the audited activity, its objectives, applicable criteria, responsibilities, and risks. GenAI can assist the auditor by preparing preliminary summaries of procedures and earlier audit reports, comparing descriptions of responsibilities across documents, and generating questions for discussions with the audited structures. Eulerich and Wood (2025) demonstrate possible applications of GenAI across internal audit activities; Anica-Popa et al. (2026) likewise examine AI integration as an issue involving technical, operational, and governance dimensions. These academic contributions identify potential uses and implementation considerations; they do not supply empirical results for Romanian public audit units.

Published professional data indicate that planning is a prominent prospective use. In research conducted by the **Internal Audit Foundation and Wolters Kluwer**, 78% of respondents **who were already using GenAI or researching its future use to support audit activities** identified planning as an area of current or intended application (Internal Audit Foundation & Wolters Kluwer, 2024). This conditional percentage must not be reported as the proportion of all auditors currently using GenAI for planning. Separately, in the **2026 Internal Audit Foundation–AuditBoard survey**, 35% of the 373 senior leaders reported extensive use of **AI generally** in audit planning and 33% reported occasional use (Internal Audit Foundation & AuditBoard, 2026).

Applied to public internal audit, an approved GenAI tool could compare an internal procedure, the responsibilities set out in job descriptions, and recommendations from a previous engagement. It might indicate that the documents describe different persons as responsible for the same control. This would be a **matter for examination**, not an established risk. The auditor would have to check document versions, subsequent decisions, and the way responsibilities are exercised in practice before deciding whether the issue belongs in the engagement risk assessment. This application to a public institution is the author's illustrative interpretation of the published literature.

4.2. Conducting the engagement

During fieldwork, auditors obtain records and explanations, perform tests, and assess whether the results support a potential finding. GenAI could help organise a large set of documents by topic, compare versions of a procedure, prepare interview questions, or list apparent differences between prescribed and documented activities. Such assistance is useful only if the auditor can return to the original material. An omitted page, a poor document extraction, or an incorrectly understood exception could otherwise produce a convincing but false discrepancy.

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The **Internal Audit Foundation and AuditBoard (2026)** reported less extensive use of AI in fieldwork than in planning or reporting: 19% of respondents cited extensive use in fieldwork and 39% cited occasional use. The survey measured **AI generally**, not GenAI alone, and did not establish why adoption varied between stages. It nevertheless provides a descriptive reason to avoid portraying automated fieldwork as an established substitute for testing by the auditor.

For example, in an engagement concerning document circulation, a generated comparison might flag a difference between the date in a register and the date on a supporting document. The auditor must inspect both records, determine what each date represents, seek clarification where necessary, and test whether the difference indicates an isolated error or a weakness in the process. The *Global Internal Audit Standards* require the analysis of relevant, reliable, and sufficient information when developing potential engagement findings (The Institute of Internal Auditors [IIA], 2024). The GenAI output can direct attention to a possible issue; the inspected and corroborated records form the basis of the auditor's assessment.

4.3. Reporting and following up recommendations

GenAI may help organise a draft report, improve the clarity of a paragraph, identify inconsistent terminology, and prepare a preliminary table linking findings and recommendations. In the follow-up stage, it may arrange management responses and submitted documents by recommendation, deadline, and reported status. These applications concern the preparation and organisation of information. They do not determine whether a finding is justified or a recommendation has been implemented.

Reporting was identified as an area of current or intended GenAI use by **75% of the subgroup already using GenAI or researching its future use** in the Internal Audit Foundation–Wolters Kluwer study (2024). In the distinct 2026 survey by the Internal Audit Foundation and AuditBoard, **35% reported extensive use of AI generally in reporting**, while 34% reported occasional use. Because the respondent groups and measures differ, the two percentages cannot be interpreted as a change in adoption over time. They support the narrower observation that preparing and communicating audit information are recognised areas of application (Internal Audit Foundation & Wolters Kluwer, 2024; Internal Audit Foundation & AuditBoard, 2026).

Before a generated paragraph is included in a report, the auditor must verify its facts against the working papers and assess whether the criterion, cause, effect, and recommendation are accurately stated. During follow-up, a management assertion that a measure has been implemented must be assessed against the supporting documents. A generated summary of those documents cannot itself establish implementation. Schafer (2026), synthesising a discussion with senior internal audit practitioners, similarly emphasises the continuing need for auditor judgment and review when GenAI is used.

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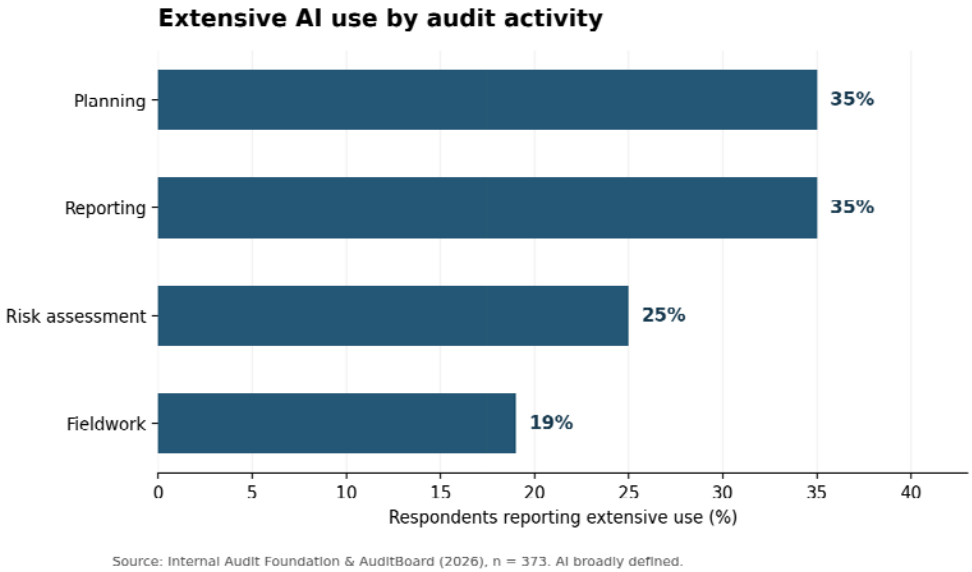


Figure 1. Extensive use of AI across audit activities reported in the 2026 survey

Source: Author's visual representation of data collected and published by the Internal Audit Foundation and AuditBoard (2026), n = 373 senior internal audit leaders in North America. The measure concerns AI generally, not GenAI specifically; it reports use, not demonstrated effectiveness.

4.4. The author's proposed verification sequence

Drawing on the literature, the professional surveys, and the evidential requirements of internal audit, this article proposes the following sequence for handling GenAI outputs in a public internal audit engagement. **It is a conceptual workflow developed by the author, not a procedure tested empirically or prescribed by one of the surveyed organisations.**

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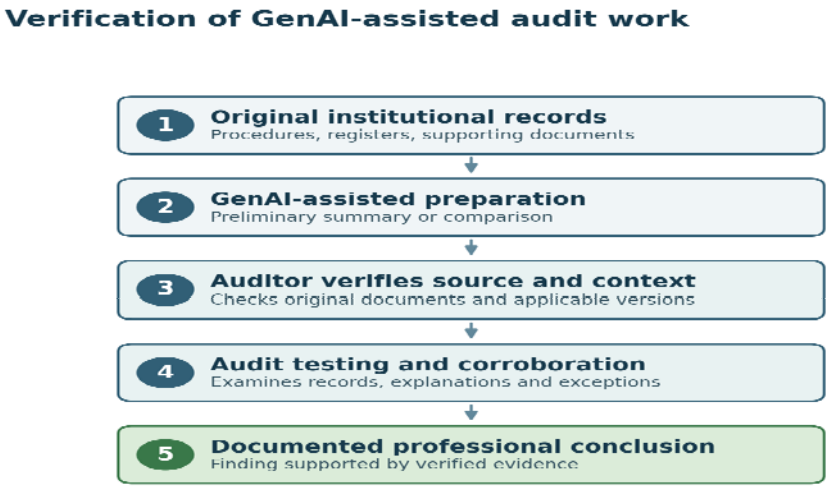


Figure 2. Proposed verification sequence for GenAI-assisted audit work

Source: Author's conceptual synthesis; illustrative workflow, not an empirically tested procedure.

To translate the verification sequence into audit practice, Table 2 shows how the division of work changes across the main stages of an engagement. At each stage, GenAI may prepare or organise information, while the auditor determines its relevance, checks the underlying records and remains responsible for the resulting judgment.

Table 2. Proposed distinction between GenAI assistance and auditor responsibility

Audit stage	Potential GenAI contribution	Auditor responsibility
Planning	Summaries and possible risks	Determine which documents and risks apply
Fieldwork	Comparisons and apparent discrepancies	Inspect originals and confirm whether differences are genuine
Reporting	Draft language and consistency checks	Trace material statements to working papers
Follow-up	List of responses and supporting documents	Test implementation of each recommendation

Source: Author's conceptual synthesis, informed by Anica-Popa et al. (2026), Eulerich and Wood (2025), Schafer (2026), and the IIA (2024). The table does not present original survey findings or results from a public audit engagement.

Published surveys describe the extent and areas of reported AI use; academic studies examine potential applications and their implications. The author's analysis applies these findings to the stages of public internal audit. **An AI-generated response**

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remains a working input, not audit evidence in itself. A finding must be traceable to verified information, supported by the procedures performed, and justified through the auditor's documented professional judgment.

5. Opportunities, Risks and Conditions for Responsible Use

GenAI offers opportunities to make audit work faster and more focused, but those opportunities depend on the quality of its outputs and on the auditor's ability to verify them. The distinction matters in public internal audit: an efficiently produced summary has value only if it helps the auditor reach a conclusion supported by institutional records. Recent academic studies discuss GenAI as an aid to audit work while identifying uncertainty in its outputs, governance, and human review as continuing concerns (Kokina et al., 2025; Zhang & Zhou, 2026).

5.1. Opportunities: time, coverage and clearer communication

One opportunity is to reduce the time spent preparing information for examination. GenAI can produce a preliminary summary of lengthy procedures, organise responses received from several departments, or compare successive versions of a document. This may allow the auditor to devote more time to testing significant issues and discussing their causes. In a **2025 Wolters Kluwer survey of 4,214 internal audit professionals**, **54%** identified expected efficiency and productivity gains as an advantage of adopting **AI generally**, while **24%** expected AI to free auditors for higher-value activities. These were respondents' expectations, **not measured time savings or demonstrated improvements in audit quality** (Wolters Kluwer, 2025).

A second opportunity is to broaden the auditor's preliminary examination of available material. When several procedures or reports concern the same process, GenAI can suggest passages that appear inconsistent or issues that merit a closer look. Its contribution is to help the auditor find questions to pursue. Whether a difference is significant must be determined through the engagement's audit procedures. A third opportunity concerns communication: a tool may help improve the structure and clarity of a draft finding or recommendation, provided that the auditor checks every material statement against the working papers (Eulerich & Wood, 2025; Schafer, 2026).

Table 3. Published indicators relevant to the benefits and conditions of AI use

Source and sample	Reported response	Interpretation
Wolters Kluwer (2025); 4,214 webinar participants	54% expected efficiency gains; 24% expected more time for higher-value activities	Anticipated benefits, not measured gains
AuditBoard (2025); 376 leaders	61% identified limited AI expertise as a challenge	Skills matter for adoption

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Source and sample	Reported response	Interpretation
Same survey	Approximately one in five documented measures to ensure output completeness and accuracy	Output controls need examination
Internal Audit Foundation & Wolters Kluwer (2024)	17% reported an organisation-wide GenAI policy	Governance should precede institutional use

Source: Author's compilation of findings published by the organisations named in the first column. The surveys differ in scope and questions; these percentages are not a single dataset and do not describe Romanian public institutions.

The table also shows why a prospective benefit should not be presented as an achieved result. To establish that GenAI actually saves time or improves the quality of a particular public audit function, that function would need to assess its own use and outcomes. This article does not make such an empirical claim.

5.2. Risks to the reliability of audit work

The first risk is **inaccurate generated content**. GenAI may omit a condition in a procedure, misread the relationship between documents, or state a false proposition confidently. The US National Institute of Standards and Technology (NIST) identifies this type of confidently presented erroneous content as *confabulation* in its 2024 GenAI risk profile (Autio et al., 2024). Kokina et al. (2025) also discuss uncertain outputs and fabricated content as practical concerns in auditing. An unchecked error could affect the audit programme, a working paper, or the wording of a finding.

A second risk is **loss of traceability**. A summary may combine points from several records without showing which original passage supports each statement. The auditor could then find it difficult to demonstrate how a conclusion was reached. The *Global Internal Audit Standards* require the analysis of relevant, reliable, and sufficient information when developing potential findings (The Institute of Internal Auditors [IIA], 2024). Consequently, generated text must be checked against identifiable sources before it influences the audit file or final report.

A third risk concerns **confidentiality**. Audit material may contain personal information, financial records, internal vulnerabilities, or explanations obtained for a particular engagement. Before using a GenAI tool, the audit function must determine whether the tool and the proposed handling of information are authorised by the institution. NIST identifies data privacy and information security among the risks associated with GenAI (Autio et al., 2024). This article does not assume that every tool is suitable for processing institutional documents.

Finally, GenAI may lead to **undue reliance on a persuasive output**. A well-phrased finding can appear complete even when the auditor has not established the applicable criterion, the facts, or the cause of the issue. This concern is particularly

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relevant where auditors are still developing their ability to use and assess GenAI. In the 2024 Internal Audit Foundation–Wolters Kluwer study, **76%** of respondents described themselves as novices or beginners in using GenAI. The IIA consequently emphasises the importance of human involvement and critical evaluation of GenAI's capabilities and limitations (Internal Audit Foundation & Wolters Kluwer, 2024; IIA, 2024).

5.3. A related risk: AI-generated material encountered during an audit

The auditor may also encounter material generated or altered through AI **within the activity being audited**. This is distinct from the auditor's own use of GenAI, but it reinforces the need to verify the origin of documents. In a **2026 survey of 373 senior internal audit leaders in North America**, respondents identified AI-powered phishing, fabricated financial documents, automated social engineering, and deepfake impersonation among their concerns about AI-enabled fraud (Internal Audit Foundation & AuditBoard, 2026). The percentages in Figure 3 represent **perceived concerns, not observed incident rates**.

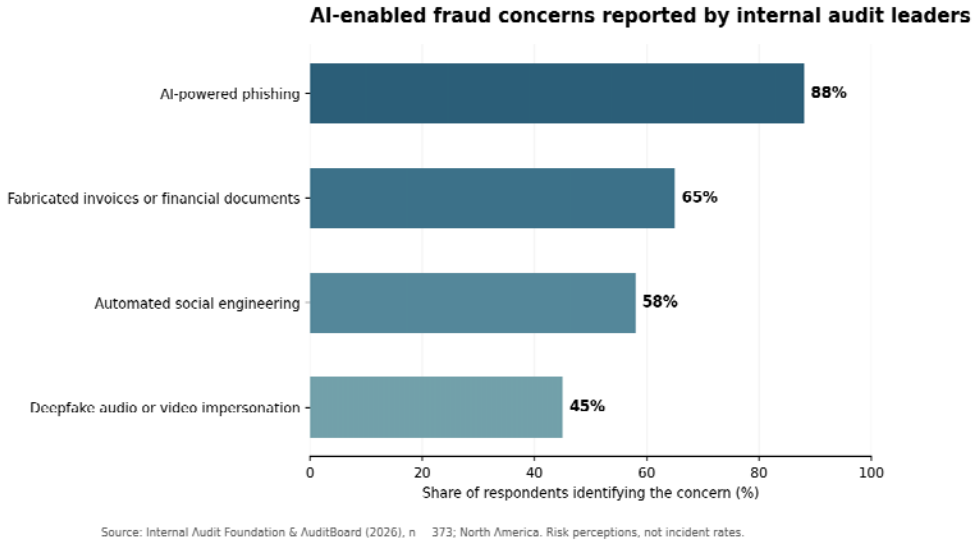


Figure 3. AI-enabled fraud concerns reported by internal audit leaders

Source: Author's chart based on Internal Audit Foundation and AuditBoard (2026), n = 373 senior internal audit leaders in North America. Respondents identified concerns; the figures do not measure the prevalence of fraud or the effectiveness of GenAI in detecting it.

For public internal audit, the relevant implication is specific: when the authenticity or origin of a document matters to a finding, the auditor cannot treat its

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appearance or a generated description as sufficient confirmation. The document must be checked through appropriate records and procedures. This is the author's application of the published survey findings to audit work, rather than a conclusion measured by that survey.

5.4. Matching opportunities with controls

Table 4. Proposed controls for GenAI-assisted public internal audit

Potential use	Main risk	Proposed auditor check
Summarising procedures	Missing conditions or outdated versions	Check passages and document version
Comparing documents	False discrepancy due to missing context	Inspect original records
Suggesting risks or questions	Irrelevant suggestions	Assess against engagement objectives
Drafting findings	Persuasive unsupported claims	Trace material assertions to working papers
Organising follow-up	False indication of implementation	Examine supporting documents
Processing audit material	Unauthorised disclosure	Use approved tools and data arrangements

Source: Author's conceptual synthesis informed by Autio et al. (2024), Eulerich and Wood (2025), Kokina et al. (2025), and IIA (2024). These proposed checks are not results measured in the surveys.

The opportunities and risks are therefore connected. GenAI can accelerate the preparation and organisation of audit work, while the auditor must protect the information used, verify the output, and document the basis for each conclusion. **The professional judgment required to make those decisions is examined in Section 6.**

6. Professional Judgment and Algorithmic Assurance

The central question is what happens after GenAI produces a plausible answer. In public internal audit, professional judgment is required to decide whether information is relevant, whether the evidence is sufficient, what an apparent discrepancy means in its institutional context, and whether the conclusion is justified. GenAI can assist with preparing an analysis; it cannot assume the auditor's responsibility for these decisions. The *Global Internal Audit Standards* define professional skepticism in terms of questioning and critically assessing the reliability of information and require auditors to document evidence supporting engagement results (The Institute of Internal Auditors [IIA], 2024).

6.1. Three different levels of information

A distinction is needed between a **generated suggestion**, **verified audit evidence**, and a **professional conclusion**. These are not successive labels for the same text. Each level requires additional work by the auditor.

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Table 5. From GenAI output to an audit conclusion

Level	Meaning	Auditor's question
Generated suggestion	A summary, apparent discrepancy or draft finding	What source produced it and what might be missing?
Verified audit evidence	Records and explanations tested for relevance, reliability and sufficiency	What do original sources establish?
Professional conclusion	Reasoned assessment of significance and recommendation	Does the verified evidence justify the conclusion?

Source: Author's conceptual distinction informed by the IIA's Global Internal Audit Standards *(2024) and recent research on AI-assisted auditing (Gu et al., 2024; Schafer, 2026). The table is not an empirical result reported by those sources.*

For example, a system may suggest that an expenditure was approved after payment because it has extracted two dates from separate documents. The auditor must first determine what each date signifies, examine the complete approval trail, and establish which requirement applies. If a discrepancy remains, further testing may be needed to determine whether it is isolated or indicates a control weakness. Only then can the auditor assess whether a finding and recommendation are warranted. A convincing sentence generated at the beginning of this process cannot substitute for its later steps.

6.2. Why human review must be substantive

The idea of **AI-assisted or "co-piloted" auditing** describes a collaboration in which technological tools extend the auditor's capacity across selected tasks (Gu et al., 2024). Its value depends on the quality of the collaboration. If the auditor merely accepts a generated summary because it appears coherent, human participation becomes a formality. Substantive review requires the auditor to challenge the output, consult the original sources, consider alternative explanations, and document why a conclusion is accepted or rejected. Schafer (2026) similarly reports that GenAI's growing role in internal audit continues to require auditor judgment and review.

This need for scrutiny is supported by research into how algorithmic advice influences judgment. In a **2026 experimental study** involving accounting students at seven Japanese universities, Sugahara and Kano found that advice from GenAI could influence ethical judgments in an accounting-related scenario. The participants were used as proxies for financial controllers; **they were not public internal auditors**, and the experiment cannot establish how auditors behave in an actual engagement. It does, however, show why the source and apparent credibility of AI advice deserve attention when professional decisions are being formed (Sugahara & Kano, 2026).

A case study of ChatGPT use within the internal audit function of **Uniper**, a multinational energy company, illustrates both the attraction and the limits of efficiency claims. Its authors report that the function estimated efficiency gains of

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50–80% for various processes based on initial tests and describe practices adopted to manage associated risks (Emett et al., 2025). These estimates belong to one company and selected processes. They must not be presented as an expected productivity gain for public internal audit. More importantly for this article, time saved in preparing work cannot justify reducing the examination of the evidence on which assurance depends.

6.3. Deciding when an output may inform a finding

A GenAI suggestion may agree with what the auditor has seen, or it may conflict with it. Neither situation resolves the question of whether the evidence is sufficient. **Figure 4 is the author's conceptual decision aid**, developed to make that distinction visible. It does not represent results from a survey or an empirically tested audit method.

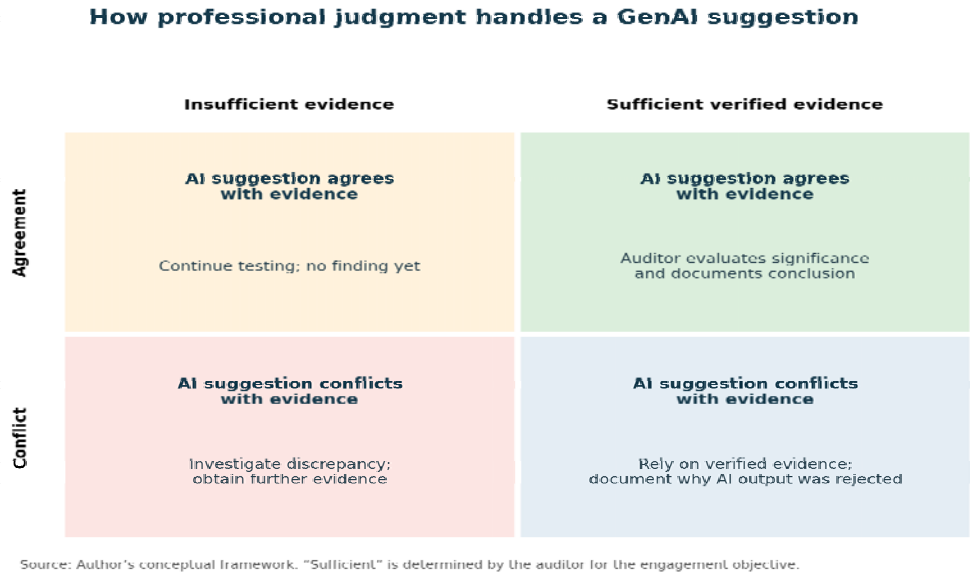


Figure 4. How professional judgment handles a GenAI suggestion

Source: Author's conceptual framework. The auditor determines whether evidence is sufficient for the engagement objective; agreement with a GenAI output is not itself a measure of sufficiency.

The upper-left situation is particularly important: **agreement between an AI suggestion and the limited material initially available does not justify a finding if the evidence remains insufficient**. Conversely, where sufficient verified evidence conflicts with the generated output, the auditor should base the conclusion on that

evidence and record why the output was rejected. The figure therefore places the quality of independent verification above the apparent persuasiveness of generated text. Three practical questions can guide this assessment throughout an engagement:

1. **Provenance:** Which original documents and passages support the statement?
2. **Corroboration:** Are the sources reliable and sufficient for the particular audit objective, and have relevant exceptions been examined?
3. **Reasoning:** Does the auditor's explanation show how the verified facts support the finding and recommendation?

These questions are the author's proposed analytical test. They give practical form to the evidential and documentation requirements in the IIA standards; they do not create a new professional standard (IIA, 2024).

6.4. Accountability in the public sector

In public internal audit, a conclusion may influence decisions about compliance, internal controls, institutional responsibilities, and the use of public resources. The auditor must therefore be able to explain the conclusion to the audited structure and to those who rely on the report. Documenting the GenAI-assisted step is useful, but recording a prompt or retaining a generated answer is not enough. The audit file must also show **which sources were checked, what testing was performed, how conflicting information was resolved, and why the final assessment was reached**.

For the Romanian public-sector setting, Law No. 672/2002 defines public internal audit as an independent and objective assurance and advisory activity, while Government Decision No. 1,086/2013 approves the general norms for its exercise (Parliament of Romania, 2002; Government of Romania, 2013). A proposed GenAI workflow must operate within the applicable national requirements, the entity's audit charter and its specific methodology. Tool use does not itself amend those requirements or establish an authorised institutional procedure.

The United Kingdom's Financial Reporting Council stated in its **2026 guidance for financial statement audits** that the use of generative or agentic AI does not transfer accountability for audit quality from human professionals to the tool (Financial Reporting Council [FRC], 2026). That guidance addresses a different audit setting and is **not presented here as a rule governing Romanian public internal audit**. It offers a consistent professional principle: technological assistance changes how work may be performed, while the responsible auditor must still obtain confidence in the output and account for the conclusion.

Algorithmic assurance is credible, therefore, only when the auditor can move transparently from a generated suggestion to verified evidence and then to a reasoned conclusion. The decision to accept, modify, investigate further, or reject a GenAI output is itself an exercise of professional judgment. That judgment remains the decisive link between technological efficiency and trustworthy public internal audit.

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7. An Illustrative Case: Generative AI in an Internal Audit of Document Handling

This section presents a **hypothetical scenario** situated at the Directorate for Culture of the Municipality of Bucharest (DCMB), a decentralised public service under the Ministry of Culture. The institution's responsibilities include activities concerning cultural heritage, making the handling of submitted documentation a relevant subject for an internal audit. The case does **not** describe an audit conducted at DCMB: the file, dates, AI output and possible findings below are constructed solely to illustrate the method.

Suppose an internal audit engagement examines how the directorate records and processes requests concerning immovable cultural heritage. One audit objective is to assess whether staff can reconstruct the path of each request from its receipt to the final communication with the applicant. For an illustrative file, the auditor has access to an incoming correspondence register, the request and its attachments, a record of a subsequent document submission, internal routing records and the outgoing response. The documents are assumed to come from an environment approved for audit work; their inclusion here does not imply that any real institutional record was used.

During preliminary review, a generative AI tool compares extracts supplied by the auditor and flags a possible discrepancy: the incoming register shows the request as received on **4 March**, whereas a document in the file bears the date **11 March**. The tool proposes the following draft observation: *"The request may have been registered seven days after receipt, indicating a weakness in document handling."* The seven-day interval is a feature of the **invented example**, not a statistic about DCMB. The value of the AI response is that it directs attention to two dates that warrant examination. It does not establish what either date means or whether a control failed.

The auditor first returns to the underlying records. Inspection shows that 4 March is the date on which the initial request entered the institution's register, while 11 March is the date on which the applicant supplied an additional attachment. These dates concern different events. The auditor then checks the applicable internal procedure, the register entries, the file's document sequence and the available routing trail. If these sources consistently explain the two dates, the proposed observation is rejected. The auditor records the reason for rejection in the working papers so that the apparently inconsistent dates do not reappear later as an unsupported finding.

A different conclusion would be possible if the records showed that a request was received on 4 March but entered in the register only on 11 March, with no documented explanation. Even then, the auditor would need to confirm the relevant procedure, establish which event starts the required workflow, obtain sufficiently reliable evidence of both dates and discuss the circumstances with responsible personnel before drafting a finding. The AI-generated sentence would remain a

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lead for testing. Under the *Global Internal Audit Standards*, engagement findings and conclusions must be supported by relevant, reliable and sufficient information; the auditor's analysis and documentation therefore determine whether the lead becomes a reportable observation (The Institute of Internal Auditors [IIA], 2024).

Table 6. Hypothetical evidence trail for the DCMB illustration

Stage	Material	Auditor's question	Status
AI screening	Two dates in extracts	Do they concern the same event?	Lead, not evidence
Source inspection	Request and register	When was the initial request received?	Potential documentary evidence
Process reconstruction	Later submission and routing trail	Does the later date mark another step?	Corroboration where reliable
Criteria assessment	Applicable procedure	Which requirement applies?	Basis for assessing a finding
Conclusion	Documented comparison	Is an observation justified?	Auditor's supported conclusion

Note. Every event and date in the table is hypothetical. The table describes an analytical procedure, not findings or performance data from DCMB.

The hypothetical DCMB case can be summarised as a sequence of three decisions. As Figure 5 shows, an AI-generated discrepancy first prompts examination of the original records; the auditor then verifies what the dates represent and decides whether the evidence supports a finding.

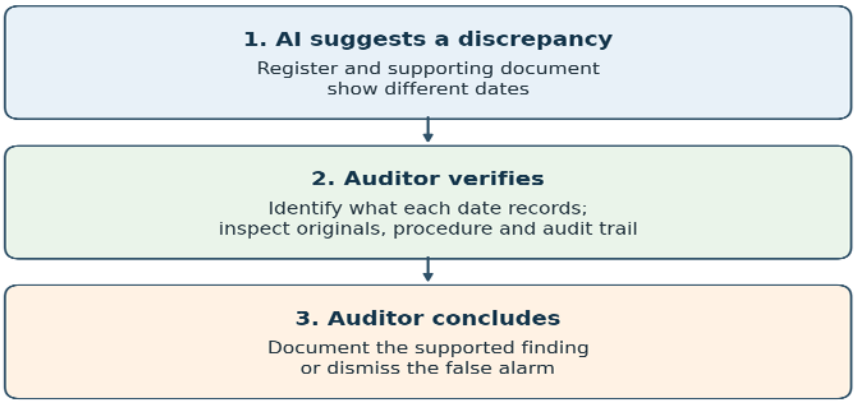


Figure 5. Illustrative verification sequence. The AI-generated discrepancy triggers examination; it does not determine the audit conclusion.

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The example also identifies a practical boundary for using generative AI in a public institution. The auditor can ask the tool to organise document extracts, list apparent inconsistencies and suggest questions for staff. The auditor must decide which records may be entered into the approved tool, verify every material assertion against the underlying documents and retain a traceable account of that verification. Published demonstrations of generative AI in internal auditing show its usefulness across audit tasks, while the IIA standards continue to place responsibility for evidence and conclusions with the internal auditor (Eulerich & Wood, 2025; Emett et al., 2025; IIA, 2024).

The case illustrates **professional judgment at two points**: deciding whether an AI-identified difference deserves further work and deciding, after examining the evidence, whether it represents a control weakness. A plausible AI statement can be useful even when it proves wrong, because testing it may clarify the document trail. It becomes problematic only if its wording is carried into the audit report without that test.

8. Discussion: Conditions for Responsible Use in Public Internal Audit

The preceding sections suggest that generative AI can support public internal audit most effectively when its role is defined at the level of the **audit task**. Summarising a set of documents, proposing interview questions or checking the consistency of a draft report are different from establishing a finding. The first group of activities can help the auditor direct attention and organise work. A finding requires the auditor to examine the underlying records, assess them against appropriate criteria and document a supported conclusion. This distinction is consistent with both the audit applications discussed by Eulerich and Wood (2025) and the requirements of the *Global Internal Audit Standards* (The Institute of Internal Auditors [IIA], 2024).

Professional interest in these tools is increasing. In the IIA's **2025 North American Pulse of Internal Audit**, the proportion of respondents reporting generative AI use in internal audit activities rose from **15% to 40%** compared with the previous survey. These figures describe the survey respondents; they cannot be treated as adoption rates for Romanian public institutions or for DCMB. They do, however, explain why audit functions need clear working rules before AI-assisted practices become routine (Internal Audit Foundation, 2025).

The hypothetical DCMB case shows how such rules matter in practice. A date difference generated a plausible draft observation, but the auditor's examination established what each date represented. If the dates concerned separate events, the observation would be dismissed. If they concerned the same event and indicated a departure from an applicable procedure, further corroboration would be necessary. In both branches, the quality of the audit depends on the auditor's ability to challenge the AI output, reconstruct the administrative process and explain the conclusion. This is an **analytical inference from the illustrative case**, not an empirical finding about DCMB.

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Table 7. Practical conditions for using generative AI in public internal audit

Condition	Application	Risk if omitted
Defined purpose	Specify task and use of GenAI	Output mistaken for a procedure
Controlled information	Use approved tools and material	Institutional information exposed
Source traceability	Link claims to records	Finding cannot be substantiated
Independent verification	Check dates and claims	Errors enter working papers
Documented judgment	Record acceptance or rejection	Reviewers cannot reconstruct decision
Human approval	Review final results	Accountability becomes unclear

Source: Author's synthesis based on IIA (2024), Autio et al. (2024), and the hypothetical case developed in Section 7. The table is a proposed practice framework, not a tested DCMB procedure.

Information handling deserves particular attention in a public institution. Requests, correspondence and internal records may contain personal or otherwise sensitive information. A practical decision must therefore precede any prompt: **which material may be processed, in which approved environment, for which audit purpose, and with what record of the interaction?** The NIST generative AI risk profile identifies risks including inaccurate generated content and privacy harms. Applied to internal audit, this supports restricting inputs as appropriate and verifying outputs before they influence working papers or reports (Autio et al., 2024).

The proposed approach also has limits. This article combines published research, professional guidance and an illustrative institutional scenario; it does **not** measure time saved, detection accuracy or audit quality at DCMB. The professional survey percentages cited elsewhere in the article have their own populations and questions and should not be combined into a single estimate of generative AI performance. Consequently, the article's contribution is a reasoned framework for deciding **where AI may assist and how its suggestions should be tested**, rather than evidence that a particular tool improves public audit outcomes.

Further research could examine anonymised audit tasks in several public institutions, comparing AI-assisted and conventional workflows on time required, errors identified, quality of supporting documentation and reviewer assessments. Until such evidence is available, the defensible position is proportional use: employ generative AI for tasks it can help structure, require stronger verification as a generated statement approaches a formal finding, and keep the auditor responsible for the final judgment. This follows the IIA's emphasis on supported engagement results while allowing audit practice to adapt to emerging technology (IIA, 2024).

9. Conclusion

Generative AI can support public internal audit at several stages of an engagement. It can help auditors navigate extensive documentation, identify

matters that warrant examination, formulate questions and improve the clarity of draft reports. The surveys examined in this article indicate growing professional interest and reported use. However, they cover different groups of respondents and sometimes address AI broadly rather than GenAI specifically. Their results do not demonstrate that GenAI improves audit quality in Romanian public institutions.

The answer to the article's research question is therefore conditional. GenAI can contribute to efficiency without weakening assurance when the audit function controls which information may be processed and the auditor independently verifies every material claim. An apparent discrepancy must be traced to original records, assessed against applicable criteria and documented before it can support a finding. The distinction between an AI-generated suggestion, verified audit evidence and the auditor's professional conclusion is essential. Responsibility for the final conclusion remains with the auditor (The Institute of Internal Auditors, 2024).

The hypothetical example situated at the Directorate for Culture of the Municipality of Bucharest illustrates this distinction. Two different dates in a file might indicate a recording problem, but they might also refer to separate administrative steps. The AI-generated observation can direct the auditor's attention to the dates; only examination of the documents, workflow and relevant procedure can establish their meaning. Because the example uses no institutional records and describes no actual audit engagement, it does not provide empirical findings about the directorate.

This article offers a framework for deciding how generated outputs may be used and verified in public internal audit. Its limits arise from the narrative selection of sources and its reliance on survey results collected by other organisations. Future research could test the proposed verification sequence with anonymised public-sector audit tasks, examining time spent, unsupported statements, quality of working papers and reviewers' assessments. Until such evidence is available, responsible use of GenAI rests on controlled information handling, traceable evidence and the auditor's independent professional judgment.

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PREDICTORS OF SATISFACTORY PERFORMANCE IN MUNICIPAL ACCOUNTING AND AUDITING SERVICES

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Abstract

The study aimed to assess and evaluate the predictors of satisfactory performance in municipal accounting and auditing services within the City of Tshwane Metropolitan Municipality. The research focused on finance employees who are responsible for applying municipal financial rules, regulations and guidelines to ensure the efficient management of public funds and the effective delivery of municipal services. A stratified random sample of 120 employees was selected to participate in the study. Data were collected using a structured, pre-tested and validated questionnaire to ensure the reliability and validity of the findings. The collected data were analysed using frequency tables, crosstab analyses and ordered probit regression techniques to identify the key factors influencing employee performance. The findings revealed a strong positive relationship between satisfactory employee performance and the quality of accounting and auditing services. Based on these findings, the study recommends the adoption of good governance principles and sound financial management practices to motivate employees

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and improve their performance. The study concludes that enhancing employee competence, commitment and accountability is essential for strengthening municipal financial management and improving the quality and effectiveness of public service delivery.

Keywords: *municipal auditing, accounting services, adherence, ordered logit analysis, satisfactory performance*

JEL Classification: H3, H11, M41, M42

Introduction

The survey by Shai, Worku and Muchie (2019:1-22) has identified common obstacles to efficiency in following guidelines stipulated in the Municipal Finance Management Act (MFMA) (Act no. 56 of 2003) in the City of Tshwane. The obstacles identified by the authors are commonly experienced in most developing municipalities in South Africa. The first category of obstacles identified by the authors consists of the inability to use financial, human, logistical resources and modern technological methods appropriately. The second category of obstacles consists of the inability to enforce municipal bylaws effectively. The MFMA provides guidelines and legislation for the efficient use of municipal finances in the course of municipal service delivery. The extent of compliance with the Act is an indicator of the effective utilisation of municipal resources.

The survey was carried out by gathering data from 120 employees whose job is to work on auditing, accounting and financial tasks and processes in the City of Tshwane, South Africa. The main finding of the survey is that 77% of the 120 employees adhered to the Municipal Finance Management Act (MFMA) sufficiently enough, whereas 23% of them did not do the same. The extent of adherence to the MFMA was dependent upon the long duration of service, the extent to which senior and well-experienced employees were used for mentoring and coaching novice financial practitioners, and the level of commitment of financial employees to follow stipulated steps and processes.

The MFMA stipulates steps, processes and guidelines that are highly valuable for ensuring the proper use of financial resources in South African municipalities including the City of Tshwane. The MFMA is a tool that is essential for ensuring the efficient use of municipal finances for municipal service delivery. The MFMA is similar to guidelines that are used worldwide in almost all municipalities for a similar purpose. Financial management in the municipal arena can be defined as those incremental processes, procedures, and systems that an institution adopts and

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implements to radically transform the institution so that it achieves improved management and financial benefits (Tkachenko, 2020). Gielen, Riutort-Mayol, Miralles I Garcia, and Palencia Jimenez (2021:280-297) have listed indicators of sound financial management that are highly valuable for municipalities. Examples of such indicators are compliance with guidelines and Acts, accountability, transparency, moderation and verification of financial statements by independent auditors, the employment of auditors and accountants based on merit, and monitoring, evaluation, and control processes. Sound financial management is essential for sustainable service delivery and the optimal use of municipal resources. The MFMA is a key piece of legislation that is vital for the proper management of financial resources in all municipalities. The MFMA is aligned with guidelines set out by the South African National Treasury for minimising the loss and abuse of municipal financial, logistical and human resources. The survey by Munzhedzi (2021) shows that failure to adhere to the MFMA often fails to use municipal budgets according to plan. The author has pointed out the need for promoting adherence to the MFMA in South African municipalities. The main areas of need are the promotion of awareness, the promotion of education and training, and the strict enforcement of guidelines and regulations. There are norms and standards set out for satisfactory compliance in the MFMA in all spheres of the South African Government. Financial resources are essential for rendering satisfactory municipal services. Thus, failure to use financial resources effectively fails to render satisfactory municipal services.

Objective of study

The research aim was to assess the level of adherence to the MFMA among employees of the City of Tshwane working on financial duties such as auditing, accounting, generating financial statements, keeping financial records, and issuing financial reports. The survey by Shai, Worku and Muchie (2019:1-22) has identified common obstacles to efficiency in following guidelines stipulated in the Municipal Finance Management Act (Act no. 56 of 2003) in the City of Tshwane. The obstacles identified by the authors are commonly experienced in most developing municipalities in South Africa. The first category of obstacles identified by the authors consists of the inability to use financial, human, logistical resources and modern technological methods appropriately. The second category of obstacles consists of the inability to enforce municipal bylaws effectively. The MFMA provides guidelines and legislation for the efficient use of municipal finances in the course of municipal service delivery. The extent of compliance with the Act is an indicator of the effective utilisation of municipal resources.

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Literature Review

The survey by Shai, Worku and Muchie (2019:1-22) has identified obstacles that are known to undermine efficiency in following guidelines stipulated in the Municipal Finance Management Act (Act no. 56 of 2003) in the City of Tshwane. The obstacles identified by the authors are commonly experienced in most developing municipalities in South Africa. The first category of obstacles identified by the authors consists of the inability to use financial, human, logistical resources and modern technological methods appropriately. The second category of obstacles consists of the inability to enforce municipal bylaws effectively. The MFMA provides guidelines and legislation for the efficient use of municipal finances in the course of municipal service delivery. The extent of compliance with the Act is an indicator of the effective utilisation of municipal resources.

The key to success in terms of ensuring the efficient use of municipal resources and finances according to plan is to ensure satisfactory understanding and adherence to the MFMA among municipal employees and officials whose job is to manage financial resources. The research work by John, Selaelo John and Khutso Lavhelani (2022:58-69) shows that sound financial management requires a combination of reliable financial, accounting, bookkeeping and auditing skills, and elements of good corporate leadership and good governance. Koekemoer and Von Solms (2021:339-351) have highlighted the benefits of acquiring appropriate skills and expertise to render efficient municipal services.

The authors have shown the need for fiscal discipline, and proper auditing and accounting in municipalities. The study shows the benefits of proper auditing and accounting, better adherence to the MFMA, business ethics, fiscal discipline, and adherence to recommended guidelines and regulations in South African municipalities. Lapuente and Van de Walle (2020) indicate that the quality level of the success or poor performance of municipal finance activities depends on its administrative, political, and policy context. Badea and Spineanu-Georgescu (2016) further argue that systematic assessment of internal audit functions enhances organisational accountability, strengthens governance mechanisms and improves financial oversight. Effective internal auditing therefore serves as a critical instrument for promoting compliance with legislative frameworks such as the MFMA.

Afroj, Hanif, Hossain, Fuad, Islam, Sharmin and Siddiq (2021:179-191) have surveyed Dhaka, Bangladesh, and have developed a scorecard that is highly helpful for ensuring satisfactory compliance with financial guidelines such as the MFMA.

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The scorecard is vital for identifying obstacles to satisfactory municipal services and the abuse of municipal resources. Govender (2017:179-191) has shown that strict monitoring and control are needed to ensure satisfactory performance and accountability among municipal employees and officials who are responsible for finances. Mamokhere, Musitha, and Netshidzivhani (2021:1-7) have argued that it is essential to promote and encourage good leadership and accountability in local municipalities so that they adhere to the MFMA in the course of municipal service delivery. Failure to follow the MFMA leads to failure to collect service fees that are owed to local municipalities. This failure, in turn, leads to protests over poor and inadequate municipal services and the abuse of municipal resources. Studies conducted by Shai, Worku, and Muchie (2019:1-22) and Molefe and Manamela (2021: 59-73) have shown that the abuse of municipal finances often leads to violent protests over poor municipal service delivery and that ensuring satisfactory adherence to the MFMA is essential for providing affordable and highly efficient municipal services to all deserving people. Sound financial management has been spread around the developing economies in public administrations aiming at improving good management and accountability in increasing the efficiency of public services and the effectiveness of public policies (Manes-Rossi, Brusca & Caperchione, 2021:400-402).

These observations are consistent with Ugoh et al. (2022), who conclude that prudent financial management, accountability, transparency, and improved financial planning are fundamental prerequisites for sustainable local government performance and effective public service delivery. The authors argue that local governments should continuously strengthen financial governance systems to minimise resource mismanagement and improve public confidence

Theoretical Background

This study is underpinned by Agency Theory (Jensen & Meckling 1976), Stewardship Theory (Donaldson & Davis 1991), and New Public Management (NPM) Theory (Hood 1991). Together, these theories provide a comprehensive framework for explaining how accounting, auditing, governance, and employee competence influence financial performance and accountability within municipalities.

Agency Theory explains the relationship between principals (citizens and elected representatives) and agents (municipal officials entrusted with public resources). According to Jensen and Meckling (1976), information asymmetry and conflicting interests between principals and agents create opportunities for

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inefficiency, fraud, and the misuse of public resources. In the municipal context, financial regulations such as the Municipal Finance Management Act (MFMA) (Act No. 56 of 2003) reduce agency problems by establishing clear procedures for budgeting, expenditure, procurement, financial reporting, and accountability. Effective accounting and auditing systems therefore serve as governance mechanisms that minimise opportunistic behaviour and enhance transparency and accountability. Empirical studies have consistently shown that weak internal controls and poor compliance with financial legislation increase the risk of financial irregularities and undermine municipal service delivery (Shai, Worku & Muchie 2019; John, John & Lavhelani 2022).

Stewardship Theory offers an alternative perspective by assuming that public officials are motivated to act in the best interests of the organisation when appropriate institutional support, leadership, and professional competence are present (Donaldson & Davis 1991). Rather than emphasising control alone, the theory highlights trust, responsibility, and commitment as drivers of organisational performance. Within municipalities, officials who possess adequate accounting, auditing, financial management, and governance skills are more likely to comply with the MFMA and contribute to effective financial administration. Studies conducted in South African municipalities emphasise that employee competence, ethical leadership, and accountability are essential for improving financial management and municipal performance (Koekemoer & Von Solms 2021; Mamokhere, Musitha & Netshidzivhani 2021).

Similarly, Rotimi et al. (2021) argue that high-quality auditing strengthens financial accountability, promotes compliance with statutory requirements and improves organisational financial performance. These findings reinforce the importance of effective auditing in ensuring compliance with the MFMA and safeguarding municipal resources.

New Public Management Theory complements these perspectives by advocating the adoption of private-sector management principles within the public sector to improve efficiency, accountability, transparency, and service delivery (Hood 1991). NPM emphasises performance measurement, financial accountability, internal controls, and results-oriented management. The introduction of legislative frameworks such as the MFMA reflects the principles of NPM by requiring municipalities to implement sound financial management practices, strengthen internal controls, and ensure responsible utilisation of public funds. Research indicates that municipalities achieving stronger financial governance and higher levels of accountability generally demonstrate better service

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delivery outcomes and improved public confidence (Lapuente & Van de Walle 2020; Manes-Rossi, Brusca & Caperchione 2021).

The integration of these theories provides a suitable conceptual foundation for this study. Agency Theory explains the importance of financial controls and oversight in reducing misuse of municipal resources. Stewardship Theory highlights the role of employee competence, ethical leadership, and commitment in achieving organisational objectives. New Public Management Theory emphasises efficient financial management and performance accountability as prerequisites for improved municipal service delivery. Collectively, these theories support the proposition that effective accounting and auditing services, supported by competent employees and sound governance structures, contribute significantly to satisfactory municipal financial performance and compliance with the MFMA.

Methods and materials of study

The survey was conducted by gathering information from 120 employees of the City of Tshwane. These employees are responsible for rendering financial services such as auditing, generating financial statements, and resolving account-related queries from the public living and working in the City of Tshwane (Shai, Worku & Muchie, 2019:1-22). A questionnaire was used for data gathering from the 120 eligible participants of the survey. The constructs used for conducting the survey were a measure of the level to which employees adhered to guidelines stipulated in the MFMA. A benchmark defined by Malsch and Salterio (2015: 1-22) was used for assessing the level of adherence to the MFMA.

List of variables of study

Data was collected from each one of the 120 respondents of study by using a structured, pretested and validated questionnaire of study. The variables of study are variables that are known to affect the degree to which respondents follow sound financial management procedures and guidelines. Examples of these variables are level of skills in accounting, auditing and financial management, level of experience on financial management, degree of job satisfaction, degree of motivation at work, ability to follow stipulated guidelines and regulations, ability to generate financial statements, reports and documents promptly, efficiently and accurately, ability to use budget effectively, ability to meet deadlines, degree of flexibility afforded to respondents, ability to use modern technological methods effectively, ability to respond quickly to the needs of customers and fellow respondents, the ability to which respondents can apply cutting edge technologies to do their job, maturity, the ability to link up effectively, access to data, degree of

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personal integrity, the ability to understand the working environment in the City of Tshwane, the degree of respect for customers and stakeholders, ability to implement plans freely and effectively, and the degree of loyalty to the City of Tshwane.

Statistical methods of data analyses

Frequency tables and crosstab tests (Warton, 2022) as well as ordered logit regression analysis (Pardoe, 2020) were used for performing data analyses.

Results of study

Table 1 shows that about 38% of respondents were younger than 30 years of age. About 15% of respondents had ages of 30 to 39 years. About 33% of respondents had ages of 40 to 49 years. About 14% of respondents had ages of 50 to 59 years. About 20% of respondents have post-matric certificates. About 67% of respondents had diplomas. About 12% of respondents had Bachelor's degrees. About 2% of respondents had Master's degrees or above.

Table 1: General assessment of finance staff on financial management

Attributes of participants of study	Number (Percentage)
Overall efficiency in financial management by the standards of Malsch and Salterio (2015)	Efficient: 92 (76.67%) Inefficient: 28 (23.33%)
Age category of respondents	Less than 30 years: 46 (38.33%) 30 to 39 years: 18 (15.00%) 40 to 49 years: 39 (32.50%) 50 to 59 years: 17 (14.17%)
Highest level of education of respondents	Post matric certificate: 24 (20.00%) Diploma: 80 (66.67%) Bachelor's degree: 14 (11.67%) Master's degree or above: 2 (1.67%)
Duration of service of respondents in years	5 years or less: 27 (22.50%) 6 to 10 years: 55 (45.83%) 11 years or more: 38 (31.67%)

Table 2 assesses the capacity to handle the government budget. The table indicates that the overall capability of employees was adequate by the benchmark defined by Malsch and Salterio (2015).

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Table 2: Ability to handle government budget (n=120)

Variable of study	Percentage
Overall government budget is followed by generally observing rules	Good: 23 (19.17%) Above average: 12 (10.00%) Average: 56 (46.67%) Below average: 15 (12.50%) Poor: 14 (11.67%)
Overall government budget is followed by documenting yearly actual revenues and expenditures after authorised revision at each level of responsibility (documenting)	Good: 15 (12.50%) Above average: 11 (9.17%) Average: 57 (47.50%) Below average: 27 (22.50%) Poor: 10 (8.33%)
Overall government budget is followed based on commitment accounting to ensure expenditures do not exceed budget (budget)	Good: 14 (11.67%) Above average: 13 (10.83%) Average: 63 (52.50%) Below average: 13 (10.83%) Poor: 17 (14.17%)

Table 3 assesses the ability of employees to collect government revenue effectively. The table shows frequency proportions for the ability of employees to collect revenue based on guidelines stipulated in MFMA guidelines. It can be seen from the table that about 70% of employees were efficient enough in terms of collecting revenues based on impartially implemented tax laws. About 70% of employees were efficient enough in terms of collecting revenue by observing free, fair and speedy appeals procedures. About 64% of employees were efficient enough in terms of collecting revenue by separating key functions such as assessment, collection and accounting. About 70% of employees were efficient enough in terms of collecting revenue by following up differences between cashbooks and bank statements.

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Table 3: Ability to collect revenues (n=120)

Variable of study	Percentage
Extent to which municipal revenue is documented following the MFMA	Good: 16 (13.13%) Above average: 11 (9.17%) Average: 57 (47.50%) Below average: 21 (17.50%) Poor: 15 (12.50%)
Extent to which municipal revenue is audited	Good: 17 (14.17%) Above average: 11 (9.17%) Average: 56 (46.67%) Below average: 14 (11.67%) Poor: 22 (18.33%)
Extent to which financial statements are documented according to MFMA guidelines	Good: 14 (11.67%) Above average: 10 (8.33%) Average: 53 (44.17%) Below average: 16 (13.33%) Poor: 27 (22.50%)
Extent to which financial statements are assessed independently according to MFMA guidelines	Good: 14 (11.67%) Above average: 11 (9.17%) Average: 59 (49.17%) Below average: 13 (10.83%) Poor: 23 (19.17%)

Table 4 shows frequency proportions for the ability of employees to assess payrolls based on guidelines stipulated in MFMA guidelines. It can be seen from the table that about 60% of employees were efficient enough in terms of performing independent verifications on payroll calculations. About 62% of employees were capable of implementing identification procedures according to MFMA guidelines.

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Table 4: Ability to assess payrolls (n=120)

Variable of study	Percentage
Independent verification of financial transactions	Good: 10 (8.33%) Above average: 11 (9.17%) Average: 51 (42.50%) Below average: 26 (21.67%) Poor: 22 (18.33%)
The extent to which line function managers assess the accuracy of financial statements	Good: 23 (19.17%) Above average: 8 (6.67%) Average: 43 (35.83%) Below average: 24 (20.00%) Poor: 22 (18.33%)

Table 5 shows frequency proportions for the ability of employees to assess procurement procedures according to MFMA guidelines. The table shows that about 85% of employees were efficient enough in terms of handling procurement procedures according to MFMA guidelines. About 70% of employees were efficient enough in terms of administering contracts based on MFMA guidelines. About 70% of employees allowed competitors enough time for obtaining documents, and to prepare and submit finance bids. About 70% of employees awarded contracts to responsive and qualified bidders with the lowest evaluated cost, without further negotiations.

Table 5: Ability to assess procurement procedures (n=120)

Variable of study	Percentage
The extent to which procurement processes are in line with the MFMA	Good: 23 (19.17%) Above average: 7 (5.83%) Average: 72 (60.00%) Below average: 15 (12.50%) Poor: 3 (2.50%)
Contracts are awarded by public competitive bidding	Good: 16 (13.13%) Above average: 11 (9.17%) Average: 57 (47.50%) Below average: 21 (17.50%) Poor: 15 (12.50%)

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Variable of study	Percentage
Sufficient time is allowed for obtaining documents, and to prepare and submit finance bids	Good: 16 (13.13%) Above average: 11 (9.17%) Average: 57 (47.50%) Below average: 21 (17.50%) Poor: 15 (12.50%)
The extent to which contracts are awarded accordance with the MFMA	Good: 16 (13.13%) Above average: 11 (9.17%) Average: 57 (47.50%) Below average: 21 (17.50%) Poor: 15 (12.50%)

Table 6 shows frequency proportions for the ability of employees to administer bids according to MFMA guidelines. It can be seen from the table that about 49% of employees were capable of ensuring eligibility requirements in bidding procedures. About 69% of employees observed and complied with the basis of bids. About 84% of employees observed and complied with deadlines for bidding procedures. About 70% of employees observed and complied with evaluation criteria in bidding procedures.

Table 6: Ability to administer bids (n=120)

Variable of study	Percentage
Eligibility requirements are included in all bidding procedures	Good: 8 (6.67%) Above average: 11 (9.17%) Average: 40 (33.33%) Below average: 44 (36.67%) Poor: 17 (14.17%)
The basis of bids is included in all bidding procedures	Good: 9 (7.50%) Above average: 12 (10.00%) Average: 62 (51.67%) Below average: 29 (24.17%) Poor: 8 (6.67%)
The extent to which due dates of bids are observed	Good: 14 (11.67%) Above average: 16 (13.33%) Average: 71 (59.17%) Below average: 14 (11.67%) Poor: 5 (4.17%)

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Variable of study	Percentage
Evaluation criteria are included in all bidding procedures	Good: 14 (11.67%) Above average: 12 (10.00%) Average: 59 (49.17%) Below average: 26 (21.67%) Poor: 9 (7.50%)

Table 7 shows frequency proportions for the ability of employees to administer procurement procedures according to MFMA guidelines. It can be seen from the table that about 70% of respondents used public advertisements as recommended in the course of administering procurement procedures. About 78% of employees used pre-qualification documents in the course of administering procurement procedures. About 84% of employees used evaluation reports. About 70% of employees used bidding documents and addenda. About 89% of employees used additional pre-qualification documents. About 92% of employees used additional evaluation reports. About 88% of employees used bidding documents and addenda.

Table 7: Ability to administer procurement procedures (n=120)

Variable of study	Percentage
Use of public advertisements	Good: 12 (10.00%) Above average: 13 (10.83%) Average: 59 (49.17%) Below average: 24 (20.00%) Poor: 12 (10.00%)
Use of pre-qualification documents	Good: 19 (15.83%) Above average: 12 (10.00%) Average: 63 (52.50%) Below average: 20 (16.67%) Poor: 6 (5.00%)
Use of evaluation report	Good: 23 (19.17%) Above average: 14 (11.67%) Average: 64 (53.33%) Below average: 13 (10.83%) Poor: 6 (5.00%)
Use of bidding documents and addenda	Good: 17 (14.17%) Above average: 14 (11.67%) Average: 50 (41.67%)

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Variable of study	Percentage
	Below average: 28 (23.33%) Poor: 11 (9.17%)
Use of additional pre-qualification documents	Good: 28 (23.33%) Above average: 14 (11.67%) Average: 64 (53.33%) Below average: 10 (8.33%) Poor: 4 (3.33%)
Use of additional evaluation report	Good: 22 (18.33%) Above average: 17 (14.17%) Average: 71 (59.17%) Below average: 9 (7.50%) Poor: 1 (0.83%)
Use of bidding documents and addenda	Good: 14 (11.67%) Above average: 15 (12.50%) Average: 77 (64.17%) Below average: 12 (10.00%) Poor: 2 (1.67%)

Table 8 shows frequency proportions for the ability of employees to adjudicate bids according to MFMA guidelines. It can be seen from the table that about 91% of employees left bids unopened until the official opening time. About 81% of employees opened bids immediately after the deadline. About 66% of employees opened bids in the attendance of representatives. About 76% of employees recorded bids at the time. About 87% of employees rejected bids if they were submitted late.

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Table 8: Ability to adjudicate bids according to MFMA guidelines (n=120)

Variable of study	Percentage
Bids left unopened until official opening	Good: 34 (28.57%) Above average: 12 (10.08%) Average: 63 (52.94%) Below average: 9 (7.56%) Poor: 1 (0.84%)
Bids opened immediately after the deadline	Good: 19 (15.83%) Above average: 29 (24.17%) Average: 50 (41.67%) Below average: 21 (17.50%) Poor: 1 (0.83%)
Bids opened in the attendance of representatives	Good: 11 (9.17%) Above average: 1 (0.83%) Average: 67 (55.83%) Below average: 30 (25.00%) Poor: 11 (9.17%)
Bids recorded at the time	Good: 17 (14.17%) Above average: 14 (11.67%) Average: 67 (55.83%) Below average: 24 (20.00%) Poor: 5 (4.17%)
Bids rejected if late	Good: 19 (15.83%) Above average: 15 (12.50%) Average: 67 (55.83%) Below average: 15 (12.50%) Poor: 4 (3.33%)

Table 9 assesses the extent to which bids are assessed under MFMA guidelines. The table shows that about 70% of employees assessed bids based on MFMA guidelines.

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Table 9: Ability to evaluate bids according to PFMA guidelines (n=120)

Variable of study	Percentage
Extent to which bids are assessed in good time	Good: 8 (6.67%) Above average: 11 (9.17%) Average: 81 (67.50%) Below average: 16 (13.33%) Poor: 4 (3.33%)
Extent to which recommended criteria are used for the assessment of bids	Good: 10 (8.33%) Above average: 10 (8.33%) Average: 66 (55.00%) Below average: 28 (23.33%) Poor: 6 (5.00%)
Extent to which relevant and supporting documents are assessed	Good: 10 (8.33%) Above average: 13 (10.83%) Average: 61 (50.83%) Below average: 29 (24.17%) Poor: 7 (5.83%)

Table 10 shows frequency proportions for the ability of employees to monitor bids according to MFMA guidelines. It can be seen from the table that about 60% of employees monitored bids for overseeing the delivery of goods and services following the awarding of contracts. Following the awarding of contracts, about 69% of employees used monitoring to verify quantity, quality and timelines.

Table 10: Ability to monitor bids according to MFMA guidelines (n=120)

Variable of study	Percentage
The extent to which a follow-up is made on the delivery of goods and services	Good: 10 (8.33%) Above average: 16 (13.33%) Average: 48 (40.00%) Below average: 35 (29.17%) Poor: 11 (9.17%)
Following the awarding of contracts, monitoring used for verifying quantity, quality and timelines	Good: 14 (11.67%) Above average: 15 (12.50%) Average: 54 (45.00%) Below average: 27 (22.50%) Poor: 10 (8.33%)

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Variable of study	Percentage
Following the awarding of contracts, monitoring used for supervising the work done by independent engineers	Good: 10 (8.33%) Above average: 15 (12.50%) Average: 62 (51.67%) Below average: 23 (19.17%) Poor: 10 (8.33%)
The extent to which an assessment is made to ensure the successful conclusion of tasks without exceeding the allocated budget	Good: 18 (15.00%) Above average: 16 (13.33%) Average: 66 (55.00%) Below average: 17 (14.17%) Poor: 3 (2.50%)
Following the awarding of contracts, monitoring used for handling disputes in accordance with conditions in contract	Good: 22 (18.33%) Above average: 12 (10.00%) Average: 68 (56.67%) Below average: 15 (12.50%) Poor: 3 (2.50%)

About 86% of employees implemented a proper maintenance of invoices and payments on a regular basis. About 64% of employees implemented a proper maintenance of progress reports on a regular basis. About 79% of employees implemented a proper maintenance of certificates of inspection on a regular basis. About 45% of employees implemented a proper maintenance of acceptance and completion on a regular basis.

Table 11: Ability to maintain key activities according to MFMA guidelines (n=120)

Variable of study	Percentage
The extent to which proper maintenance of change and variation orders is carried out according to MFMA guidelines	Good: 20 (16.67%) Above average: 13 (10.83%) Average: 72 (60.00%) Below average: 14 (11.67%) Poor: 1 (0.83%)
There is a proper maintenance of invoices and payments	Good: 28 (23.33%) Above average: 12 (10.00%) Average: 64 (53.33%) Below average: 14 (11.67%) Poor: 2 (1.67%)

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Variable of study	Percentage
There is a proper maintenance of progress reports	Good: 13 (10.83%) Above average: 12 (10.00%) Average: 52 (43.33%) Below average: 34 (28.33%) Poor: 9 (7.50%)
There is a proper maintenance of certificates of inspection	Good: 13 (10.83%) Above average: 17 (14.17%) Average: 65 (54.17%) Below average: 22 (18.33%) Poor: 3 (2.50%)
There is a proper maintenance of acceptance and completion	Good: 20 (16.67%) Above average: 9 (7.50%) Average: 36 (30.00%) Below average: 17 (14.17%) Poor: 38 (31.67%)
The extent to which documents related to financial claims and disputes are maintained according to MFMA guidelines	Good: 24 (20.00%) Above average: 7 (5.83%) Average: 23 (19.17%) Below average: 13 (10.83%) Poor: 53 (44.17%)

Before payments were made, about 27% of employees checked if prices were charged according to approved scales. Before payments were made, about 91% of employees checked if proper authority has been obtained for the expenditures. Before payments were made, about 24% of employees checked if computations and costing were verified and arithmetically correct. Before payments are made, about 9% of employees checked if there was acceptance and completion of all relevant tasks, responsibilities and terms of reference. Before payments are made, about 69% of employees checked if there was a record of claims, disputes and their outcomes.

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Table 12: Ability to administer payments according to MFMA guidelines (n=120)

Variable of study	Percentage
The extent to which verification of work done is carried out before payment is made	Good: 12 (10.00%) Above average: 20 (16.67%) Average: 22 (18.33%) Below average: 6 (5.00%) Poor: 60 (50.00%)
The extent to which prices are verified against approved scales	Good: 13 (10.83%) Above average: 13 (10.83%) Average: 6 (5.00%) Below average: 24 (20.00%) Poor: 64 (53.33%)
The extent to which all expenditures are duly approved by the relevant authorities	Good: 45 (37.50%) Above average: 30 (25.00%) Average: 35 (29.17%) Below average: 7 (5.83%) Poor: 3 (2.50%)
The extent to which all financial calculations are carried out according to MFMA guidelines	Good: 8 (6.67%) Above average: 2 (1.67%) Average: 19 (15.83%) Below average: 46 (38.33%) Poor: 45 (37.50%)
Before payments are made, there is a check that there is acceptance and completion of all relevant tasks, responsibilities and terms of references (completion)	Good: 3 (2.50%) Above average: 4 (3.33%) Average: 7 (5.83%) Below average: 31 (25.83%) Poor: 75 (62.50%)
Before payments are made, there is a check that there is a record of claims, disputes and their outcome (outcome)	Good: 51 (42.50%) Above average: 1 (0.83%) Average: 30 (25.00%) Below average: 16 (13.33%) Poor: 22 (18.33%)

Table 13 shows frequency proportions for the ability of employees to assess overspending according to MFMA guidelines. It can be seen from the table that about 54% of employees were capable of preventing overspending at the workplace. About 54% of employees were capable of detecting overspending at the workplace. About 53% of employees were capable of penalising overspending at the workplace.

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Table 13: Ability to assess overspending according to MFMA guidelines (n=120)

Variable of study	Percentage
Overspending is prevented	Good: 24 (20.00%) Above average: 10 (8.33%) Average: 31 (25.83%) Below average: 34 (28.33%) Poor: 21 (17.50%)
Overspending is promptly detected	Good: 21 (17.50%) Above average: 3 (2.50%) Average: 41 (34.17%) Below average: 16 (13.33%) Poor: 39 (32.50%)
Overspending is penalised	Good: 18 (15.00%) Above average: 7 (5.83%) Average: 39 (32.50%) Below average: 19 (15.83%) Poor: 37 (30.83%)

Table 14 shows attributes that are significantly associated with satisfactory adherence to MFMA guidelines among municipal auditors and accountants working on financial duties on a day-to-day basis. The table shows that all attributes displayed in the table are statistically significant. It follows that satisfactory adherence to the MFMA is significantly associated with the following 10 attributes:

1. Long duration of service
2. Collecting municipal revenues with efficiency
3. Learning from well-experienced employees
4. Age category of employee
5. Following the overall government budget by documenting actual yearly revenues and expenditures
6. Following the overall government budget by ensuring that expenditures do not exceed the budget
7. Attending regular training on financial and auditing processes that are used for budget control
8. Exercising financial controls through high visibility
9. Following the overall government budget by generally observing rules
10. Procuring goods and services based on bidding processes stipulated in the MFMA
11. Long duration of service

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Table 14: Table of associations with satisfactory adherence to MFMA guidelines

Determinants of satisafactory adherence to MFMA guidelines	Observed chi-square value	P-value
Long duration of service	15.1332	0.0040
Learning from well experienced employees	13.6089	0.0090
Observing rules stipulated in the MFMA	13.4786	0.0040
Collecting municipal revenues with efficiency	13.2565	0.0100
Following overall government budget by documenting actual yearly revenues and expenditures	12.1808	0.0160
Following overall government budget by ensuring that expenditures do not exceed budget	10.9139	0.0280
Attending regular training on financial and auditing processes that are used for budget control	10.5898	0.0320
Exercising financial controls through high visibility	10.2568	0.0360
Procuring goods and services based on bidding processes stipulated in the MFMA	10.1689	0.0380
Age category of employee	9.7036	0.0080

Table 15 shows odds ratios estimated from ordered logit regression analysis (Pardoe, 2020). The table shows that adherence to MFMA guidelines is significantly influenced by 3 factors. These 3 factors are long duration of service, learning from well-experienced employees, and observing rules stipulated in the MFMA on a day-to-day basis with enough discipline.

Table 15: Table of odds ratios from ordered logit regression (n=120)

Variable	P-value	Odds Ratio	95% Confidence Intervals of Odds Ratio
Long duration of service	0.000	4.77	(1.79, 8.34)
Learning from well experienced employees	0.000	4.12	(1.69, 7.55)
Observing rules stipulated in the MFMA	0.000	2.97	(1.52, 5.49)

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Conclusion

The findings indicate that compliance with the Municipal Finance Management Act (MFMA) in the City of Tshwane is influenced primarily by employees' length of service, knowledge transfer from experienced colleagues, and the consistent application of the Act's provisions in daily financial management. Although 77% of the surveyed financial employees demonstrated satisfactory compliance, the remaining 23% highlights the need for targeted interventions to achieve full adherence.

The study further concludes that ineffective utilisation of financial, human, and logistical resources, limited adoption of modern technological systems, and inadequate enforcement of municipal bylaws remain significant barriers to effective MFMA implementation. As the MFMA provides the legislative framework for sound municipal financial governance and accountable service delivery, strengthening institutional capacity, promoting continuous skills development, and improving resource management are critical to enhancing compliance and ensuring the efficient use of municipal resources.

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A DUMITRESCU-HURLIN PANEL CAUSALITY TEST ANALYSIS ON SUBNATIONAL DEBTS AND POVERTY

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Abstract

This research investigated the impact of subnational debts on economic development of Nigeria's 36 states, with poverty as the dependent variable and Subnational domestic and external debts as the independent variables, while state internally generated revenue and state allocation from the federation account were deployed as the check variables. The secondary longitudinal data spanning from 2012 to 2021 were extracted from CBN, DMO and NBS annual statistical bulletins and reports. Using Dumitrescu-Hurlin causality estimating techniques. The result of the research uncovered that there is a bi-directionally causality between subnational debts and poverty level, while the direction of causality between external debts and poverty was found to be uni-directionally running from subnational external debts to poverty. The policy

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implication of this findings indicates the 36 federating units have not channel their public borrowing into programs and projects that can alleviate the level of poverty in these states. Hence, the states are encouraged to appropriate a significant share of their borrowed funds to people-centered programs and projects through investment in education, agricultural value chain development, as well as, the sponsorships and support of entrepreneurial skills development. The subnational units are also encouraged to inculcate the culture of fiscal discipline, through the establishment of States' Debts Management Agencies that would be saddle with the responsibilities of planning, managing, controlling and monitoring of states debt. The study further advocated for states legal autonomy, to prosecute cases related to state fraud without any reference to federal courts, in order to eliminates undue interference by the federal government.

Keywords: *subnational debt, poverty, economic development, public.*

JEL Classification: H63; H74; I32; C23.

1.0 Introduction

Subnational debts is similitude to national debts and it is a strand of public debts procured by the constituents units in a federating unit meant to bring about economic development. According to Rahman (2012), government at the national or subnational levels create Public debts through public borrowing from within and out of the country, it is often necessitated by the shortfalls in revenue vis-à-vis government determination to promote social welfare (economic development) through the provision of Public goods or social infrastructures such as education, health, security, energy, road, rail, military equipment and armaments, among others, that act as a catalyst for economic growth, improve healthcare, improve literacy levels, increase consumption, increase employment, reduce the level of poverty and improve private sector investment in an economy.

Unlike the pre-World War II economists whom asserted that the economic development or social welfare of any society was an absolute function of the level of economic growth in an economy. Seers (1969) contended that economic prosperity or social welfare cannot be exclusively quantified or determined by the weights of infrastructural, technological and institutional development alone. Rather economic development from Seers' perspective is measured by the extent to which these three core macroeconomic parameters: unemployment, inequality, and poverty, have been eliminated or reduced. These three fundamental macroeconomic indicators are the most important deterministic factor or yardstick for estimating

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the level of economic progress in modern society. This is because any economic development that is non people-centered and fails to address the core social problems of unemployment, poverty, and inequality in any economy cannot truly be referred to as economic development.

In the contemporary Nigeria context and its 36 subnational structure that are faced with enormous macroeconomic issues, key among is the protracted high level of poverty and other sundries macroeconomic imbalances amidst the shortfalls in revenue to address these imbalances. Thus, the 36 states have increasingly resorted to borrowing from both domestic and foreign creditors to supplement the shortage in revenue, in an attempt to provide public goods and services that would help eliminate the poverty issues in these states. From the foregoing, the trajectory of states governments' debt in Nigeria has witnessed a significant upsurge from N66.16 billion in 2003 to N118.24 billion in 2009, and, a decade and half later, these debts got to N5.85 trillion in 2020, thereby increasing the share of sub-national debts part of national debt from 17.85% in 2011 to 20% in 2019. At the individual state level for instance, the public debt of each of the 36 states has grown exponentially, such that the subnational debts of 26 states has increased above 50%; among them, 13 states debt increase exceeded 100% between 2016 and 2021. These states includes Sokoto, Anambra, Yobe, Borno, and Ogun, with increases of 409.97%, 346.05%, 184.49%, 176.75%, and 169.95%, respectively.

Surprisingly, despite the massive increase in the subnational debts, the level of poverty remain relatively high and posed as one of the major contemporary macroeconomic threat facing ~~the~~ 36 federating units. Although, efforts have been made by the individual state to fight the menace of poverty. Yet, the problem of poverty have continue to grow multidimensionally and it is currently one of the most conspicuous identifier of the Nigerian state in the committee of nations. Tunji (2022), observe that the incidence of poverty are differentially prevalence among the 36 states and was found to be relatively higher in Sokoto were 90% of its population were found to be living below $2.15 per day, followed by Bayelsa at 88.5%, Gombe at 86.2%, Jigawa at 84.3%, and Plateau at 84.3%. Ondo have the lowest rate of 27.2%. Nevertheless, according to NBS (2020) in Adegboyega (2021) and Biodun (2022) they also observe that the problems of poverty across the 36 states is further exacerbated and intensify by the high level of unemployment and out of school children. In 2020 for instance, the highest level of unemployment was reported in Imo state with 57.6% of its labour force been unemployed, Adamawa 54.9%, Cross River 52.7%, Akwa Ibom 48.7%, and Rivers 45.2%. In terms of numbers, the states with the highest unemployment levels were Lagos 1.8

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million, Rivers 1.6 million, Akwa Ibom 1.2 million, Kaduna 1.1 million, and Cross River 1.0 million, respectively. Similarly, these states Kano (4.83 million), Lagos (3.13 million), Katsina (3.04 million), and Kaduna (3.01 million) accounted for the largest percentage of Nigeria's 16.17 million out-of-school children in 2021.

Therefore, in-line with Seers perspective, the objective of this study is to empirically justify the effect of subnational debts on the level of poverty in Nigeria's 36 states between 2012 to 2021. And by so doing we can be able to ascertain if the volume of subnational debts incurred by these states have being sustainably used to fight the menace of poverty and create a favorable macroeconomic ambiance for improved social welfare or possibly the funds borrowed may have been corruptly embezzled, mismanaged and misappropriated, hence stalled the economic development of these federating units.

2.0 Review of Literature

The early classical economists assumed economic development to be synonymous with economic growth. Economic growth as defined by Kuznets (1966) is simply the quantitative increase in the productive capacity of an economy per annum. This in fact was the pre-World War II definition of economic development; however the post-World War II development experience totally revolutionized the concept of economic development which was necessitated by the perceived high economic growth rate in some of the Underdeveloped countries that was higher than the advanced nations. Contemporary, the concept of economic development has been profusely defined by several scholars, for which Jhigan (2007) simply states that economic development entails growth that is accompanied with structural transformation that cuts across the structural changes in the institutional arrangements inherent in any society. As such, economic progress that is propelled by change must also be accompanied by technological change and human capital development. Todaro and Smith (2008) states that economic development means a process where social change is sustained and accompanied by improved social welfare.

According to IMF (2017) subnational debt is a strand of public indebtedness that is incurred by the constituent units that makes up a country, more so referred to as provincial or States debts. There are various classifications of public debt both in Nigeria and beyond, naturally, public debt is decomposed into two main classes namely the domestic debt (internal, onshore and endogenous debt) and foreign debt (external, offshore, overseas and exogenous debt). These two categories of public debt have different classifications in terms of sources, instruments, durability and

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willingness. However, in Nigeria the subnational governments are by law permitted to borrow from both the endogenous and exogenous credits sources with a degree of administrative bottlenecks. Hence, the review of the theoretical literature was done as follow:

The crowd out effect theory of public debt is one of the conspicuous theories of public indebtedness that was propagated by Adam Smith in one of his flagship paper title "An inquiry into nature and causes of the wealth of nations' published in 1776. Subsequently, other forunners of the theory such as Friedman (1962), Friedman and Schwartz (1963) and Rockoff (2021) among others have further corroborated and extended the Smithian pessimistic view about public borrowing and government intervention on the economy. The fundamental assumptions of the theory is built on the classical and the monetarists foundation that view government unwarranted intervention in an economy as being distortive and deleterious to the smooth operation of the market system (Invisible hand) that is thought to be self-correcting. The theory deduced that government borrowing to supplement revenue shortfalls is merely an extravagant expedition and has inflationary influence on the economy. And, at the same time engender stiff competition between the government and the private sector for the limited or scarce capital resources from the surplus units of the economy. Hence, the entry of the government into the domestic and global money and capital markets, to source for both short term and long term capital to augment the fiscal deficit, would concurrently lead to the increase in the demand for loanable funds and the increase in the cost of capital or interest rate. The resultant effect of the increase in the cost of loanable capital fueled by government borrowing is the consequential depletion in the profits of the private sector and as such, lead to the decline in private investment, because of the high cost of loanable funds, private investment becomes unprofitable. The effect of public borrowing putting pressure on the cost of borrowing to rise far beyond the reach of the private sector and further dovetail into the decline or disinvestment is referred to as the crowd out effect of public debt on the private sector. However, the literature is afloat, with the conceptions that the crowd out effect of public debt is primarily the debt problem associated with domestic borrowing only Anyafo (1996). While, Iyioha (1996) submitted otherwise that offshore borrowing can also lead to the problem of public debt crowding out effect on the private investment triggered by the debt services obligations and opined that the channel through which external debt crowds out private investment is through exchange rate. The kernel and the trajectory of the trade-off effect of public debt on the private sector, as well as its impact on the totality of other macroeconomic aggregates is stem

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from the transmission impact of public debt on interest rates and its infiltration on the costs of private investment which ultimately affect a gamut of other macroeconomic fundamentals required to induce the optimum growth and development of any nation. The crowds out adherents are of the inclination that the domino effect of public debt on the economy transit primarily from the interest rates path. The increase in interest necessitates a rise in the cost of loanable funds, resulting in the decline in investment, consumption and employment. The interest rates effect of public borrowing on exchange rate and import is positive as against the negative effects of the cost of public borrowing on exports given that foreign portfolio investors often leverage on the interest opportunity to invest in government financial instruments that have become more profitable (Evan, 1985).

The Crowd-Out theory is criticized for its inability to take into account the failure of the market system to provide for Public goods for which government intervention is needed. The theory was limited in foresight for being unable to see the globalization of the capital market and the theory is also criticized for over simplifying the wealth and multiplier effects of government spending on the economy, which has the potential to stimulate private investments.

The Crowd-in theory of public debt is a thought process that evolved from the seminar work of Keynes (1936). In furtherance of the Keynesian economic standpoint Krugman (1988), Musgrave (1949) and others have expanded the frontiers of the Keynesians idiosyncrasies. The core assumptions surrounding the Crowd-in theory of public debt and by extension public spending is born out of the optimistic perception that expansionary fiscal spending targeted at providing basic infrastructure in the economy has the multiplier or wealth effect of increasing aggregate demand in the economy and by implication lead to the increase in consumption, which would further lead to the increase in investment, employment, reduce poverty and economic growth. Public debt from Keynesian assumption is countercyclical and very critical to any economy because it is an important fiscal capsule for the regeneration of an economy experiencing recession back to the path of growth. As such, public debt and fiscal spending is therefore beneficial and has a crowding in impact on an economy, upon this public debt is a pro-growth variable and has a positive effect on the economy at large. To evaluate the crowding in or non- Ricardian equivalence wealth effects and countercyclical hypothesis of public debts on the economy Hansen, (1941) found that expansionary fiscal policy propelled by public borrowing has the ability to create employment. Similarly, Harold, (1943) further credited public debt as a fiscal tool for unleashing economic prosperity of any nation. Public borrowing to support expansionary fiscal policy

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has been criticized by Branson (1976) and Elmendorf and Mankiw (1998) as having the potential to increase inflationary pressure. Romer (1990) caution the government to guide against the mismanagement of borrowed funds so as not to cause negative macroeconomic consequences because governments operations are by nature characterized by inefficiency in allocation of scared resources. Lastly, the intervention of the government in the economy distort market signals.

Wagner (1893) in Bhullah and Maamor (2010) and Goffman (1968) hypothesized that the increasing functions of the state to provide public goods and infrastructures required for economic growth and development is sequel to the growth in the population and the further restructuring of the state, which would eventually lead to the rise in aggregate demand for public goods and services needed by both the private and public sectors of the economy. Considerably, the theory of expansionary state activities is of the view that when the government borrows to finance developmental projects such as infrastructural development, urban development and industrial development to mention but a few, such debt financing activities would have a positive multiplier effect on the economy at large. In essence, when a state borrows to supplement the shortfall in its revenue required to meet the country's increasing functions or activities such borrowing as advanced by the Wagner induces a positive linear relationship between public debt and macroeconomic performance.

The preposition of the theory of public debt overhang effect is a contemporary economics thought process firstly initialized by Howard in 1972 that is centred on the consequences of overgrowing public indebtedness that manifest into huge debt services obligations on the economy. Krugman (1988) and Sachs (1989) assumed the theory of public debt overhang is a scenario in which public borrowing incrementally increases (large public debt accumulations) beyond that proportion that is believed to be sustainable both in terms of capital and interest repayments, such debt would eventually become in-serviceable and unsustainable and create public debt burden on the current and future generations. Debt overhang as argued by Kobayashi (2013) apparently disincentivizes both domestic and foreign investments, this is because any fiscal policy strategy geared at liquidating outstanding public debt arrears and meeting the debt servicing obligations can only be met by the increase in all categories of taxes. Therefore, the increase in taxes to offset public indebtedness adversely affects investors' profits and disposable income that further emits undesirable macroeconomic outcomes such as the decline in employment generation, decrease in export, decline in capital formation and a plunge in economic growth and development. Iyioha (1997), Sachs (1989) and

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Krugman (1988) corroborated the debt overhang hypothesis and summarily assert that the proliferation of public debt and debt servicing obligations is antithetical to any nation's economic progress and development. And, that public debts overhang hypothesis according to Sachs (1989) is concave in trajectory and is often referred to in the literature as Debt Laffer Curve (transposed U), this dimension of public debt analogy defines the various stages of public debt and debt services effects on the nation's economy. The theory overtly asserts that the dimensions of public debts effects on any economy are in three dimensional phases which are the positive effects, negative effects and neutrality effects. Therefore, the relationship between public debts, debt service and economic growth is non-linear. Having reviewed a handful of theoretical literature, an analysis of the empirical literature was also undertaken with results of some of these studies analyzed as revealed below

Akindutire, (2019). Studied the impacts of foreign debt on rates of poverty in Nigeria covering a period of 18 years from 2000 to 2017. Using the ARDL framework on secondary series that were extracted from the CBN, NBS, DMO, IMF and the World Bank. The study adopted the total public outlays on public goods and services as a proxy for poverty. While the independent variables captured in the work were external debt, foreign debt services and domestic debt, however, inflation and exchange rate were deployed as the control variables. The work uncovered that there is significant long-term relationships among the model variables. However, in the short run, external debt, domestic debt, exchange rate and inflation reduces poverty as they all had negative signs which indicates a reduction in poverty.

Tamunonimim (2014) Employed the Ordinary Least Squares method, Johansen Co-integration, vector Autoregression and Granger Causality technique of data analysis to examined the nexus between internal debt and the rate of poverty in Nigeria from 1986 to 2012 on secondary data that was sourced from the CBN, NBS and DMO. The OLS result disclosed that there exists a significant positive relationship between domestic debt and the rate of poverty in Nigeria. The Johansen cointegration result further revealed that there is a long term co-movement among the variables in the model.

Nanfa, et al, (2023) using the following techniques of data analysis correlation, Johansen cointegration test and the error correction method. They investigated the impact of public debt on poverty rate in Nigeria from 2000 to 2021 on time series that was extracted from the CBN, NBC and DMO. The work discovered that the relationship between foreign debt and poverty rates in Nigeria is significantly

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positive, while the relationship between domestic debts, debt servicing and poverty rates is negative and significant at 5% level. Also, the Johansen cointegration test result indicated that there is a long run association among the model variables

Imandojemu (2019) assessed the effects of state governments borrowing on the progress of the Nigerian economy. The work utilized the Fully Modified Ordinary Least Squares and Granger Causality techniques of data analysis, on data that was sourced from the debt management office of and the Central Bank of Nigeria covering a period of 1996 to 2018. Empirically, evidence from the study indicates that the impact of subnational debt on the nation's economic growth is positive and statistically significant. However, the response of economic growth to local government debt and exchange rate is negatively significant and the result further reveals that the response of growth to interest rate is positive and statistically insignificant. Though, Imandojemu (2019) work examined the impact of state government debt on the economic growth of Nigeria, this work however intends to determine the effects of subnational debt on the economic development Nigeria from the 36 States perspective.

Ozigbu (2018) used the dynamic least squares method (DOLS) and the Johasen cointegration test on secondary data that was sourced from the national bureau of statistics and the World Bank covering a period of 30years from 1986-2016. The short DOLS results underscore that external debt has a positive significant relationship with poverty.

3.0 Methodology

Data Collection, Scope and Sources

This study adopted an Ex-post facto design given that the series for the work were secondary longitudinal data of the 36 states and was sourced from the Central bank of Nigeria, the Debts Management Office and the National Bureau of Statistics spanning from 2012 to2021.

Classification of the variables

The dependent variable employed for this work is the poverty level (POV) measured by the proportion of the each of the 36 states population living below the international poverty line of $2.15 per day. While, the explanatory variables are the Subnational Domestic debt (SDD), subnational external debts (SED) and the two control variables internally generated revenue (IGR) and the State allocations from the federation account (SFA)

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Model Specification

To ascertain the theory associated with Subnational debts and economic development at the states level in Nigeria, this work adopted the Keynesian Public debts Crowd-in theory as the theoretical framework. Most importantly, the model adopted for this study is model that was derived from the work of Olaoye and Alonge (2022). Thus, our model for this study is constructed as follows:

$$POV = \alpha_0 SDD^{\alpha 1} SED^{\alpha 2} IGR^{\alpha 3} SFA^{\alpha 4} \varepsilon t$$

The model above is further linearised or transform into a linear panel ARDL(p,q,q,q,q) generalized three in one model that captures the dynamics of both the short-run, the long-run and error correction econometrics model as specified below

$$\Delta LPOV_{it} = \sum_j^{p-n} \alpha_{1i} \Delta LPOV_{i,t-1} + \sum_j^{q-n} X \alpha_i \Delta LSDD_{i,t-1} + \sum_j^{q-n} \alpha_{3i} \Delta LSED_{i,t-1} + \sum_j^{q-n} \alpha_{4i} \Delta LIGR_{i,t-1} + \sum_j^{q-n} \alpha_{5i} \Delta LSFA_{i,t-1} + \lambda_i (LPOV_{i,t-1} - (\Upsilon_{1i} LSDD_{i,t-1} + \Upsilon_{2i} LSED_{i,t-1} + \Upsilon_{3i} LIGR_{i,t-1} + \Upsilon_{4i} LSFA_{i,t-1})) + U_i + e_{it}$$

Δ connotes difference operator; P-n connotes the lag length of the dependent variable; q-n connotes the lag length of the explanatory variables; i connotes subscript for individual cross-section; t connotes subscript for time dimension; connotes the natural logarithm which measure the degree of elasticity between the regressands and the regressors in the model; $\alpha_{1i} - \alpha_{5i}$ connotes short-run coefficient estimates; $\Upsilon_{1i} - \Upsilon_{4i}$ connotes long-run coefficient estimates; λ_I connotes the error correction term that measures the annual rate of adjustment towards convergence between the short-run and long-run.; U_i connotes the intercept and e_{it} connotes the stochastic or residual term.

A-priori expectation

$\alpha_{2i} - \alpha_{4i} < 0$. Short-run the relationship

$\Upsilon_{1i} - \Upsilon_{4i} < 0$. Long-run relationship.

Data Analytical Techniques

Consequently, the under listed techniques of data analysis were deployed for the empirical evaluation of this paper, these techniques of analysis includes the cross-sectional dependent test, second generation Panel Unit root tests and the Dumitrescu and Hurlin Panel Causality Test was also conducted to estimate direction of causality. All the data sets were analyzed using E-view Version 12 software.

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4.0 Results and Discussion

Descriptive Statistics Test Result

Table 4.1: Descriptive statistics Test Result

	POV (%)	SDD(NB)	SED($M)	IGR(NB)	SFA(NB)
Mean	42.28708	8.02E+10	1.04E+08	2.71E+10	6.81E+10
Median	38.30000	6.22E+10	52719820	1.17E+10	5.47E+10
Maximum	91.90000	6.59E+11	1.47E+09	5.46E+11	2.95E+11
Minimum	1.100000	2.70E+08	14154526	1.79E+09	1.79E+10
Std-Dev	25.14575	7.91E+10	2.07E+08	5.93E+10	4.45E+10
Skewness	0.238449	2.949734	5.257883	5.370359	2.537961
Kurtosis	1.738202	16.66074	31.35866	35.67033	9.405252
Jarque-Bera P-Value	27.29348 0.000001	3321.294 0.000000	13721.92 0.000000	17740.70 0.000000	1001.884 0.000000
Sum	15223.35	2.89E+13	3.74E+10	9.76E+12	2.45E+13
Sum Sq-Dev	226998.9	2.24E+24	1.54E+19	1.26E+24	7.11E+23
Observations	360	3560	360	360	360

Source: Researcher's computation from E-view 12 (2024).

Above is a presentation of the descriptive statistics output of the longitudinal data that was deployed for this work. From the descriptive series it is clearly evidence that the maximum (Max) and minimum (Min) values of the data that defines the range of the panel data for each of the variables are POV (Max: 91.9000 and Min: 1.1000) this range portrays the highest and the lowest rates of poverty across the 36 states in Nigeria, which stood at between the highest of 91.9 percent to the lowest of 1.1 % within the timeframe of the research.

The descriptive statistics further uncovered that the maximum and minimum Naira (N) values of the states' domestic debt (SDD) were N6.59E+11 and N2.70E+08 respectively. Similarly, the maximum and minimum Dollar values of States external debt that defines the range of foreign debt was $147E+09 to $14,154,526. Also the maximum and minimum range of the internally generated revenue(IGR) that was generated by the subnational government in Nigeria stood at a maximum Naira worth of N5.46E+11 to a minimum Naira value of N1.79E+09. Nevertheless, the minimum and maximum Naira values of federal

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allocation (SFA) received by the states was a maximum of N91.79E+10 and the minimum of N2.95E+11.

The following figures 2.28708, 8.02E+10, 104E+08, 2.71E+10 and 6.81E+10 were the mean values of POV, SDD, SED, IGR and SFA respectively. These mean values are simply the averages of each of the longitudinal data employed for this research.

A further analysis of the descriptive statistics reveals Skewness values of 0.238449 for the dependent variables POV which implies that the variable was symmetrically normal or normally skewed, whereas, SED, IGR and SFA are asymmetrically skewed to the right. Again, the kurtosis values of 1.738202 disclose that POV has many of its values higher than its sample mean, which implies that both POV was Platykurtic or having flatter curves. However, the kurtosis values of SDD, SED, IGR and SFA appeared to be Leptokurtic, indicating that these variables were having positive values that were greater than their respective sample mean. This identifies that these set of variables were positively peaked, because the P-value are greater than the 5% level of significance.

Lastly, the Jarque-Bera p-values of each of the variables indicates that all the variables are not normally distributed.

Cross sectional Dependency test

However, the current conversations and debates in literature contend that the first generation unit root test lack the capacity to capture the problem associated with cross-sectional dependence that are inherent in panel data analysis unlike the time series analysis.

Table 4.2: Cross sectional Dependency test Result

Test Method	Statistics	Degree 0f Freedom	P-value
Breusch-Pagan LM	2393.765	630	0.0000
PesaranScaled LM	48.68846		0.0000
Pesaran CD	12.98736		0.0000

Source: Researcher's computation from E-view 12

The above result of the Pesaran CD test reports that cross sectional interdependency exists among the 36 states or cross section given the P-value<0.05 significant level, meaning that we reject the null hypothesis of no cross-sectional dependence in Model. Therefore, following the confirmation of the presence of cross-sectional interdependence among the 36 States, thus the conduct of the second generation Pesaran CIPS unit root test becomes necessary to

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ascertain the stationary status of the series. This result further reveal that the effect of subnational debt on the level of poverty is the same across the 36 states.

Second Generation Unit Root Test

There are a number of second generation unit root test available but for this study we adopted the Pesarsn CIPS second generation unit root test

Table: 4.3: Result of Pesaran Second generation unit root test.

Level Stationary				First Difference Stationary				
Variable	Crutical-Value	T-Stat	P-Value	Critrical-Value	T-Stat	P-Value	Order of Integration	Remark
LPOV	-2.23	-2.81827	<0.010	-	-	-	I(0)	Stationary at Level
LSDD	-2.23	-3.22924	<0.010	-	-	-	I(0)	Stationary at level
LSED	-2.23	-2.41508	<0.010	-	-	-	I(0)	Stationary at level
LIGR	-2.23	-2.40098	<0.050	-	-	-	I(0)	Stationary at level
LSFA	-2.23	-2.84491	<0.010	-	-	-	I(0)	Stationary at level

Source: Researcher's computation from E-view 12 (2024)

The Pesaran second generation unit root test result above inferred that all the variables were stationary at levels. In the nutshell, the model variables or longitudinal series for the work are confirmed to be level stationary I(0). Thus, necessitating the application of panel he Dumitrescu and Hurlin Panel Causality Test estimating technique to test the study hypotheses.

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Tanle: 4.4. Result of Pairwise Dumitrescu-Hurlin Panel Causality Test.

Null Hypothesis:	W-Stat.	Zbar-Stat.	Prob.
LSDD does not homogeneously cause LPOV	2.50738	1.80206	0.0415
LPOV does not homogeneously cause LSDD	3.90092	4.29489	2.E-05
LSED does not homogeneously cause LPOV	4.55003	5.45605	5.E-08
LPOV does not homogeneously cause LSED	2.51521	1.81607	0.0694
LIGR does not homogeneously cause LPOV	1.70309	0.36330	0.7164
LPOV does not homogeneously cause LIGR	0.76942	-1.30690	0.1912
LSFA does not homogeneously cause LPOV	1.67555	0.31403	0.7535
LPOV does not homogeneously cause LSFA	2.11898	1.10727	0.2682
LSED does not homogeneously cause LSDD	2.64190	2.04269	0.0411
LSDD does not homogeneously cause LSED	2.44408	1.68883	0.0913
LIGR does not homogeneously cause LSDD	1.72408	0.40084	0.6885
LSDD does not homogeneously cause LIGR	3.50536	3.58729	0.0003
LSFA does not homogeneously cause LSDD	2.73060	2.20137	0.0277
LSDD does not homogeneously cause LSFA	2.27365	1.38394	0.1664
LIGR does not homogeneously	2.44744	1.69483	0.0901

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Null Hypothesis:	W-Stat.	Zbar-Stat.	Prob.
cause LSED			
LSED does not homogeneously cause LIGR	3.06572	2.80085	0.0051
LSFA does not homogeneously cause LSED	1.42635	-0.13175	0.8952
LSED does not homogeneously cause LSFA	1.51072	0.01918	0.9847
LSFA does not homogeneously cause LIGR	0.99403	-0.90510	0.3654
LIGR does not homogeneously cause LSFA	1.51804	0.03227	0.9743

Source: Researcher's computation from E-view 12 (2024)

From the Pairwise Dumitrescu-Hurlin causality test result output above, it is empirically evidence that both subnational external and internal debts do bi-directionally and homogeneously causes poverty in all the 36 states in Nigeria within the scope of this research. More so, IGR and SFA do not have any and homogeneously causality with poverty in Nigeria.

Discussion of the Findings

The tests result support that both strand of subnational debts causes a rise in the level of poverty in all the States in Nigeria. Hence, poverty is a positive function of the increase in Subnational domestic debts. This result negates the a-priori expectation of the study that was premised on the public debt crowd-in theory of the Keynesian Economists. Rather the result tends to suggest that a rise in subnational debts will leads to an increase in the level of poverty across the 36 states. In addition, the result further confirm that we reject the null hypothess, denoting that there exists a positive significant relationship between SDD and the level of poverty across all the states in Nigeria. Thus, this findings is at variant with the crowd in theory underpinnings or associated with sub-national domestic borrowings, rather the theory associated by SDD in Nigeria are the theories of public debt overhangs and the classical economists theory of public debt Crowd-Out. The policy implication of this result is that the fiscal policies decisions propagated by these states had failed or were not significantly targeted at

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addressing the macroeconomic challenges of poverty in these States. Perhaps, policy failures could be attributed to fiscal indiscipline, the corrupt mismanagement, embezzlement, misappropriation of borrowed funds resulting in odious borrowing, or probably the borrowed funds were deployed to service outstanding domestic debts obligations and possibly policy failure could be linked to policy summersaults arising from the change in government.

In the case of SED the result empirical support that the increase in the level of poverty in all the States in Nigeria is significant causal function of the increase in Subnational external debts. This result do not align with the a-priori expectation of the study that was premised on the public debt crowd-in theory of the Keynesian Economists. The policy implication of this findings tends to justify that these states have no adopted fiscal discipline and by so doing a greater proportion of the SED incurred by the states were not been deployed to people-centered macroeconomic policies, programs and projects that have the capacity to eliminate or reduce poverty in line with Seers' (1969). Which infers that the borrowed funds have not been prudentially managed as such the could have been misappropriated, embezzled and mismanaged.

5.0 Concluding Remarks

The states are encouraged to focus their fiscal policies on people-centered programs and projects that have the capacity to reduce the level of poverty through investment in education, agricultural value chain development, as well as, the sponsorships and support of entrepreneurial skills development. The subnational units are encouraged to inculcate the culture of fiscal discipline, through the establishment of States' Debts Management Agencies that would be saddle with the responsibilities of planning, managing, controlling and monitoring of states debt. More so the Agencies should periodically appraised states borrowing so as to maintain debt sustainability, as well as to ascertained that the borrowed funds were utilized for programs and projects for which the loans were procured, and by so doing the Agencies may help eliminate or reduce borrowed funds deviations, misapplications or misappropriations, embezzlement, thievery and odious borrowing that are often associated with states' borrowing.

States should make sure that any state officials whom act in connivance with contractors and financial institutions to engage in state fraud or economic sabotage are prosecuted and punished in accordance with the law. As such, the thesis advocates for states legal autonomy, this independent would empowered the states'

legal system to prosecute cases related to state fraud without any reference to federal courts, in order to eliminates undue interference by the federal government.

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THE EFFECT OF CORRUPTION AND PUBLIC DEBT ON INFRASTRUCTURAL DEVELOPMENT

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ABSTRACT

Infrastructure is a key macroeconomic variable that stimulate long-term and sustained economic growth and development in any modern economy. However, in West Africa, the significant effect of infrastructural development to growth resurgence has not been felt despite huge public debt accumulation. This study, examined the long-run effect of corruption, public debt and infrastructural development in West Africa from 2015 to 2024 using data from World Development Indicators (WDI), African Development Bank (AFDB), Transparency International (TI) and Ibrahim Index on African Governance (IIAG). The study adopted Panel Fully Modified Ordinary Least Square (P-FMOLS) test to confirm the long-run co-integration of the variables. While panel-system generalized method of moment (P-SGMM) was used to analyse the short-run and the interactive effect of COC and DEBT on INFR. Findings shows a long-run positive and significant relationship between public debt and

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infrastructural development in West Africa. Also, control of corruption (COC) exhibited a negative and statistically significant coefficient, indicating that higher financing costs associated with weak institutional quality constrain the outcome variable. It was therefore recommended that governments in West Africa should adopt stringent fiscal policy measures to properly manage public funds borrowed to finance critical infrastructure and that corruption control measures be strengthened through institutional quality framework to minimize revenue leakages and consequently close the persistent fiscal imbalances in the West African region.

Keywords: *fiscal deficit convergence, heterogeneity, corruption*

***JEL Classification**: H63, H54, D73*

1. Introduction

West Africa is a region strategically located in Africa and bordered by West and South Coast of the Atlantic Ocean and Gulf of Guinea and to the North by Sahara desert. The region has approximately 480 million people and constitutes about 31% of the Africa's population. West Africa is blessed with abundant human and natural resources and huge mineral deposits such as gold, diamond, lime-stones, iron ore, coal & charcoal, chromium, bitumen, crude oil, natural gas including hydrothermal, magnetic, sedimentary, placer and residuals which ultimately offers the region and indeed the entire Africa continent as net exporter with huge foreign exchange earnings which could augments earnings from agriculture exports (AfDB, 2022; Anyanwu, 2020). Despite this enviable potentials, the region has suffered from decades of infrastructural development gaps, resulting in an unprecedented declined in GDP growth rates, unemployment and poverty. (Olugbero et al., 2026; Adeleke, 2025; Chiyemura et al., 2023).

Infrastructure is a major macroeconomic variable that stimulate output growth and spur private sector's investment (Owusu et al., 2019). Many developed economies have developed infrastructural development network through massive investment on critical infrastructures such as good transportation network, electricity, communication, water, health care facilities, and sewage systems (Meyer, 2025; Herrera, 2020; Banerjee & Qian, 2020). While, West African economies are lagging in terms of quality infrastructural development with evidences of huge infrastructural development gaps. According to (AfDB, 2019), West African region requires an estimated sum of US$20 billion to over US$36 billion annually to close infrastructural gaps, while infrastructure spending was

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estimated to reach over US180 billion per annum by 2025 with major gaps in transport,, power and digital infrastructure limiting regional economic growth. For instance, about 70% of the West African population does not have access to electricity compared to a significantly less than 20% in the other part of the developing economies. Road access rates are about 34% compared to over 50%, internet penetration rates is about 6% compared to over 40%. While public spending remains low, 1.6% of GDP, the region is increasingly tapping into private finance and public private partnership (PPPs) to address fiscal deficit.

West African economies has been in an uninterrupted fiscal deficit since 2009 with implication for public debt accumulation. Prior to the COVID-19 pandemic, only eight countries – Burkina Faso, Ghana, Guinea-Bissau, Liberia, Niger, Senegal, Sierra Leone and Nigeria exceeded the ECOWAS fiscal deficit convergence benchmark of 3% of GDP as at 2019. The outbreak of the COVID-19 led to an unprecedented increase in fiscal deficit to US$46.22 billion, resulting in public debt accumulation. For instance, the fiscal deficit expanded by 17.6%, 122.4% and 170.1% in Nigeria, Ghana and Cote d'Ivoire, respectively. The persistent fiscal deficit in ECOWAS has been due to weak domestic revenue, worsened by non-diversification of these economies from primary produce to stimulate export earnings, persistent expansionary fiscal policy and pervasive corruption resulting from weak institutional quality (AfDB, 2019).

Empirical researches have conspicuously demonstrated over the years that debt financed government expenditures on capital projects can only be productive under strong fiscal responsibility framework (Simba, 2022; Sekrafi & Soghaier, 2018). The budget deficit of Nigeria in 2021 was N5.6 trillion with a total public debt reaching N46.25 trillion by 2023 (Sissoko & Kone, 2013). The Nigerian Federal Government allocated US$2.7 billion approximately (N4.06 trillion) for infrastructures in its 2025 annual budget). Ghana's domestic debt to-GDP ratio rose from 76.7% in 2022 to 81.3% in 2023, reflecting over reliance on domestic borrowing to finance deficits (August, et al., 2015). Cote d'Ivoire's domestic debt increased from 50.8% of GDP in 2022 to 55% in 2023, while Mali's domestic debt rose to 51.7% of GDP in 2022, up from an average of 38.3% over the previous decade. Senegal's domestic debt rose from 46.2% in 2022 to 49% of GDP in 2023 (Gimba & Obadiah, 2026; Telesetsky, 2023; Raga et al., 2022; World Bank, 2023).

The excessive revenue leakages in the West African region are inimical to economic growth and development and this has been adduced to poor institutional quality in the region. The quality of institutions to drive government's macroeconomic objectives is a direct function of the marginal returns that these

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economies would expect from governments' investments (Aqeeq & Chamadia, 2023; Ferdous & Mohajan, 2022). This is because for any meaningful development to take place in an economy, institutions matters. Unfortunately, in Africa, particularly in West African economies, corruption has become the norms as major institutions that supposed to be custodian of national resources have compromised their civic responsibilities for rent seeking, falsification, bribery and corruption so as to amass wealth at the detriment of national development (Adewole, 2021; Abu & Staniewsk, 2019; Sharma & Mitra, 2019). The resultant effect of corruption driven by poor institutional quality in the region has consistently led to a slump in GDP growth rate in the region. For instance, average GDP growth rate in West Africa, declined from 3.8% in 2019 to 1.2% in 2020, indicating, in clear terms how these economies have become vulnerable to external shocks and poor institutional quality. The African Development Bank's infrastructure development index reveals that West African economies consistently rank among the lowest performers globally, with average scores of 15.4 out of 100 compared to a continent average of 32.8 (AfDB, 2023). The corruption perception index has consistently ranked the regions as one of the most corrupt region in the continent (TI, 2022).

Several authors, have looked at the relationship between infrastructural development and public debt with opposing views. (Owusu et al., 2019; Chiyemura et al., 2023), argued that there are asymmetric long-run positive effect of public debt on infrastructural development in West African countries. While others such as (Aladejana, 2022; Ofurum & Fubara, 2022), have argued in their submissions that public debt have not had any meaningful impact on infrastructure outcomes in the region mainly due to reported cases of pervasive corruption resulting from institutional failures. This study aims to contribute to the ongoing debate on the effect of corruption and public debt on infrastructural development in West Africa using summary statistics and panel fully modified ordinary least square (P-FMOLS) econometric techniques to empirically investigate the asymmetric effect of the explanatory variables on the explained variable.

This paper is structured as follows: section one deals with introduction, giving general background to the study, section two deals with literature review, section three is concerned with methodology, section four deals with results and discussions and section five concludes the work.

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2. Literature Review

Theoretical Review

There are several theories that explains corruption, public debt and infrastructural dynamics such as the Neoclassical theory of optimal capital accumulation by Solow and Swan, 1958, the Aschauer production function model, the Debt overhang theory, the Debt –cum growth theory, the Principal-Agent theory of corruption, and the Marxian and political economy theory of corruption. However, this study is anchored on the Aschauer's Production function model.

The Aschauer, (1989) production function model was drawn from the work of (Solow & Swan, (1956)'s neoclassical proposition that growth in an economy results from investment in capital, labour and technological progress which are exogenous. Theoretically, infrastructure have a direct effect on output as a factor input and indirectly through technological progress. In the work of (Bhattacharya & Bose, 2023), an aggregate production function can be expanded to accommodate infrastructure capital. This is done by including infrastructure capital in a growth model which is seen as one of the major inputs in a production process (Foster et al., 2022, Row et al., 2021). Generally, the production function is specified as:

$$Y=AF(K,L) \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (2.1)$$

Where: Y is real gross output, A is technology, K is private capital and L is man power.

Empirical Review

The soundness of any theory whether economic or otherwise, is tested by its behaviour when subjected to empirical analysis. A number of empirical studies have been carried out to so far to investigate the relationship existing among corruption, public debt and infrastructural development in both developed and developing economies. Below is a summary of a few of these empirical studies.

Olugbenro et al., (2026) investigated the relationship between public debt and infrastructural development in Nigeria from 1990 to 2025. The study applied autoregressive distributed lag (ARDL) econometric technique to carry out the analysis. Findings indicated a positive but not significant long run relationship between external debt and infrastructure development, while domestic debt exerted a positive and significant effect on infrastructural development during the period under review. It was recommended that governments in the West African region should adopt stringent fiscal measures to properly manage public debt to stimulate infrastructural development outcomes in the region. Also, institutional quality

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should be strengthened to reduce persistent revenue leakages and consequently close the fiscal deficit gaps in the region.

Orhewe & Ogbeide-Osaretin (2025) explored the effect of public debt, governance quality and debt servicing on human development in West Africa. The study adopted the panel-system generalized method of moment (P-SGMM) econometric technique for the analysis. Findings indicated a negative and significant effect of government debt and debt servicing on human capital development in the region during the study period mainly due to weak institutional quality resulting in massive revenue leakages and persistent fiscal imbalances. It was recommended that governments in the region should strengthen regulatory framework and rule of law to mitigate against the adverse effect of pervasive corruption and ensure fiscal sustainability in the regional economies.

Olanipekun et al., (2024) carried out a study to find out if there is any long-run effect between government debt and infrastructural development in Nigeria from 1986 to 2021. The study employed Autoregressive Distributed Lag (ARDL) and Error Correction Model (ECM) econometric techniques for the empirical analysis using statistical data from World Development Indicators (WDI) database and Central Bank of Nigeria (CBN) Statistical Bulletins. The empirical results revealed that there was a 25% speed of adjustment taking place from short-run equilibrium to long-run equilibrium state within a year. The result also indicated a negative and significant long-run effect of external debt, debt servicing obligations and exchange rate on infrastructural development, while domestic debt showed positive response on infrastructural development in the short-run period. The study therefore recommended that government should reduce foreign debt accumulation to fund infrastructures while domestic debt should be encouraged in the short-run period only and not in the long-run because of its crowding out effect on private sector's investment.

Okere et al., (2023), investigated the relationship between public debt and energy poverty in 30 Sub-Saharan African countries from the period, 2007 to 2018. A component energy poverty index was developed using the principal component analysis. The Generalized Method of Moment (GMM) econometric technique was applied to analyse the panel data after taking into consideration individual country's specific fixed effect. The results found a positive, linear effect of public debt on energy poverty index both in the short-run and the long-run period. The study recommended strict fiscal measures to reduce energy cost and consequently energy poverty in Sub-Saharan African countries.

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Doojav & Baatarkhuu, (2023) investigated the long-run effect of public debt on economic growth in Asian developing countries. The study applied Panel Generalized Method of Moments (GMM) and Panel Vector Autoregressive (VAR) models to analyse the variables. The results indicated a positive long-run relationship between public debt and economic growth in Asian developing countries. The result also showed evidence of geographical cross country heterogeneity in the mutual feedback effects. These findings have important policy implications, including the need to use geographic or region specific debt threshold levels and asymmetric response coefficients in public debt policy analysis.

Gomez-Puig et al., (2022) carried out a study to determine the long-run effect of public debt on economic growth in developed countries from the period of 1995 to 2016. The study adopted the group fixed effect estimator and a multinomial logit model to carry out the investigation. It was found that a positive long-run relationship exist between public debt and economic growth which was majorly propelled by the institutional quality and the stringent fiscal responsibility framework adopted by the fiscal authorities in these economies during the study period. Based on this findings, the study recommended that prudent financial measures be intensified to manage fiscal deficits and hence public debt and that public debt should be properly channeled to critical infrastructures that have spillover effect on private sector's investment and consequently economic growth.

Aladejana et al., (2022) studied the effect of public debt on infrastructural development in Nigeria from the period 1998 to 2019. A multiple ordinary least square (OLS) regression technique was used to analyse the annual time series data that was sourced from the Central Bank of Nigeria (CBN) statistical bulletins, National Bureau of Statistics (NBS) database and World Development Indicators (WDI). The result of the hypothesis at the 5% significance indicated a strong asymmetric positive significant relationship between domestic debt and infrastructural development at both current and lagged coefficients. There was also a strong asymmetric negative relationship between external debt and infrastructural development at both current and lagged values. This means that there was a robust positive and significant long-run relationship between public domestic debt and infrastructural development in Nigeria while the external debt has not been impactful as revealed by the negative co-efficient.

Ofurum & Fubara (2022) studied the relationship between public debt and economic growth in Nigeria. Granger Causality test, Unit Root test using Augmented Dickey Fuller (ADF) and Autoregressive Distributed Lag (ARDL) econometric techniques were employed to analyse the time series data. The result

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indicated a non-existence of positive relationship between external debt and real GDP growth in Nigeria.

Fawaz & Popiashuiyi (2021) investigated the nexus between governance and economic growth in 111 developing countries from the period 1991 to 2018. The study found a positive, significant and asymmetric long-run effect between the rule of law and control of corruption in enhancing per capita income.

In a study to investigate the dynamic linkages between external debt and economic growth in 43 African countries from 2001 to 2018, (Ehikioya et al., 2020) employed Johansen co-integration test, system generalized method of moment (SGMM) to analyse the time series data that were sourced form World Development Indicator's data base as published by the World Bank and the World Economic Outlook. It was found that there exist a long-run, positive and asymmetric effect between external debt and economic growth in Africa during the period under review.

Gaps in the Literature

The study was motivated due to some few observed gaps in the literature. First, several studies have not been able to come to a consensus either to agree or refute the nexus between corruption and public debt in West Africa. This was mainly as a result of differences in data sources, variables used in their analysis, the country of focus and the methodology they have adopted to carry out their analysis which have resulted in mixed results. While some of the studies found positive and significant long-run relationship between the variables of interest (Olugbenro et al., 2026; Okere et al., 2023; Ehikioya et al., 2020), others found negative relationship (Orhewe & Ogbeide-Osaretin, 2025; Aladejana et al., 2022). Secondly, most of the studies examined only one or two variables in West Africa not the three variables together. By combining the effect of corruption and debt on infrastructure growth dynamics in the West African region is a major gap which this study has advanced to add to the existing ongoing debates. Thirdly, this study extended the Aschauer's production function model by incorporating the institutional quality variables; control of corruption (COC) and rule of law (ROL) into the infrastructure model. Fourthly, several of the studies disaggregated both external debt and domestic debt in West Africa. The results obtained from those studies were therefore considered to be too narrow and cannot be generalized to reflect the region's growth dynamics. This study used the aggregate government debts in West Africa to give a robust results on their interactions within the regional context. This is also a major gap which this study has also advanced to close the existing gaps in the literature.

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3. Methodology

The study commenced by expressing the functional relationship of the model to capture the endogenous and the exogenous variables. Thereafter, the estimation procedures and sources of data were specified as explained below:

Model Specification:

The study is motivated by the huge infrastructural development gaps in the West African region despite huge public debt accumulation and the mediating role of corruption control in closing the existing infrastructural deficit gaps in the region. The model is adapted with modifications from the works of (Oyekale et al., 2024; Drama, 2022).

Functionally, the model is expressed as:

$$INFRA = GDEBT + GDP + COC + TROP + INF + ROL \quad \text{..... (3.1)}$$

Equation 3.1 can be transformed into an econometric model as specified below:

$$INFRA_{it} = \theta_i = 0 + \alpha_1 \Delta GDEBT_{it-1} + \alpha_2 \Delta GDP_{it-1} + \alpha_3 \Delta COC_{it-1} + \alpha_4 \Delta TROP + \alpha_5 \Delta INF_{it-1} + \alpha_6 \Delta ROL_{it-1} + \varepsilon_{it}$$

..... (3.2)

Where: INFRA = Infrastructure, GDEBT = Government Debt, GDP = Gross Domestic Product, COC = Control of Corruption, TROP = Trade Openness, INF = Inflation, ROL = Rule of Law, ε_{it} = Stochastic Error Term.

The logarithm transformation for equation 3.2 becomes:

$$lnINFRA_{it} = \theta_{it} = \alpha_0 + \alpha_1 \Delta lnGDEBT_{it-1} + \alpha_2 \Delta lnGDP_{it} + \alpha_3 \Delta lnCOC_{it} + \alpha_4 \Delta lnTROP_{it} + \alpha_5 \Delta lnROL_{it} + \alpha_6 \Delta INF_{it} + \varepsilon_{it}$$

..... (3.3)

Where: ln represents the natural logarithm of the variables and $\alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5, and\ \alpha_6$ are all parameters to be estimated. θ_{it} is the country's specific intercept while Δ is the first difference operator.

Estimation Procedures

Panel Unit Root Test In panel data analysis, it is very important to carry out stationarity test to detect presence of a unit root problem because most cross sectional time series data are not stationary at their level forms but tends to exhibit stochastic trends (Drama, 2022). To resolve this problem, panel unit root test was applied with the application of Augmented Dickey Fuller (ADF) and the Philip Peron (PP) tests. The second generation panel unit root test is specified below:

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$$Y_{it} = \alpha_t + \theta_t + v_{it} \text{ with } \sum_{j=1}^{\rho_i} d_{tj} v_{t-j} + \varepsilon_{it} \quad \text{.....(3.4)}$$

Where ε_{it} is $iid(0, \sigma_{\varepsilon,i}^2)$, the temporal effect θ_1 represented by stationary process.

Panel Fully Modified Ordinary Least Square

Panel fully modified ordinary least square (P-FMOLS) is an econometric technique used to estimate long-run co-integrating relationships in panel data sets, particularly when dealing with non-stationary series that are integrated of order one, I(1). It is designed to eliminate the potential endogeneity of regressors and serial correlation of residuals. Panel FMOLS is a more robust estimation when compared to standard OLS (Drama, 2022).

The base panel FMOLS model with individual - specific fixed effects is generally specified as:

$$Y_{it} - \partial_i^1 + \delta_{it}^1 + \beta_i x_{it} + u_{it} \quad \text{.....} \quad (3.14)$$

- Where y_{it} is the dependent variable for country i at time t.
- x_{it} is a vector of I(I) independent variables $(x_{it} = x_i, t-1 + v_{it})$
- ∂_1 regression individual fixed effects (intercepts)
- δ_{it} represents individual – specific time trends
- v_{it} is the stationary co-integrating residuals.

Basically, there are two methods of estimating the Panel FMOLS. These are:

(a) Pooled (Within-Dimension) FMOLS.

Used to estimate a common long-run co-integrating vector, while allowing for heterogeneous short-run dynamics (Phillips & Hansen, (1990).

$$\hat{\beta}_{GM} FMOLS = \left[\sum_{1=?}^{N}\sum_{T=1}^{I}(x_{it} - \bar{x}_t)\right]^{-1}\left[\sum_{t=?}^{N}\sum_{t=?}^{I}(x_{it} - \bar{x}_t)\right] y_{?it}^{2t} \text{ ..... (3.15)}$$

(b) Group-mean (Between–Dimension) FMOLS used to estimate the mean of individual co- integrating vectors, allowing for heterogeneity in the long-run parameter β_i

$$\hat{\beta}_{GM} \frac{i}{N}\sum_{i=1}^{N}\hat{\beta} FMOLS, i \quad \text{..... (3.16)}$$

Where, $\hat{\beta} FMOLS, i$ is the FMOLS estimator computed for each individual i.

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Sources of Data

Data for the study were sourced from World Development Indicator (WDI), African Development Bank (AFDB), Transparency International (TI) and Ibrahim Index of Africa Governance (IIAG) data bases from the period 2015 to 2024. This period is significant to capture some of the major events that happened in the world which adversely affected major economies globally such as the corona virus pandemic (COVID-19).

Table 3.1: Summary of Expected Variables and Signs

Variables	Description	Source	Expected Sign
GDP	Gross domestic product	WDI, 2023	**(+)**
INFRA	Infrastructure development stock	AFDB,2022	(+)
COC	Control of Corruption	WGI (2024)	(-)
INFL	Measure by annual consumer price index	WDI, 2023	(+)
DEBT TROP	Aggregate public debt stock Trade Openness (Difference between Export and Import)	WDI (2024) IMF, 2023	(+) (+)

Authors' Computation, 2026

4. Results and Discussion

Summary Statistics

Table 4.1 below presents the summary statistics for infrastructure development (INFR), public debt (DEBT), control of corruption (COC), gross domestic product (GDP), trade openness (TROP), inflation (INF), and rule of law (ROL) based on a total of 345 data points. The mean value of infrastructure (INFR) is (0.021), while the median is negative (–0.471) which shows that infrastructure performance varied throughout the entire study period. The standard deviation (1.429) shows that infrastructure outcomes display major differences from each other. The positive skewness (1.999) indicates a right-skewed distribution that demonstrates periods of exceptionally high infrastructure performance happened, but not frequently, yet produced strong results. The kurtosis value (7.152) which exceeds the benchmark value of 3 shows a leptokurtic distribution that has fat tails and extreme observations. The Jarque–Bera statistic shows a statistically significant

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result (p = 0.000) which provides strong evidence against the null hypothesis that states normality.

The public debt (DEBT) shows extreme distribution because its standard deviation reaches 3.89×10^8, while its range moves from 0.254 to 4.35×10^9. The distribution shows strong rightward skewing because the skewness value reaches 7.374 which indicates that the distribution's upper tail contains most of its high-debt episodes. The exceptionally high kurtosis value (64.597) signals severe leptokurtosis which indicates the presence of frequent extreme debt shocks. The Jarque–Bera probability of 0.000 confirms that the debt series is far from normally distributed. Control of corruption (COC) records a negative mean (–0.587) and median (–0.675) which shows that the period under review had weak corruption control. The positive skewness (1.075) shows that corruption control sometimes improves but those improvements do not last. The distribution shows leptokurtic behavior because its kurtosis value (4.309) exceeds the value of three which leads to extreme outliers from the average value. The Jarque-Bera statistic shows significance at the 1% level because its value of p equals 0.000 which leads to rejection of the normality assumption. The average Institutional enforcement level of rule of law (ROL) express weak enforcement, which results in a negative mean value of -0.683.

Table 4.1: Summary Statistics

	INFR	DEBT	COC	GDP	TROP	INF	ROL
Mean	0.020768	72910542	-0.586752	3.79E+10	53.82544	6.421689	-0.683384
Median	-0.471342	6.167862	-0.674529	8.17E+09	52.71536	4.369723	-0.745471
Maximum	5.649657	4.35E+09	1.127157	5.20E+11	143.9805	47.64287	1.044188
Minimum	-1.445179	0.253938	-1.596066	7.05E+08	3.291988	-3.502586	-1.880870
Std. Dev.	1.428863	3.89E+08	0.538268	1.00E+11	25.40489	7.300425	0.569065
Skewness	1.998747	7.374467	1.074936	3.742659	0.443344	2.022065	0.461868
Kurtosis	7.151779	64.59740	4.308768	15.99782	3.801489	8.836224	2.537130
Jarque-Bera	477.4975	57669.21	91.06308	3233.990	20.53616	724.7372	15.34583
Probability	0.000000	0.000000	0.000000	0.000000	0.000035	0.000000	0.000465
Sum	7.164830	2.52E+10	-202.4294	1.31E+13	18569.78	2215.483	-235.7674
Sum Sq. Dev.	702.3278	5.22E+19	99.66793	3.46E+24	222020.6	18333.90	111.3991
Observations	345	345	345	345	345	345	345

Authors' Computation, 2026

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Correlation Analysis

The correlation matrix displayed in Table 4.2 below shows the pairwise correlations among infrastructure development (INFR) and control of corruption (COC) and public debt (DEBT) and gross domestic product (GDP) and trade openness (TROP) and inflation (INF) and rule of law (ROL). The results indicate varying degrees of linear association between the studied variables. The research found a strong positive link between infrastructure development and institutional quality indicators especially with control of corruption which showed a correlation of 0.746 and rule of law which showed a correlation of 0.591. The research shows that better institutional performance leads to better infrastructure performance because governance systems play a key role in infrastructure development.

Control of corruption demonstrates a strong positive link to rule of law at 0.212 which shows how these two institutional measures depend on each other. The correlation between the variables meets theoretical expectations. Public debt shows weak connections to infrastructure development which has a correlation of 0.164 and control of corruption which has a correlation of 0.018 and rule of law which has a correlation of 0.012. The study found that current debt accumulation shows no strong link to infrastructure results or institutional quality during the study period. The connection between public debt and gross domestic product shows weak positive results which indicate that debt levels have little direct effect on economic performance.

Gross domestic product shows weak links to infrastructure development which has a correlation of 0.056 and trade openness which shows a moderate inverse correlation of -0.171. The data shows that GDP has a negative relationship with control of corruption which has a correlation of -0.237 and rule of law which has a correlation of -0.141. This means that countries with higher economic output tend to have poorer institutional performance during this time period. Trade openness shows moderate positive correlations with infrastructure development at a value of r equals 0.374 and control of corruption at 0.430 and rule of law at r equals 0.293. This finding shows that countries which increase their global economic ties experience better infrastructure and governance results. Inflation shows weak negative correlations with infrastructure development at a value of -0.031 and institutional quality indicators at COC -0.158 and ROL -0.149 and trade openness at -0.048. These findings show that macroeconomic instability negatively impacts both governance and infrastructure performance. The relationship between inflation and gross domestic product shows moderate positive correlation at 0.254. This relationship occurs because demand-side pressures increase during times of

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economic growth. The correlation coefficients display values which fall below the standard 0.80 benchmark.

Table 4.2: Correlation Analysis

	INFR	COC	DEBT	GDP	TROP	INF	ROL
INFR	1.000						
COC	0.146	1.000					
DEBT	0.164	0.018	1.000				
GDP	0.056	-0.237	0.036	1.000			
TROP	0.374	0.430	-0.023	-0.171	1.000		
INF	-0.031	-0.158	-0.083	0.254	-0.048	1.000	
ROL	0.291	0.812	-0.012	-0.141	0.293	-0.149	1.000

Authors' Computation, 2026

Panel Unit Root Test

To determine the stationarity status of the variables in the model, the study utilized both the Augmented Dickey Fuller (ADF) and the Philip Peron (PP) unit root tests. From the analysis of the unit root test, both the Augmented Dickey Fuller (ADF) and the Philip Peron (PP) tests were not stationary at their level forms. However, the variables became stationary after taking their first differences. They are therefore integrated of order one I(1) as indicated in Table 4.3 below.

Table 4.3: Panel Unit Root Test Result (Augmented Dickey Fuller and Philip Peron tests)

	Panel ADF Test		**Panel PP Test**		
Variable	**Coeff.**	**Prob.**	**Coeff.**	**Prob.**	**Order**
LINFR	-8.5225***	0.000	-8.675***	0.002	I(1)
LCOC	-6.199***	0.000	-6.830***	0.000	I(1)
LDEBT	-7.182***	0.021	-7.289***	0.021	I(1)
LGDP	-8.303***	0.015	-10.249***	0.024	I(1)
LINF	-6. 831***	0.000	-6.176***	0.022	I(1)
LROL	-11.471***	0.000	-13.509***	0.000	I(1)

Author's Computation, 2026 *** denote 5% significance levels

Panel Fully Modified Ordinary Least Square (FMOLS)

The Panel Fully Modified Ordinary Least Squares (FMOLS) method provides long-run estimations which Table 4.4 displays after correcting for endogeneity and serial correlation in co-integrated panel data. The research establishes permanent links between the independent variables and the dependent variable which

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measures infrastructure development. Public Debt shows a positive and statistically significant impact on infrastructure development with a 1% level of significance. Public debt evidence shows that countries experience a 1% increase in infrastructure development through optimal usage of borrowed funds to finance infrastructure projects across the countries studied. Control of Corruption creates a strong positive link with infrastructure development which shows highly significant statistical results. The results demonstrate that better corruption control measures lead to major improvements in infrastructure results which show how institutional quality helps to achieve proper public resource distribution and handling of public resources.

The coefficient of Trade Openness demonstrates a negative relationship which achieves statistical significance at the 1% confidence threshold. The results establish that higher trade openness reduces infrastructure development during extended periods because the economy depends on imports while domestic manufacturing capacity remains inadequate thus creating fiscal challenges which restrict public infrastructure financing. The 1% level of statistical significance establishes that inflation has a direct positive effect on infrastructure development. The evidence shows that moderate inflation drives government spending and economic growth which leads to infrastructure development. The connection between inflation and investment efficiency demonstrates excessive inflation reduces investment efficiency which makes it necessary to approach this connection with caution. The statistical results demonstrate that Rule of Law establishes a negative relationship which fails to show that rule of law affects infrastructure development across extended time periods within the model. The infrastructure outcomes for this study encounter problems because enforcement mechanisms fail to operate properly while corruption control together with other institutional variables control the situation. The constant term (C) shows a positive value which lacks statistical significance to demonstrate that the intercept captures omitted factors which have no important effect on infrastructure development. The R-squared value of the model shows that it accounts for 55.6% of the changes in infrastructure development which demonstrates that the model possesses strong capacity to explain infrastructure development.

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Table 4.4: Panel Fully Modified Ordinary Least Squares (FMOLS)

Variable	**Coeff.**	Std.Error	T.stat	**Prob.**
DEBT	0.106***	0.021	4.887	0.000
COC	0.546***	0.429	5.925	0.000
LTROP	-0.546***	0.205	-2.663	0.008
INF	0.070***	0.429	5.925	0.000
ROL	-0.232	0.425	-0.547	0.585
C	1.365	0.829	1.644	0.102
R-Squared	0.556			

***** * represents 1% level of significance***

Author's computation, 2026

Trend of Infrastructure, Public Debt, and Corruption Control in West Africa

The trend analysis shows different patterns of infrastructure progress across the West African region. This is clearly shown in Fig. 1 below. Apart from Cote d'Ivoire which consistently maintains an upward trends in its infrastructural growth trajectory, other countries in the region were dragging their feet in terms of quality infrastructure deliveries during the period under review. Public debt was astronomical in the region with majority of the economies acquiring debts that were far above the globally acceptable Debt-to-GDP threshold. Unfortunately, the result of the trends analysis was not able to justify the excessive public debt accumulation with infrastructural development in the region calling for concern over the role of institutions in harnessing national resources for developmental projects. It can be seen as conspicuously displayed by the trend analysis that corruption control index was weak, indicating poor institutional quality. The adverse effect of poor institutional quality has resulted to huge revenue leakages, persistent fiscal deficits, unprecedented rise in public debt accumulation and a persistent deceleration in GDP growth rate resulting in low income, unemployment and poverty across regional economies.

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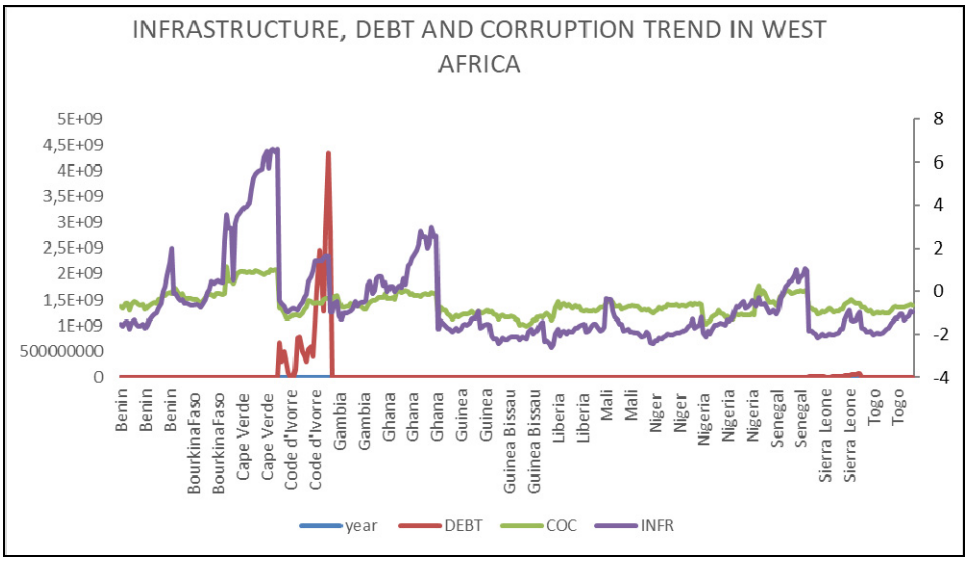


Fig. 1: Trend of Infrastructure, Debt and Corruption Control in West Africa

5. Conclusion

The study examined the long-run relationship between corruption and public debt on infrastructural development in West African economies from the period of 2015 to 2024. The study utilized both the Augmented Dickey Fuller (ADF) and the Philip Peron (PP) tests to confirm stationarity status of the series and the variables were found to be integrated of order one I(1) enabling us to apply the Panel Fully Modified Ordinary Least Square (P-FMOLS) econometric technique to analyse the long-run co-integration of the explanatory variables on the explained variable. From the results**,** the P-FMOLS) estimation results reported in Table 4.6 provide important insights into the long-run determinants of the infrastructure within the specified Panel Fully Modified Ordinary Least Square's framework. Most notably, corruption control (COC) exhibits a negative and statistically significant coefficient, indicating that higher financing costs associated with weak institutional quality constrain the outcome variable. Its statistical significance suggests that institutional inefficiencies exert a persistent long-run drag on economic outcomes. This finding aligns with (Asongu & Odhiambo, 2020) who demonstrated that weak corruption control increases transaction and financing costs, discourages

productive investment, and ultimately suppresses development outcomes in sub-Saharan Africa. The result for GDP, which shows a negative and statistically significant effect, though with a very small effect size, suggests that economic size alone does not translate into proportional improvements in the dependent variable. This outcome supports the argument advanced by (Olaoye & Olomola, 2023; Adewole, 2021 and Azam, 2022) that GDP growth in developing economies may be accompanied by structural inefficiencies, rent-seeking, and weak absorptive capacity, thereby diluting its positive impact. Moderate inflation in developing economies may not significantly disrupt long-run outcomes when financial markets adjust over time, which supports the insignificance observed in this study.

On the relationship between public debt and infrastructural development in West Africa. Public debt exerts a positive and statistically significant effect on infrastructure development, indicating that debt financing has been an important channel for funding infrastructure projects during the period under review. The result supports the developmental debt hypothesis, which posits that borrowing can enhance growth and infrastructure outcomes when funds are directed toward productive public investment. This finding is consistent with (Presbitero, 2021), who show that public debt positively affects infrastructure provision in developing economies when fiscal resources are allocated to capital projects rather than recurrent expenditure.

Based on the outcomes of the empirical analysis, it was therefore recommended that governments in the West African economies should adopt stringent fiscal measures to properly harness all financial resources including borrowed funds for investment on critical infrastructures that could help stimulate GDP growth and consequently employment while limiting revenue leakages through inefficiencies and pervasive corruption which have over the years resulted in persistent fiscal imbalances necessitating in huge public debt accumulation to fund governments' expenditures on infrastructures.

Contribution to Knowledge and Recommendation for Further Studies

The study extended the Aschauer's production function model by incorporating institutional quality variables (COC, ROL) into the infrastructure model. This is a major contribution to knowledge which the study has advanced. Further studies may consider examining sub-sectoral infrastructure effects (energy, transport, water) using non-linear panel ARDL for asymmetric analysis. They may also extend to other African sub-regions for comparative analysis.

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THE MANAGERIAL INVESTMENT DECISION IN THE IMPROVEMENT OF CIVIL SERVANTS IN THE FIELD OF ACCESSING STRUCTURAL FUNDS – THE KEY TO SUCCESS. THEORETICAL AND PRACTICAL ASPECTS

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Abstract:

The implementation process of non-reimbursable European funds and national structural funds is incumbent on the civil servants involved, in addition to the obligation to comply with national legal provisions; the principles underlying the exercise of the public function and the provisions of the European Union regulations in this regard, which will have the purpose of implementing the allocated financial resources through appropriate management, the correct and transparent use of development funds. They are obliged to respect the moral and deontological values of the profession which are highlighted by a behavior appropriate to this profession – satisfying the needs of the citizen and by the efficiency with which the administrative act is completed.

Within the central and local public administration there is a direction, a compartment or a delegated person who deals with attracting and implementing European or structural funds. The result of its activity is

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determined by the financial resources attracted through various operational programs and implemented punctually.

In order to achieve maximum efficiency, the civil servant, in addition to the ability to efficiently organize the administrative activity, must have a high degree of conscientiousness towards the service he provides, doubled by professionalism and continuous professional training, and the employer must ensure him appropriate working conditions, with all legal and salary rights related to rank and position. These will have the direct result of ensuring an optimal standard of living and will allow specific activities to be carried out in good conditions, and his desire and involvement will generate excellent results for the community, for the benefit of the citizens of the city, be it city or village/community.

Attracting European funds from local public authorities is a challenge, because the excessive bureaucracy required to complete the process of approving the funding requests required by the specialized structures in Brussels is arduous and cumbersome. Continuous professional training, courses, debates and individual deepening of the knowledge of each civil servant create an appropriate climate for maximizing the results obtained and contribute to the development of the administrative structure that ultimately benefits from the respective funding.

Keywords: *structural funds, civil servants, continuous professional training*

JEL Classification: H83; J24; M53; R58.

1. Introduction

The capacity of public administration to transform funding opportunities into completed development projects depends on the people, organisational arrangements and managerial decisions that support implementation. Securing financial resources represents only one stage of this process. Public institutions must also identify community needs, prepare viable applications, organise procurement, coordinate implementation and demonstrate that expenditure produces meaningful public benefits. Consequently, investment in the professional development of civil servants deserves consideration as a component of institutional capacity and public investment management.

Recent European policy developments reinforce the importance of administrative modernisation. The European Commission's ComPAct initiative connects public administration reform with skills development and the capacity to manage digital and green transitions (European Commission, 2023). Meanwhile,

the Ninth Cohesion Report recognises the contribution of Cohesion Policy to economic and social convergence while identifying continuing regional challenges and the need to improve policy design and implementation (European Commission, 2024). Together, these developments establish a policy context in which effective funding management requires sustained attention to administrative capabilities.

Professional development is particularly relevant where local administrations depend on small teams undertaking several interconnected responsibilities. Knowledge of funding procedures must be combined with project planning, financial management, procurement expertise, communication and ethical judgement. The OECD's work on public employment emphasises forward-looking workforce management and the development of capabilities appropriate to changing public service demands (OECD, 2021). Its subsequent analysis highlights learning cultures as an important dimension of a flexible public service (OECD, 2023a). These perspectives support treating professional development as an ongoing managerial responsibility rather than an occasional response to individual knowledge gaps.

However, allocating resources to training does not automatically improve institutional performance. For this study, the central managerial issue concerns the relationship between identified competence needs, the content of professional development and opportunities to apply acquired knowledge. Training expenditure should therefore be considered alongside workload distribution, access to appropriate tools, coordination between departments and the retention of experienced staff. This approach is consistent with the OECD's beneficiary-capacity framework, which combines people and organisation, capacity analysis, technical support and communication, and engagement with external actors (OECD, 2025a).

Against this background, the present article examines the managerial rationale for investing in professional development among personnel involved in accessing and implementing development funding. The empirical component focuses on Vâlcele local administration in Covasna County, Romania, drawing on interviews with members of the local project team and representatives of external public institutions. Since the project team includes different categories of personnel, the analysis distinguishes the broader institutional team from civil servants specifically. It also recognises that the project portfolio includes European and national funding sources, which should not be treated as interchangeable financing instruments.

The study addresses three questions: How do participants perceive the professionalism and cooperation of the personnel involved in funding-related

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activities? What importance do they assign to continuous professional development? How do these perceptions inform the managerial justification for allocating resources to training? Its contribution lies in connecting the professional-development decision with the practical demands of local project management. As an exploratory case study, it provides context-specific insights into perceived needs and institutional relationships without claiming a causal estimate of training effectiveness or financial return.

2. Literature Review

Recent institutional literature relevant to this study brings together public workforce development, administrative capacity, investment implementation, integrity and public trust. Although these publications differ in scope, they provide complementary perspectives on why staff development matters and why its effects depend on the organisational environment.

OECD (2021) approaches public employment through the requirements of a future-oriented public service. Its emphasis on workforce capabilities and leadership supports the proposition that institutions should anticipate changing competence requirements. In funding management, this perspective suggests that training priorities should reflect upcoming responsibilities and project demands, rather than being limited to correcting problems after they arise.

OECD (2023a) develops this discussion by examining flexibility and learning within public employment. The relevance of a learning culture extends beyond participation in formal courses: institutions must create conditions in which knowledge can be shared and applied. For the present article, this distinction is important because course attendance represents an input, whereas improved working practices constitute a potential outcome. A professional-development strategy should therefore connect learning opportunities with actual responsibilities and organisational support.

The European Commission's ComPAct initiative places administrative skills within a wider modernisation agenda (European Commission, 2023). Its attention to administrative cooperation and the digital and green transitions broadens the competence requirements facing public institutions. Applied to local funding management, this policy orientation suggests that professional development should encompass adaptability and coordination alongside procedural knowledge. This is an interpretation of the initiative's relevance to the case study, rather than evidence that a particular training programme has improved municipal outcomes.

A more direct connection between capacity and funding implementation appears in OECD (2025a). The report argues that beneficiary capacity-building requires a strategic, proactive and tailored approach extending beyond administrative compliance. Its four-part framework integrates organisational arrangements, assessment of capacity needs, technical support and external engagement. This provides a useful conceptual basis for analysing local administrations: staff competences are important, but they operate within systems of support, communication and institutional cooperation.

The territorial dimension is addressed by European Commission (2024), which considers both the achievements of Cohesion Policy and persistent regional challenges. This perspective supports evaluating funding management in relation to development objectives. For the present study, the implication is that the value of professional development should ultimately be assessed through its contribution to project quality and community benefits, rather than solely through the volume of funding applications submitted.

Romania-specific evidence adds an important contextual dimension. OECD (2024a) identifies the need to strengthen administrative capacity for the design, implementation and monitoring of climate-related investment. Although its focus is broader than municipal staff training, the report reinforces the relevance of implementation capabilities to Romania's investment agenda. It also suggests that human-resource development should be considered together with planning and monitoring arrangements.

Procurement represents another critical dimension of project implementation. OECD (2025c) examines procurement risks in Romania and explains how integrity breaches can increase costs, undermine competition and compromise the quality of purchased goods, services and works. Its analysis covers risks across the procurement cycle. For administrations implementing development projects, this supports including risk awareness, documentation and procurement-related judgement within professional-development priorities.

Integrity literature also cautions against interpreting professionalism exclusively as technical competence. OECD (2023b) evaluates Romania's integrity and anti-corruption framework and recommends translating general policies into practical measures adapted to institutional contexts. While the report concentrates on selected sectors, its broader relevance lies in the need to connect ethical expectations with operational responsibilities. In funding management, the present study therefore treats professionalism as encompassing both competent performance and responsible stewardship of public resources.

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Public trust provides a further perspective on administrative performance. OECD (2024b) examines how perceptions of public governance relate to trust in institutions. This literature supports attention to responsiveness, transparency and reliable institutional conduct. Nevertheless, satisfaction with interactions should be distinguished from objective measures of project performance. Interview responses may reveal perceived strengths and weaknesses, but they should ideally be complemented by evidence concerning implementation timelines, expenditure quality and completed outputs.

Finally, OECD (2025b) situates administrative performance within wider governance challenges, including digital government and the management of public resources. Its relevance to staff development is that competence requirements evolve alongside institutional practices and technologies. For local funding teams, professional development should consequently be reviewed periodically and aligned with changing operational needs.

Taken together, these sources support a framework in which professional development contributes to administrative capacity through improved knowledge, judgement and coordination. They also indicate that training should be embedded in organisational arrangements that enable learning to influence practice. The present study applies this framework to a local administrative setting by examining stakeholder perceptions of professionalism, cooperation and training needs. Its empirical contribution is exploratory: it identifies perceived priorities and provides a basis for subsequent evaluation using measurable project and institutional outcomes.

3. Research motivation and methodology

"If you want success in life, make perseverance your best friend, experience your wise counselor, caution your elder brother, and hope your guardian genius." (Joseph Addison)[1]

The structural funds represent an important opportunity for economic development of all the member states of the European Union, and at the same time we have the obligation that, through the investments we will implement at the level of central and local public authorities, we will have as our main goal the economic development of the communities and creating appropriate living conditions.

[1] https://www.brainyquote.com/quotes/joseph_addison_400057- *Joseph Addison* - English essayist, poet and politician (1672-1719)

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The leaders of the central or local public authorities want, during the time in which they carry out their activity, to exploit the potential of the officials to the maximum. The financing opportunities, all the possibilities of economic and social development and implicitly the creation of a stimulating and competitive business environment, will result in new, well-paid jobs and implicitly an increase in the standard of living.

In order to achieve the above, the authorities must create their own operating mechanism of the compartment specialized in accessing European funds, from the procedure of identifying the funding source, request, application, signing, acquisition, implementation, monitoring and completion of the access procedures both of the structural funds applicable at the national level, and of the European funds. The ability to attract funds differs from one institution to another, due to the number of officials and especially the degree of professionalism and professional training. Here comes the ability of the management of the territorial administrative structure to understand the importance and practical efficiency of creating a body of specialized and efficient civil servants!

98% of the civil servants who directly deal with the implementation of the projects are graduates of higher education who must be very well prepared for the performance of their duties, because the results of the execution of their duties can be observed throughout Romania, from projects from large infrastructure (highways, viaducts, railway modernization) to small infrastructure projects (rehabilitation of cultural homes, human dispensaries, streets, parks, etc.). The implementation of these projects in different segments (education, culture, health, economy, etc.) has the direct effect of increasing the quality of human life. The implementation of the projects has a positive impact on the state, county, local budgets and especially on the private environment.

In this sense, for the desired positive results, the professional training, professionalism and involvement of the official must be at a high level.

The general objective of this research paper is to contribute to clarifying the importance of continuous professional training of civil servants in the process of attracting European, structural and other funds for central and local public authorities, based on funding standards and procedures.

The specific objective of this research paper is:

• Continuous professional training of civil servants responsible for the implementation of projects at the level of local authorities. Case study – Vâlcele town hall, Covasna county.

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Any scientific work is based on specific research of the chosen topic to ensure the achievement of the proposed objectives. The entire research process is based on bibliographic documentation from various sources (specialist books, scientific works, publications, etc.) based on which the author can prepare a complex work, which will concretely and coherently transpose the proposed general and specific objectives.

The work proposed for the research *"The managerial investment decision in the improvement of civil servants in the field of accessing structural funds - the key to success. Theoretical and practical aspects."* it is structured on several levels, namely the conceptual - theoretical part, the conceptual - practical part and practical aspects analyzed through an applied case study.

4.The importance of the chosen theme

"Vocational training is a learning process (training) through which people acquire new theoretical and practical knowledge, as well as skills and techniques to make their work more effective."[2]

The human resources market in Romania has started to experience, in recent years, essential changes. If until 1990 the essential role for recruiting a job was played by the diploma and possibly the "recommendation" of an influential person, today some changes are felt in the procedures and reasoning used, an increasingly important emphasis on professional value, competence and creativity. Although it is stated that people are at the center of the organization, it is found that few owners/managers/leaders of institutions really pay attention to this fact.

In order to have competent and creative staff, organizations must prioritize investments in human resources, investments that materialize in ensuring optimal working conditions, designing a job description that ensures work efficiency, hiring a number of staff that corresponds to strategic objectives of the organization, designing and applying an employee motivation system and continuous training programs.

In the analyzed situation, respectively, the continuous training of the civil servant is characterized by the allocation of adequate financial resources to reach his maximum potential level to satisfy the needs of the citizen in whose interest the public office is exercised and the achievement of the effectiveness of the public

[2] Robert L Mathis, John H. Jackson – Human Resource Management, Twelfth Edition 1994, publishing house South-Western College Pub, pag.39

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service through the gradual increase of public interest results generic. The effectiveness of the civil servant varies according to his personal capacity, memory, personality and thinking.

An organization becomes efficient if it consists of efficient and effective staff. The value of the public sector is not only given by the material or financial means at its disposal, but especially by the value found in its human potential. [3]. We observe here the fact that a mayor must know the capacity of each subordinate employee in terms of the efficiency of the performance of their duties and stimulate the capacity of self-improvement of each individual, in order to become more efficient and at the same time, the institution will become more efficient in meeting the needs of the citizens, and in the event that they find their deficiencies, to order corrective measures by deepening their knowledge.

5. Current data of the proposed objective

The quality of public administration and governance of a country is an essential factor for its economic performance, but also for the well-being of the citizens of that country. Effective public administrations are at the service of citizens and businesses. It is essential that public authorities can adapt to changing circumstances[4].

Training and professional development of civil servants is both a right and an obligation. We are talking here about the right of civil servants to periodically participate in training courses, for improvement to continuously improve their skills and professional training. In this sense, it is provided for in the national legislation, respectively in the Administrative Code. *"Public authorities and institutions have the obligation to ensure the participation of every civil servant in at least one professional training and improvement program once every two years, organized by the National Institute of Administration or other professional training providers, under the conditions of the law."*[5] For all this, the public authorities must allocate sums necessary to fully cover the estimated costs of these programs, and if these courses are held outside the town, the expenses related to transport, accommodation and meals. University studies cannot be financed from the state or local budget.

[3] Sorina Dana Veiss - "Efficiency and effectiveness of the public service", publishing home Recent, Vol.13 no.3(36), page 375
[4] https://reform-support.ec.europa.eu/what-we-do/public-administration-and-governance_ro
[5] Emergency Ordinance 57/2019 – Administrative Code – Statute of civil servants – Rights and duties Art. 458 Paragraph (2)

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"Public authorities and institutions have the obligation to draw up annually the plan for the professional development of civil servants, the estimation and the distinct highlighting of all the sums provided for in art. 458 para. (4)."[6] At the level of Vâlcele commune, by Local Council Decision no. 56 of 2021, the Professional Development Plan for civil servants from the specialized apparatus of the Mayor of Vâlcele commune was approved.

The local public administration represents a distinct part of the public administration in Romania, which represents one third of the employees paid from public funds. It is directly related to the citizen whose general interests it primarily serves, and both the investments and the decisions taken have a direct impact on the quality of life and living conditions.

In the content of this paper, we will focus on the Vâlcele Administrative-Territorial Unit from Covasna County. On September 1, 2024, it had 6,195 inhabitants in its 4 villages (Araci, Vâlcele, Ariușd and Hetea), being the largest rural locality in Covasna County. To solve administrative and local interest problems, the specialized apparatus of the mayor of the commune has a total of 23 employees, dignitaries, civil servants, contractual staff and other types of public personnel. Out of the total of 23 employees, only 4 people have duties in the field of funds and project implementation, namely the mayor, the deputy mayor, the mayor's advisor and an advisor from the office of public procurement and project implementation.

Speaking about these 4 people, we will research these people with duties in the application and implementation of European funds at the local level. Although the bureaucracy in this area is very large, the local public authority is doing remarkably well in terms of how it manages structural funds. Following this research, it was found that there is a close, open and success-oriented collaboration between these people, having primarily the desire to carry out projects in the local public interest of the citizens and to strengthen the purpose for which they exercise their public authority.

6.**The Main question of scientific research**

Since the purpose of this scientific research is the professional training and the place of research, we ask ourselves the question: Is the staff that deals with the implementation of European funds within the Vâlcele commune's Town Hall well professionally trained?

[6] Emergency Ordinance 57/2019 – Administrative Code – Statute of civil servants – Rights and duties Art. 459 Paragraph (1)

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Developing the topic, other questions follow, to which I will try to formulate the answers in the current research: with the first question...For who is this research important? What will be the positive implications following the realization of this research?

7. The scientific and practical consequences of the research

Following this research carried out on this segment of civil servants, in the next period the research can be extended to other similar localities, respectively municipalities, or it can be expanded vertically to the level of cities, municipalities, counties, to the level of sectors and even to the level capital.

New perspectives can be addressed, such as the identification of common problems faced by civil servants in this sector, proposals to improve the legal spectrum that applies in this field, the introduction of new courses, workshops and implicitly the modification of work procedures, with mandatory provision of feed-backs to ensure the necessary efficiency from a practical point of view, both for the organization, but especially for the beneficiaries from outside the community.

The scientific research used in this project is **applied research - empirical**, original, with the main purpose of accumulating new information; research that is oriented towards the specific practical objective.

To carry out this research, I decided to use the Interview as a research technique. Through this method, I wanted to make direct contact with people from other institutions who have direct contact with these officials, to be able to see the reaction, the way of response, etc.

I wanted the target group to be a complex group, which could provide an overview of the scientific research carried out and result in conclusive information on the civil servants in the municipality of Vâlcele responsible for the implementation of European funds. Thus, I interviewed the 4 (four) persons targeted by the scientific research, I randomly chose 16 (sixteen) civil servants from advisory institutions such as (Agency for Environmental Protection - Covasna, Covasna Forest Guard, Covasna County Council, Heritage Directorate and Culture Covasna, Agricultural Directorate Covasna, Agency for Financing Rural Investments – Covasna, Romanian Waters – Covasna Branch, National Land Improvement Agency – Covasna) who were kind enough to answer my questions under the protection of anonymity.

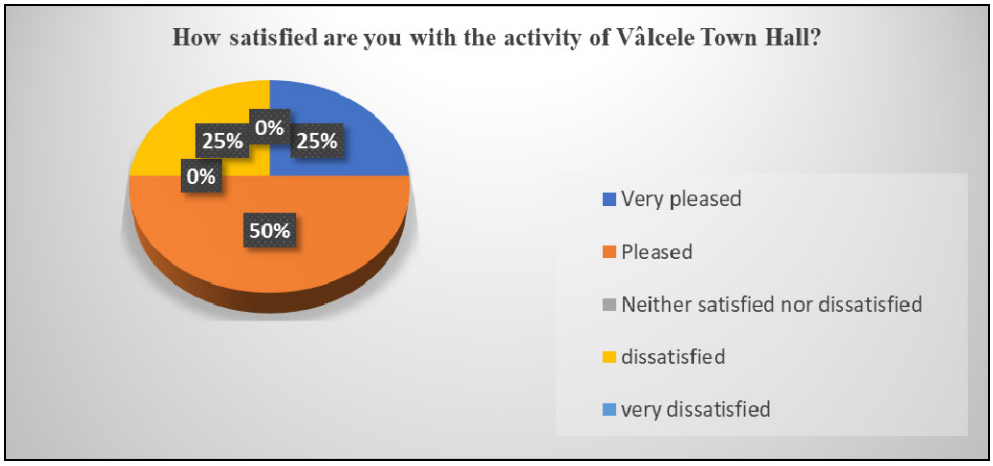
The random interview took place both at the institution's headquarters in Araci Village, Vâlcele commune, no. 464, Covasna County, as well as at the headquarters of the institutions during the period 02.09.2024 – 06.09.2024.

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8. The questions used

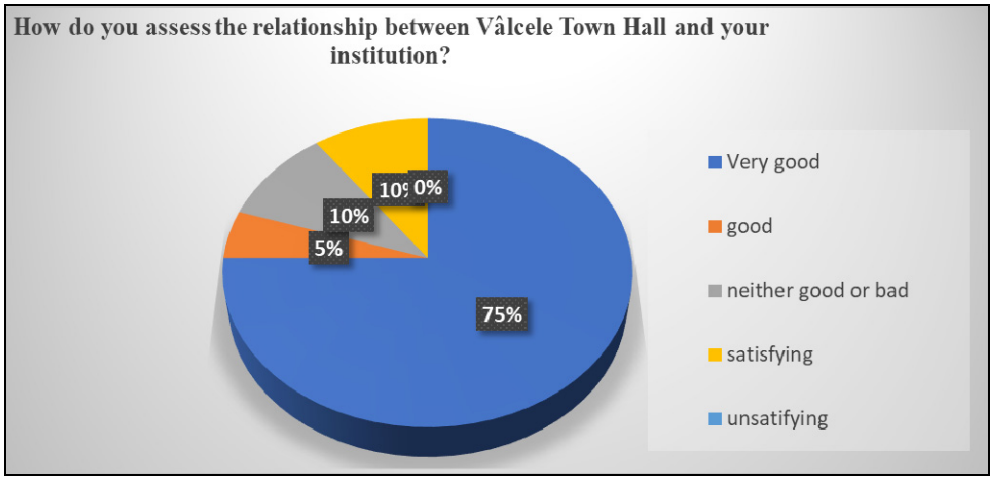
1. How satisfied are you with the activity of Vâlcele Town Hall?
2. How do you assess the relationship between Vâlcele Town Hall and your institution?
3. How do you assess the way in which projects are submitted to obtain funding from different sources?
4. Appreciate the way the City Hall responded to your requests for clarification?
5. Does the municipality of Vâlcele effectively monitor and implement the ongoing projects?
6. Are civil servants responsible for structural funds professionals?
7. Is there a need for continous professional training within the European funds department?
8. Annually, the management of the Vâlcele municipality allocates considerable amounts (50,000 Ron) for the training of civil servants in the field of European funds, although there are many areas where these sums can be invested. Is it the right decision?



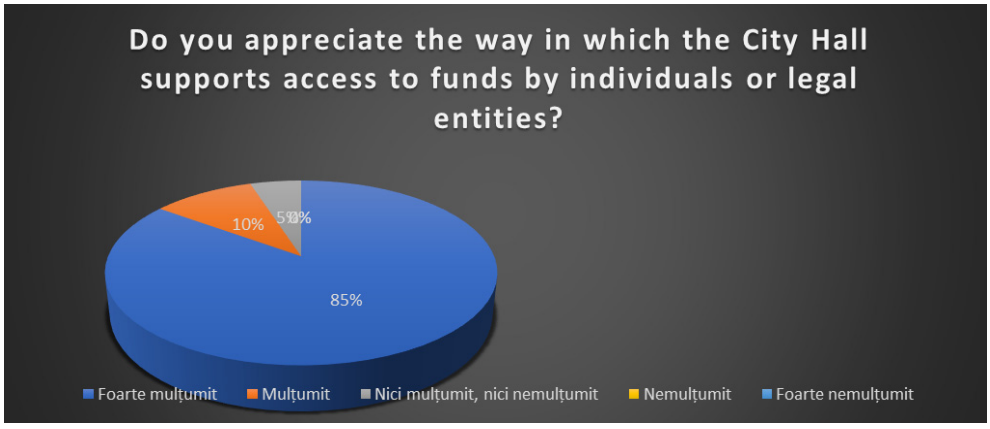
Regarding this question, half of the people interviewed declared themselves satisfied with the institution's activity, a quarter even very satisfied, and a quarter declared themselves dissatisfied.

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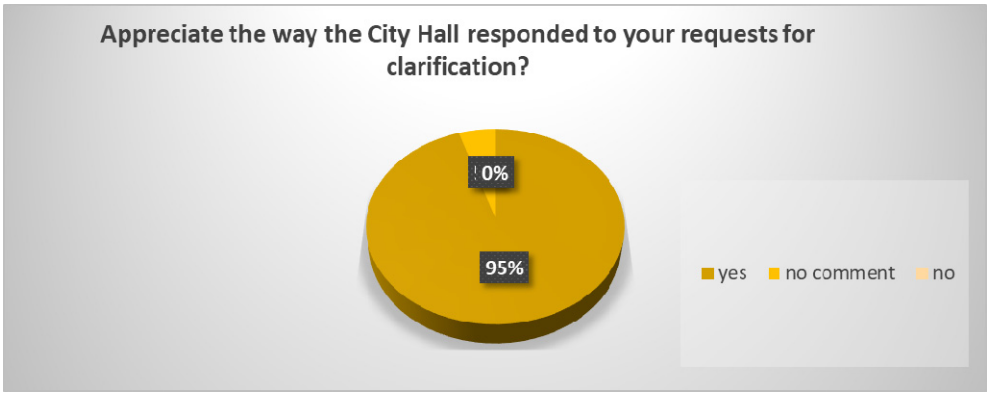
Question number 2 was aimed at ascertaining the relationship between the civil servants of the Vâlcele town hall - the European funds department and the advisory institutions, most of the answers were conclusive, and the satisfaction with the officials with whom they interacted is visible.

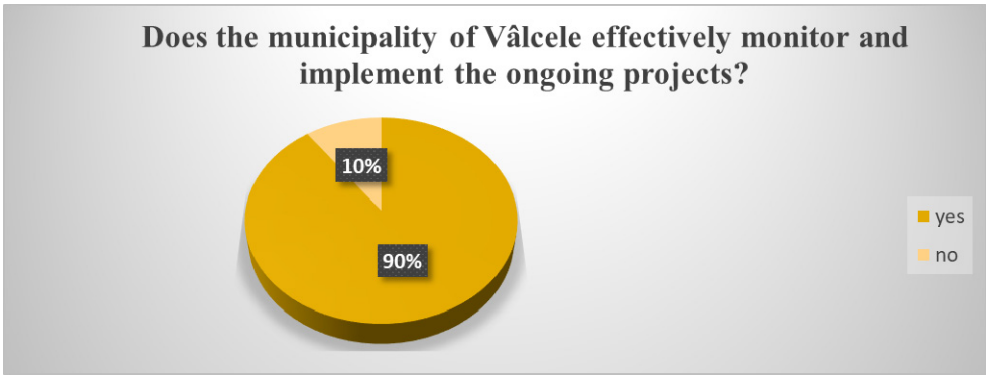


Regarding this question, the method of submitting the projects is very satisfactory from the point of view of half of the people interviewed. The relationship between the institutions is appropriate.

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We conclude from this question that the Town Hall of Vâlcele municipality, through the designated officials, responded to the requests of the advisory institutions on time and according to the clarifications.

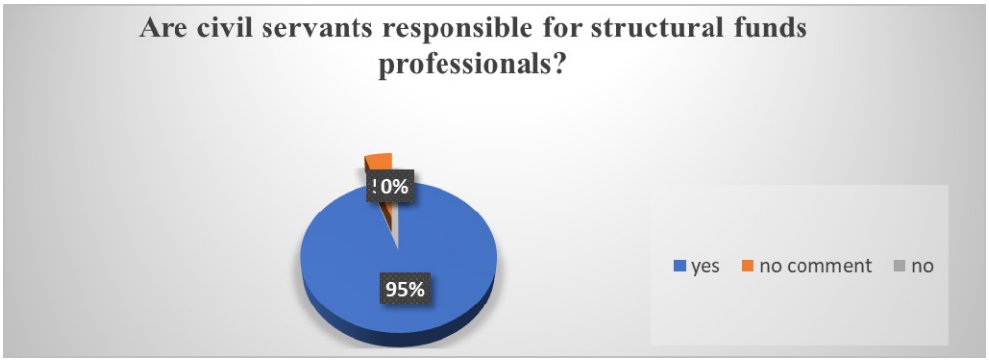




From these answers it is obvious that the Vâlcele commune's Town Hall properly executes its duties related to the projects, and in conclusion the specialized officials are well trained.

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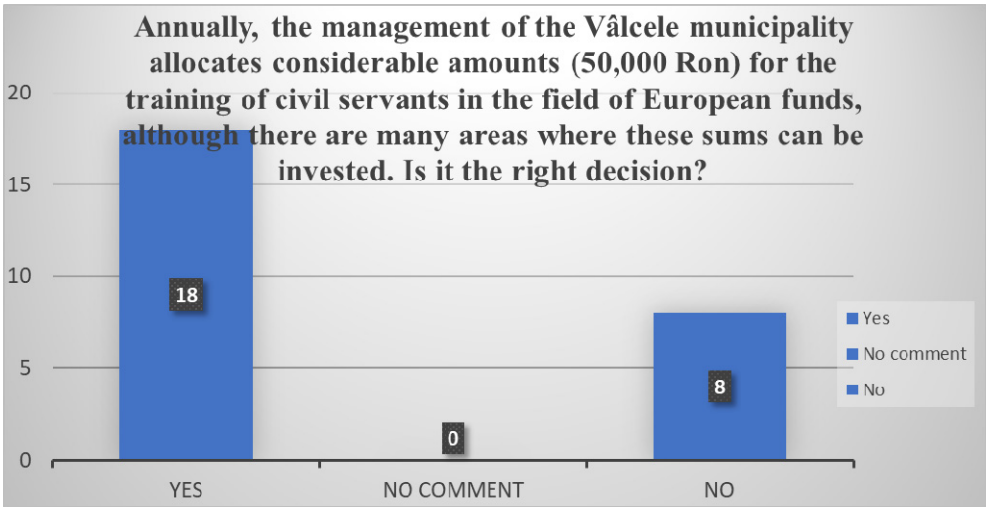
Although at the level of Vâlcele commune there are many ongoing projects, still in the eyes of the advisory institutions, the local public administration through the designated civil servants creates a state of responsibility based on professionalism.



Since civil servants responsible for the implementation of structural funds participate in continuous training programs in this field, all the interviewed people considered continuous professional training impetuously necessary.

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Following the analysis carried out, it is found with a majority that the management's decision to invest substantial amounts in continuous training is a correct one.

9.Projects - structural funds in Vâlcele commune

- ✓ Rehabilitation and modernization of cultural homes in the villages of Araci, Vâlcele and Ariușd, Vâlcele commune, Covasna County – 840,727.47 Euros
- ✓ The Cadastre and Tabulation Program through the Covasna Real Estate Cadastre and Publicity Office – 34042.55 Euros
- ✓ Kindergarten construction in Hetea Village, Vâlcele commune, Covasna County – 313,689.99 Euros
- ✓ Rehabilitation and modernization of internal streets in Araci Village, Vâlcele commune, Covasna County – 1065755.67 Euro
- ✓ Rehabilitation and modernization of ditches, pavements, gutters and sidewalks along DJ 103 in Araci Village, Vâlcele commune, Covasna County - 572540, 45 Euros
- ✓ Construction of a water and wastewater network in the village of Araci, Vâlcele commune, Covasna County – 3321923.78 Euros
- ✓ Rehabilitation and modernization of the human dispensary in the village of Araci, Vâlcele commune, Covasna county – 240,821.67 Euros

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- ✓ Establishment of human dispensary and dental office in Vâlcele Village, Vâlcele commune, Covasna county – 590245, 26 Euros
- ✓ Construction of a multifunctional sports field in Vâlcele Village, Vâlcele commune, Covasna County – 82,237.07 Euros
- ✓ Rehabilitation and modernization of ditches, pavements, gutters and sidewalks along DN 13E in Araci Village, Vâlcele commune, Covasna County - 1,191,131.91 Euros
- ✓ Rehabilitation and modernization of the inner street related to the tourist area in Vâlcele village, Vâlcele commune, Covasna County - 464,439.19 Euros
- ✓ Modernization of the bridge over the Olt River on DC33A Ariușd village, Vâlcele commune, Covasna county – 2348361.20 Euro
- ✓ Extension of water and wastewater in the village of Araci, Vâlcele commune, Covasna county – 3400000 Euro

The total investments currently underway in the Vâlcele Territorial Administrative Area amount to approximately 15 million Euros. In addition to this, 3 more projects with a total value of approximately 6 million Euros are submitted for approval. All these projects were submitted through a lot of work, perseverance and above all through ambition, even if the implementation and access procedures are difficult and the bureaucracy is high**.**

10. **Conclusions**

The research project addressed a topic of great topicality and at the same time very interesting for the local public administration in Romania, namely European funds and especially the civil servants who deal with attracting and implementing them.

The general objective was to show the importance of respecting ethical values by the civil servants who manage the structural funds, and as a specific objective it was to verify the way in which the officials from the Town Hall of Vâlcele commune, Covasna County respect these values.

The general objective of this research work was to show the importance of investment in subordinate human resources, especially for civil servants who manage structural funds, and as a specific objective the continuous professional training of civil servants responsible for the implementation of projects at the level of the authorities local case study – Vâlcele town hall, Covasna county.

The questionnaire was addressed both to the officials directly involved and to the civil servants from other institutions directly involved with them and aimed to answer the question Are the staff dealing with the implementation of European funds within the Vâlcele commune Town Hall well professionally trained?

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The logic of this research in the plan of the evaluation is to determine to what extent the civil servants involved in the management of European funds are well trained.

Following the interviews conducted, it was concluded that the people are well prepared in this regard. Although both legislative procedures are constantly changing, continuous preparation helps the specialized apparatus to brilliantly manage the implementation of projects.

In conclusion, considering the implementation procedures, government policy and the fact that this subject represents an economic hub, European funds represent a research topic of great importance both nationally and internationally, from the perspective of the practical role it has in the development of local communities but also of the country.

Thus, I consider that the approach of this topic by professional researchers has a positive impact: on the one hand, the creation of a correct perception of these officials by civil society, and on the other hand, the institutions / management authorities that manage these structural funds.

The purpose of the development of towns with a smaller population is to provide the inhabitants with an environment developed at the evolved level of cities, to ensure the growth and education of young people in their native towns, and then to keep them in attractive jobs, which allow them to stay close to their families, and even establish their own family in the same hometown developed at the European level, with decent living conditions, corresponding to the aspirations of the younger generation.

Considering the objective of this stage and taking into account the above data, we consider that our goal has been achieved and the local public authority has carried out all the steps to have people who are ready, with work force and willing to achieve objectives necessary for the community, at the level of European standards, to generate added value for residents.

The importance of the managerial decision to ensure the continuous improvement of civil servants involved in the process of accessing European and structural funds, both in our case, the Town Hall of Vâlcele commune, and in the case of other institutions, from the perspective of efficiency and optimization of the work done, represents an aspect very important, since this ensures a finality in the service and interest of the citizen, for the development of the entire community.

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DOES GLOBALISATION SPUR CARBON EMISSIONS? NEW EVIDENCE FROM AN EMERGING ECONOMY

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Abstract

This study aims to examine the relationship between globalisation and CO2 emissions in South Africa from 1983 to 2022. The study aims to examine whether globalisation has a positive or negative effect on CO2 emissions and whether the relationship is linear or non-linear. Specifically, the study aims to examine whether the relationship between globalisation and CO2 emissions follows a U-shaped or inverted-U-shaped curve. Using a quadratic equation within an ARDL framework, the study found that, while globalisation has no impact on CO2 emissions in South Africa in the long run, in the short run, the relationship between globalisation and CO2 emissions is non-linear and follows an inverted U-shaped curve. This implies that although globalisation may increase environmental degradation at initial stages, once a certain threshold is reached, it may reduce it by enabling the spread of cleaner technologies through foreign direct investment (FDI), multinational corporations, and international trade. The study also found that for South Africa to benefit from the CO2-reducing effect of globalisation, the country's level of economic globalisation must exceed 42.44, which is the turning point identified in this study.

Keywords: *globalisation, quadratic equation, South Africa, carbon emission*

JEL Classification: Q53, F64, Q56, C22

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Introduction

The call for the reduction of carbon emissions and climate change, led by the United Nations and shared by developed and developing countries alike, has transformed the traditional belief that economic growth alone is sufficient to increase living standards and general social welfare. The Paris Agreement, which brings both developed and developing countries together in order to reduce greenhouse gas emissions, has been a major driver of climate change (Williams, 2025). The countries that signed the agreement are expected to reduce greenhouse gas emissions and make a nationally determined contribution, a commitment by their respective countries to reduce carbon emissions (Williams, 2025). The Sustainable Development Goals (SDGs) – Goal 12- responsible consumption and production, and Goal 13- Climate Action encapsulate the ethos of the Paris Agreement on environmentally friendly actions (United Nations, 2026a). This has been recently accompanied by globalisation, which has gained traction as a driver of economic growth, technology and cultural diffusion, increased financial flows, and freer labour mobility (Samuelson et al., 2022).

The World Trade Organization advocates accelerated globalisation, characterised by the removal of trade barriers so that participants can derive greater benefit from trade. South Africa, like any other country, joined the cause to fight climate change by signing the Paris Agreement and to advance economic development by embracing global integration through the liberalisation of the trade and financial sectors. Thus, South Africa is expected to meet the targets set under the SDGs and the Paris Agreement. Given South Africa's emphasis on reducing carbon emissions and advancing economic growth through globalisation, the main objective of this study is to re-examine the impact of globalisation on carbon emissions.

Several studies have attempted to establish the relationship between carbon emissions and globalisation; however, the results are inconclusive. This makes generalisation of the results inappropriate across countries. Some studies found globalisation to reduce carbon emission (see, Raihan, 2023; Gyimah and Yao, 2022; Shahbaz et al.,2018), and another strand of literature found globalisation to worsen carbon emission (for example, Matenda et al., 2024; Rahman, 2024; Sultana et al., 2023; Lenz and Fajdetic, 2022; Adebayo and Kirikkaleli, 2021). The inconclusive results have less relevance for policy direction in South Africa. South Africa is among the high-polluting countries (Clean Air Fund, 2026; Parliamentary Monitoring Group, 2024), and policies that reduce carbon emissions and boost

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economic development are no longer optional but urgently needed if South Africa is going to meet the Paris Agreement and SDGs targets.

This study examined the impact of globalisation on carbon emissions using a quadratic equation approach. The approach provides a non-linear approach to the relationship between carbon emissions and globalisation. The extant literature on globalisation and carbon emissions has used linear approaches that assume that the impact of globalisation on carbon emissions is constant and proportional. The quadratic approach provides more informative results that can guide policy in South Africa. South Africa has been selected as a country of study because of two factors. Firstly, the country is a signatory to the Paris Agreement and the globalisation spearheaded by the WTO. A study that provides guidance on the delicate balance between globalisation and the reduction of carbon emissions is therefore pertinent for the country. Secondly, South Africa is arguably among the most industrialised countries in Africa. It is also an upper-middle-income country hence, the policies derived from this study may also benefit some other African countries.

The rest of the study is structured as follows: Section 2 presents the literature review; Section 3 outlines estimation techniques; and Section 4 presents the results and discussion. Section 5 concluded the study.

Literature review

2.1 Globalisation and carbon emission dynamics in South Africa

South Africa is among the world's most polluting economies (Parliamentary Monitoring Group, 2024). The high reliance on electricity generated from coal contributes a large percentage to greenhouse gas emissions. The energy sector in South Africa is heavily reliant on coal, which accounts for over 80% in 2024 (Statistics South Africa'statssa', 2026). South Africa is a signatory to the Paris Agreement, which aims to minimise climate change. Further, South Africa has also signed the Sustainable Development Goals (SDGs), where the country is expected to meet the 17 SDGs by 2030. Among the SDGs Goal 7 – affordable and clean energy; 12- responsible consumption and production; 11- sustainable cities and communities; and 13- climate action (United Nations, 2026a), are some of the relevant goals to the study.

The Paris Agreement and the SDGs provide an international obligation that South Africa is expected to meet. To minimise carbon emissions and ultimately transition to clean energy, South Africa passed the Carbon Tax in 2019. The tax is aimed at taxing carbon emissions under the polluter-pays principle. The tax would indirectly provide incentives to heavy polluters to adopt processes that reduce

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emissions. The Just Energy Transition Partnership (JETP), a funding mechanism in which international partners finance the transition to clean energy and the reduction of coal-fired electricity generation, provides the funds required for South Africa to transition to cleaner energy sources.

The Just Energy Transition Policy Management Unit was established by the Presidency in 2023 to implement the Just Energy Transition Plan (JET IP) (Just Energy Transition, 2026). The Unit has a mandate to mobilise and guide finance towards addressing the JET IP (Just Energy Transition, 2026). The COP26 in Glasgow pledged USD8.5 billion in finance from France, Germany, the United Kingdom, the United States, and the European Union (International Institute for Sustainable Development 'IISD', 2022). This is a great leap towards the funding required to expand renewable energy and gradually wean the economy from electricity generated from coal. The JETP framework also aims to support affected workers and communities during the transition away from coal as the main source of electricity generation (Just Energy Transition, 2026). Apart from the carbon tax and the JETP, South Africa has made a commitment to reduce carbon emissions by submitting the Nationally Determined Contribution (NDC). The country made a commitment to reduce carbon emissions to 350 - 420 MtCO2E and achieve net-zero emissions by 2050 (Just Energy Transition, 2026). This is a huge commitment given that the country relies on coal for electricity generation. Moreover, the power generation sector would be exposed to a transformation that would entail the shedding of jobs and the creation of jobs in cleaner energy. Given that South Africa has high unemployment and income inequality levels, the transition is not only about reducing carbon emissions but a social and economic transformation that comes with huge costs.

On globalisation, liberalisation of the financial sector and the trade sector picked up momentum in the 1990s. This was characterised by the adoption of market -based policies on the financial market and the tradables. Financial liberalisation includes the opening of the financial sector to competition and the free flow of capital (South African Reserve Bank's SARB, 2025). The removal of restrictions on capital flows and regulatory controls enabled the free flow of capital. During apartheid, South Africa was under sanctions, which restricted the movement of capital and goods (United Nations, 2026b). The liberalisation of the financial sector opened South Africa to the global economy. On the trade front, South Africa has drafted a trade policy that reflects a balance between supporting economic development and advancing industrialisation. The trade policy supports industrial development through strengthening manufacturing and local industries

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(Department of Trade, Industry and Competition, thedtic, 2021). This allows the country to build capacity to produce more value-added products that can fetch more foreign currency on the international market. The trade policy also supports job creation, inclusive growth, and regional integration (thedtic, 2021). South Africa joined other countries in the African Free Trade Area (AfCFTA) as a move to realise this goal. Although South Africa embraces liberalisation of trade policies and regulations, the country still uses tariffs and anti-dumping duties to protect local industries (thedtic, 2021).

In a bid to integrate into the global economy, South Africa is a member of the World Trade Organization (WTO), which was created in 1995 as a successor to the General Agreement on Tariffs and Trade (GATT). The WTO sets rules governing the buying and selling of goods and services in international markets. The rules are aimed at ensuring a smooth flow of goods and services. The WTO advocates for free trade and encourages all members to gradually remove trade restrictions and provides a dispute resolution platform (WTO, 2026). South Africa has entered into several trade agreements such as the free trade agreement with European Union; Southern African Customs Union (SACU); Southern African Development Community (SADC) free trade agreement; India-Brazil-South Africa (IBSA) initiative; African Growth and Opportunity Act (AGOA); Generalised System of Preferences with countries like EU, Canada, Japan, Russia, Norway and Switzerland; and bilateral agreements with countries like Zimbabwe, India and Mozambique (Department of Trade, Industry and Competition 'thedtic', 2026). These agreements ensure South Africa's access to a broad market at favourable trade terms.

Apart from trade and financial liberalisation, South Africa has benefited from foreign direct investment, technology diffusion, and labour movement across nations due to globalisation. Globalisation has brought advantages in information sharing without delays, which has facilitated decision-making and communication across time and space. However, although the benefits of globalisation have been well documented, some scholars have found globalisation to increase economic dependency, increase susceptibility to political and economic manipulation of countries, stiff competition that has resulted in the elimination of domestic industries, worsening dependency on external manufacturers, and inequality (Samuelson et al., 2022). In South Africa, the export basket remains dominated by commodity products and dependence on large and mature markets (SARB, 2021).

2.2 Empirical literature

The Environmental Kuznets Curve (EKC) posits that pollution is usually high in the early stages of economic development. This is largely driven by rapid

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industrialisation, with sectors such as mining and manufacturing contributing a large share of pollution. At that stage, environmental policies are also weak, perpetuating high levels of pollution. According to the theory, pollution peaks and then starts decreasing when the government enforces environmental policies, citizen awareness of the negative impact of pollution increases, and there is wide adoption of cleaner technologies and renewable energy. Looking at the current steps in the enforcement of policies that reduce pollution and the adoption of cleaner energy in South Africa, it may be that South Africa is in the declining phase of the Environmental Kuznets Curve, characterised by strong enforcement of environmental policies and citizen awareness of the consequences of pollution.

According to globalisation theory, globalisation has several advantages for countries that open their economies. These include, among others, the diffusion of technology, the sharing of good management and marketing skills, and support for backward and forward integration among firms linked to export-oriented companies. These benefits drive economic growth compared with a scenario without integration. Globalisation drives output and increases living standards. However, according to the EKC curve, an increase in production tends to increase emissions of greenhouse gases. The extent to which an increase in production contributes to pollution depends on the level of economic development and the depth of environmentally friendly policies implemented. If a country has strong environmental policies and a widespread adoption of renewable energy sources, the impact of globalisation on carbon emissions will be lower than in a country that expands production with weak environmental policies and relies on fossil fuels to generate energy. Studies that have examined the impact of globalisation on carbon emissions are reviewed in this section. The studies are categorised into those that found globalisation reduced pollution, followed by those that found a positive impact of globalisation on carbon emissions.

Matenda et al. (2024) examined the impact of globalisation on carbon emission for South Africa using data from 1990 to 2020. The study found that globalisation increases carbon emissions. Rahman (2024) investigated the impact of globalisation on carbon emissions in Lithuania using data from 1988 to 2018 and a non-linear ARDL model. The study found that positive shocks to financial globalisation worsen carbon emissions. In the same vein, Sultana et al. (2023) found results consistent with that of Matenda et al. (2024) in a study of N-11 countries using data from 1990 to 2019.

Lenz and Fajdetic (2022) examined the impact of globalisation on the climate for 26 European Union countries using data from 2000 to 2019 and dynamic panel

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analysis. The study found trade globalisation to be detrimental to the climate, and financial globalisation was found to have a weak impact and only increases emissions in below-average countries. Adebayo and Kirikkaleli (2021) studied the impact of globalisation on carbon emissions in Japan using wavelet-based statistical tools and data from 1990Q1 to 2015Q4. The study found globalisation to increase carbon emissions. Muhammad and Khan (2021) studied the impact of globalisation on carbon emission using data from 1991 to 2018 for 155 developing and 31 developed countries. Using the generalised method of moments (GMM), the study found that social globalisation reduces carbon emissions in developed and developing countries and economic globalisation increases carbon emissions. Destek (2020), in a study on Central and Eastern European countries (CEECs) using data from 1995 to 2015 and second-generation panel data methodology, found that economic globalisation, social globalisation, and overall globalisation increase carbon emissions, and political globalisation reduces environmental pollution. Khan et al. (2019) examined the impact of globalisation on carbon emission for Pakistan using data from 1971 to 2016 and found social, political and economic globalisation to have a positive impact on carbon emissions. Khan and Ullah (2019) in a study on Pakistan using data from 1975-2014 and employing ARDL, found 1% increase in economic globalisation, social globalisation, and political globalisation to increase carbon emission by 038, 0.11, and 0.19, respectively.

Apart from studies that found a positive impact of globalisation on carbon emission, there is a strand of literature that found negative or mixed results depending on the study period and the globalisation measure used. Raihan (2023) found that globalisation reduced carbon emissions in a study of Colombia using data from 1990 to 2020 and dynamic ordinary least squares (DOLS). Ivanovski and Hailemariam (2022) in a study on carbon emission and globalisation for 21 OECD countries using data from 1970 to 2014 found globalisation to increase carbon emission until 2000 before the impact turned negative thereafter. In the same spirit, Ansari et al. (2022) found that globalisation decreased carbon emissions in a study of the top 10 carbon emitters in developing countries, using data from 1980 to 2018. The same results were found by Gyimah and Yao (2022) in a study on Ghana using GMM. Shahbaz et al. (2018), using autoregressive distributed lag (ARDL), annual data from 1970 to 2014 for Japan, found threshold-based positive and negative shocks from globalisation to increase carbon emission, with the negative shock having a great impact.

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The studies reviewed are tilted toward a positive impact of globalisation on carbon emission (for example, Matenda et al., 2024; Rahman, 2024; Sultana et al., 2023; Lenz and Fajdetic, 2022). However, a few studies like Raihan (2023), Gyimah and Yao (2022), and Shahbaz et al. (2018) found that globalisation reduces carbon emissions. The variation in the results makes generalisation of the results inappropriate. This study, therefore, re-examines the nature of the relationship for South Africa. Given that South Africa is classified as a high-polluting nation that has also taken steps to reduce carbon emissions and is simultaneously embracing globalisation.

Methodology

The baseline model used in this study to analyse the effect of trade openness on carbon emissions can be expressed as follows:

CO_2 = f (EGI, FDI, ENERGY, GFCF, IND, YPC)

Where:

CO_2 = Carbon emissions

EGI=Economic globalisation index

FDI = Foreign direct investment inflows.

ENERGY = Energy use per capita

GFCF= Gross fixed capital formation

IND = Industrialisation

YPC = Economic growth

The impact of globalisation on carbon emissions using a quadratic model can be expressed as follows:

$$CO2_t = \sigma_0 + \sigma_1 EGI_t + \sigma_2 EGI_t^2 + \sigma_3 ENERGY_t + \sigma_4 FDI_t + \sigma_4 GFCF_t + \sigma_5 IND_t + \sigma_5 YPC_t + \mu_t \quad (7)$$

EGI^2 represents the square of economic globalisation.

The ARDL specification of the above equation can be expressed as:

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$$\Delta CO2_t = \alpha_0 + \sum_{i=1}^{n} \alpha_{1i} \Delta CO2_{t-i} + \sum_{i=0}^{n} \alpha_{2i} \Delta EGI_{t-i} + \sum_{i=0}^{n} \alpha_{3i} \Delta EGI^2_{t-i} + \sum_{i=0}^{n} \alpha_{4i} \Delta ENERGY_{t-i} + \sum_{i=0}^{n} \alpha_{5i} \Delta FDI_{t-i} + \sum_{i=0}^{n} \alpha_{6i} \Delta GFCF_{t-i} \sum_{i=0}^{n} \alpha_{7i} \Delta IND_{t-i} + \sum_{i=0}^{n} \alpha_{8i} \Delta YPC_{t-i} + \beta_1 EGI_{t-1} + \beta_2 EGI^2_{t-1} + \beta_3 ENERGY_{t-1} + \beta_4 FDI_{t-1} + \beta_5 GFCF_{t-1} + \beta_6 IND_{t-1} + \beta_7 YPC_{t-1} + \mu_{1t}$$

(2)

The ECM-based representation of equation 2 can be expressed as follows:

$$\Delta CO2_t = \alpha_0 + \sum_{i=1}^{n} \alpha_{1i} \Delta CO2_{t-i} + \sum_{i=0}^{n} \alpha_{2i} \Delta EGI_{t-i} + \sum_{i=0}^{n} \alpha_{3i} \Delta EGI^2_{t-i} + \sum_{i=0}^{n} \alpha_{4i} \Delta ENERGY_{t-i} + \sum_{i=0}^{n} \alpha_{5i} \Delta FDI_{t-i} + \sum_{i=0}^{n} \alpha_{6i} \Delta GFCF_{t-i} \sum_{i=0}^{n} \alpha_{7i} \Delta IND_{t-i} + \sum_{i=0}^{n} \alpha_{8i} \Delta YPC_{t-i} + \lambda_1 ECM$$

(3)

Where: ECM_{t-1} is the lagged error correction term.
Table 1 provides a summary of the definitions of the variables included in the model, as well as the corresponding data sources.

Table 1: Variables and Data Sources

Variable Name	Measurement	Data Source
CO2	Carbon emissions per capita	WDI
EGI	Economic Globalisation Index	KOF Swiss Economic Institute
ENERGY	Energy Consumption	WDI
FDI	FDI Inflows	WDI
GFCF	Gross Fixed Capital Formation	WDI
IND	Industrialisation	WDI
YPC	Economic Growth (GDP per capita growth)	WDI

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Empirical Results

4.1 Unit Root Test

The study used the Phillips-Perron (PP) and Augmented Dickey-Fuller (ADF) tests for unit roots. The results of the unit root test are reported in Table 2.

Table 2: Stationarity Test Results

	Augmented Dickey Fuller (ADF)		Phillips-Perron (PP)	
Variable	Level	Δ	Level	Δ
CO_2	-0.989978	-5.611201***	-0.734643	-5.632079***
EGI	-1.033972	-4.152075***	-0.836701	-4.051937***
ENERGY	-1.701157	-6.206745***	-0.443502	-6.206745***
FDI	-5.186107***	-	-5.171493***	-
GFCF	-2.100668	-4.307644***	-2.104335	-4.259028***
IND	-0.928609	-6.945132***	-0.743150	-7.127959***
YPC	-1.887699	-4.671271***	-1.912982	-4.766455***

Notes: *, ** and *** denote statistical significance at 10%, 5% and 1% levels, respectively. Δ denotes first difference.

The stationarity results reported in Table 2 confirmed that the variables included in the model are stationary in levels of first difference. This means the estimation can be done using the ARDL approach.

4.2 Cointegration Test

The results of the cointegration test among the variables included in the model are reported in Table 3.

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Table 3: Bound Test

Dependent variable	**F-Statistic**				**Cointegration**	
CO2	7.122304***				Cointegrated	
Asymptotic critical values						
	10%		5%		1%	
	I (0)	I (1)	I (0)	I (1)	I (0)	I (1)
	1.700	2.830	1.970	3.180	2.540	3.910

Notes: *** denotes statistical significance at the 1% levels.

The bounds test results confirmed the presence of a long-term relationship among the variables included in the model. The F-statistic (7.122304) is compared to the critical values, also reported in Table 3. The calculated F-statistic is greater than the upper bound at 1% level of significance, confirming the existence of a long-run relationship. The next step is the estimation of the long-run and the short-run coefficients. The long-run and short-run results are presented in Table 4.

Table 4: Short-run and Long-run results

Dependent: Carbon emission		
Panel A: Long-Run Results		
Regressor	**Coefficient**	**T-ratio [p-value]**
EGI (-1)	-0.124160	-1.427389 [0.1629]
EGI^2(-1)	0.001476	1.528500 [0.1359]
ENERGY	0.001392***	2.928680 [0.0061]
FDI (-1)	-0.107679**	-2.273178 [0.0297]
GFCF (-1)	-0.111486**	-1.789303 [0.0367]
IND	0.139292***	3.171448 [0.0033]
YPC (-1)	0.000975***	3.629534 [0.0009]
Panel B: Short-Run Results		
Regressor	**Coefficient**	**T-ratio [p-value]**
D(EGI)	0.119258*	1.886726 [0.0689]
D(EGI^2)	-0.001405*	-2.003761 [0.0542]
D(ENERGY)	0.000957**	2.537148 [0.0184]
D(FDI)	-0.031127**	-2.278745 [0.0300]
D(GFCF)	-0.047328	-1.474231 [0.5327]
D (GFCF (-1))	-0.060934*	-1.969623 [0.0582]
D (GFCF (-2))	0.099824***	4.017679 [0.0004]

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D(YPC)	0.001483***	6.786177 [0.0000]
D (YPC (-1))	0.001073***	3.622704 [0.0011]
D (YPC (-2))	0.001163***	4.311625 [0.0002]
D (IND (-1))	0.095757***	3.547134 [0.0017]
ECM (−1)	-0.687452***	-8.620887 [0.0000]
R-Squared	0.815836	
Adjusted R-Squared	0.760587	
F-Statistic [Prob]	14.76646 [0.0000]	
Normality test	1.378910[0.501849]	

Notes: *, ** and *** denote statistical significance at 10%, 5% and 1% levels, respectively.

The empirical results reported in Table 4 show that globalisation has an effect on carbon emissions only in the short run. In the long run, there is no impact whatsoever of globalisation in South Africa. The results show that globalisation has a positive impact on CO2 in the short run, implying that an increase in globalisation leads to an increase in CO2 emissions. The results further show that although globalisation has a positive impact on CO2 emissions, globalisation squared has a negative impact on CO2 emissions. These findings have been supported by the coefficient of globalisation in the CO2 emissions, which has been found to be positive and statistically significant and the coefficient of globalisation squared, which has been found to be negative and statistically significant. This finding, therefore, shows that there is an inverted U-shaped relationship between globalisation and CO2 emissions in the short run. This suggests that globalisation may lead to an increase in environmental degradation in the early stages, but that once a certain threshold is reached, it may ultimately reduce environmental degradation by facilitating the spread of cleaner or environmentally friendly technologies through foreign direct investment (FDI), multinational corporations, and international trade.

Since we have established that there is an inverted U-shaped relationship between globalisation and carbon emissions, we can now derive the turning point, i.e., the level of globalisation that must be attained in order for globalisation to have beneficial effects on CO2 emissions. Based on our results, this turning point has been found to be 42.44. This therefore implies that for globalisation to have a significant beneficial effect on CO2 emissions in South Africa, its level must exceed 42.44.

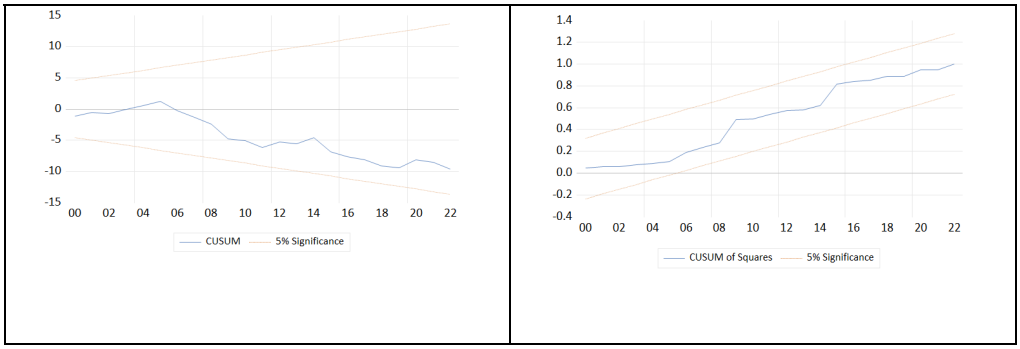
Other results reported in Table 4, Panel A and Panel B, confirmed that energy consumption per capita (ENERGY) has a positive impact on carbon emissions in

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both the short run and the long run. This finding is not surprising, given that South Africa relies on coal for electricity generation and has been ranked among the most polluting countries. The study found that foreign direct investment (FDI) reduces carbon emissions regardless of the time frame considered. The results reported in Table 4 also confirmed that gross fixed capital formation (GFCF) reduces carbon emission in the long run; however, the results were inconclusive in the short run. Industrialisation (IND) was found to increase carbon emissions in both the short and long run. This is reflected in the use of coal to generate electricity, which is a key component of industrialisation. The expansion of industries under these circumstances leads to an increase in demand for electricity. The study also found Gross Domestic Product per capita (YPC) to positively impact carbon emissions. The results reinforce the positive impact of industrialisation and gross fixed capital formation on carbon emissions, as these two components contribute to GDP growth. The higher the GDP, the greater the energy demand, leading to more coal being burned for electricity generation.

The explanatory power of the model was found to be 81.6%, confirming that the model is a good fit. The error correction term (ECM) (-0.687452) has the expected sign and is significant at 1% level of significance. This implies that the model is convergent whenever there is a disequilibrium in the economy. The model passed the normality test and the stability test at 5% level of significance. The stability test – cumulative sum and cumulative sum of squares are reported in Figure 1.



Note: Stability test at 5% level of significance

Figure 1: Stability Test

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Conclusion

As a signatory to the Paris accord on CO2 emissions and as one of the largest per capita coal producers in the world, South Africa has made a concerted effort to reduce its carbon footprint by implementing a just energy transition. In addition, the country has made significant strides in attracting foreign direct investment and expanding its bilateral and multilateral trade agreements with a number of countries. In this paper, we examine the impact of globalisation on CO2 emissions in South Africa during the period from 1983 to 2022. The study also examines whether the relationship between globalisation and CO2 emissions depicts a linear, U-shaped, or inverted U-shaped curve. Consequently, the study uses a quadratic equation within an ARDL framework to examine this linkage. The study was informed by the high level of CO2 emissions recorded in South Africa due to its dependence on coal-generated electricity and its concerted efforts to pursue open-economy-based policies aimed at expanding its bilateral and multilateral trade, as well as foreign direct investment inflows. Our results show that there is a long-run relationship between globalisation and CO2 emissions in South Africa. The results also show that although globalisation has no impact on CO2 emissions in the long run, its impact on CO2 emissions in the short run follows an inverted U-shaped curve. In other words, globalisation tends to increase CO2 emissions up to a certain level, beyond which further increases tend to reduce rather than increase CO2 emissions. Based on our results, we established that the turning point, above which the effect of globalisation becomes beneficial for environmental degradation, is 42.44. This implies that economic globalisation must reach 42.44 in order to reduce CO2 emissions in South Africa. As a signatory to the Paris Agreement and given South Africa's concerted efforts to reduce CO2 emissions, it is recommended that the country continue with its open-economy policies aimed at attracting foreign direct investment and expanding bilateral and multilateral trade relations.

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URBAN SPRAWL AND TERRITORIAL ATTRACTIVENESS IN SMALL AND MEDIUM-SIZED TOWNS

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Abstract

This article examines the impact of urban sprawl on the territorial attractiveness of the towns of Tizi-Ouzou, a region with significant economic and tourism potential. The study aims to assess how diffuse and poorly controlled urban expansion affects territorial balance, mobility, access to services, environmental quality, and local development opportunities. Based on a qualitative methodology, the research draws on semi-structured interviews conducted with institutional stakeholders in the wilaya of Tizi-Ouzou, as well as an analysis of local planning documents. The findings show that urban sprawl has a predominantly negative impact on territorial attractiveness, mainly through increased car dependency, spatial and social fragmentation, pressure on infrastructure, and the degradation of natural and agricultural areas. However, the study also highlights that controlled planning, improved governance, better transport infrastructure, and the promotion of local economic and tourism assets can help strengthen sustainable attractiveness. The article concludes that more coherent and firmly implemented urban planning policies are necessary to support balanced territorial development in Tizi-Ouzou.

Keywords: *urban sprawl, territorial attractiveness, territorial planning, mobility, tourism, sustainable development.*

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JEL classification: R11, R14, R58, O18

1. Introduction

Urban sprawl has become one of the most visible consequences of contemporary urbanization. It refers to the expansion of built-up areas toward the periphery, often through low-density, fragmented, and poorly controlled forms of development. This process is closely linked to the rural-urban demographic transition and to the role of growth poles in shaping regional development. The theory of urban transition (Bretagnolle et al., 2015) explains the gradual shift from rural societies to urban-centred structures, while the theory of growth poles (Perroux, 1955) highlights the spillover effects of dynamic economic areas on surrounding territories. Similarly, the centre-periphery model developed by Krugman (1991) shows how economic activities and populations first concentrate in urban centres before spreading toward peripheral areas. These approaches help explain the transition from a monocentric urban model to more dispersed and fragmented urban forms.

This issue is particularly important because urban sprawl directly affects territorial attractiveness, which has become a strategic factor in economic and social development. Territorial attractiveness refers to the capacity of a territory to attract and retain populations, businesses, and tourists by enhancing its economic, social, cultural, and environmental assets (Mulkay, 2006; Olszak, 2010; Chaze, 2017). However, uncontrolled spatial expansion can weaken this capacity by increasing car dependency, fragmenting space, placing pressure on infrastructure, degrading natural and agricultural areas, and reducing access to services. In small and medium-sized towns, these effects may be even more significant because such towns often act as intermediate hubs between large urban centres and rural areas, while having more limited planning, transport, and investment capacities (Isakov, 2023).

In Algeria, rapid urbanization is profoundly transforming local territories (Belguidoum, 2021). In the wilaya of Tizi-Ouzou, urban expansion is reflected in the dispersal of housing and activities toward peripheral areas, creating major challenges related to mobility, infrastructure, access to services, environmental preservation, and territorial balance. This article therefore focuses on the impact of urban sprawl on the territorial attractiveness of small and medium-sized towns in Tizi-Ouzou. More specifically, it seeks to assess how this spatial expansion affects economic, residential, functional, and tourism-related attractiveness, and to

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determine whether urban sprawl acts mainly as a constraint or whether it can also generate opportunities for sustainable territorial development under appropriate planning and governance conditions.

To answer this question, the study adopts a qualitative approach based on semi-structured interviews with institutional stakeholders in the wilaya of Tizi-Ouzou, combined with an analysis of local planning documents, particularly the Wilaya Territorial Development Plan for 2030 (PATW2030) and local urban planning instruments. This methodological choice makes it possible to compare the theoretical understanding of urban sprawl with the territorial realities observed in selected small and medium-sized towns, taking into account their different locations, topographies, accessibility conditions, economic functions, and tourism potential.

This article contributes to the existing literature by linking two fields that are often studied separately: urban sprawl and territorial attractiveness. Previous studies have examined urban sprawl through demographic, spatial, transport, environmental, and planning perspectives (Antoni, 2013), while territorial attractiveness has often been analysed in relation to investment, competitiveness, quality of life, and local development. The originality of this article lies in applying this combined perspective to secondary towns in Tizi-Ouzou, rather than limiting the analysis to the regional capital. By doing so, the study highlights the specific constraints and opportunities of small and medium-sized towns and contributes to the debate on sustainable territorial planning in Algeria.

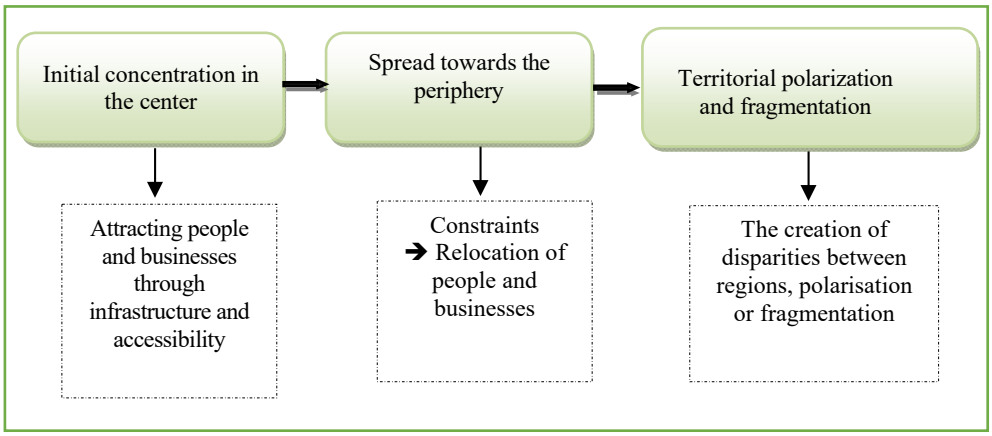
2. From urban sprawl to territorial attractiveness

Urban sprawl is regarded as a phenomenon involving the geographical expansion of urban areas (Mirabel & Reymond, 2013) at a faster rate than population growth (Sainteny, 2008). This expansion, often linked to improvements in transport infrastructure, is not necessarily synonymous with population growth or a decline in the city centre population. According to Glaeser and Kahn (2003), urban sprawl refers to the expansion of the city toward the periphery. It is characterized by low density and the spatial dispersion of residential and economic areas, facilitated by access to motor vehicles. More broadly, urban sprawl refers to the expansion of built-up areas toward the outskirts. It leads to the dispersion of housing and economic activity, low-density development, and increased land consumption.

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Figure no. 1. Process of urban sprawl dynamics



Source: Compiled by the authors (2026)

Figure 1 highlights the dynamics of urban sprawl, in which large cities attract people and businesses because of their infrastructure and accessibility. First, this concentration creates both positive externalities and costs, including congestion and rising land prices. Subsequently, faced with constraints in the city centre, certain populations and businesses relocate to peripheral areas, attracted by lower costs and a better quality of life. This process is amplified by improvements to transport networks, including motorways, railways, and public transport, which facilitate commuting (Pumain, 2020). Finally, urban sprawl can exacerbate territorial disparities by creating attractive peripheral areas, endowed with services and jobs, alongside more marginalized areas marked by infrastructure deficits and social segregation.

Smiraglia et al. (2021) explain this phenomenon through an approach based on demographic transitions, ranging from urban growth to changes in household behaviour, and through a socio-ecological approach involving the assessment of environmental costs. Urban sprawl is a new form of urban space. It does not manifest itself in the same way in all urban areas. The following table highlights its main forms and characteristics, as identified in the literature.

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Table no. 1. Forms and characteristics of urban sprawl

Authors	Forms of urban sprawl	Characteristics
Marchal & Stébé (2018); Offner (2020)	Suburban sprawl	• Residential areas of detached houses; • Facilitated by home ownership; • Significant consumption of agricultural and natural land; • High dependence on cars.
Pouyane (2005)	Scattered sprawl / leapfrog development	• Dispersed urbanization; • Isolated buildings; • Fragmented landscape; • Infrastructure problems.
Bueno-Suarez & Coq-Huelva (2020)	Low-density dispersed sprawl	• Dispersed housing; • Low proximity; • Low population density.
	Suburban expansion	• Expansion of residential areas toward the outskirts, facilitated by car use; • Decentralization of economic and leisure activities.
	Linear or belt-shaped growth	• Development of housing and businesses along transport routes, whether road and/or rail.
	Organized or regulated sprawl	• Policies implemented to promote more compact urban forms or urban densification.
	Sprawl linked to secondary residences	• Development of second homes in areas offering a favourable climate, particularly in coastal towns.

Source: Compiled by the authors (2026)

Table 1 outlines the most common forms of urban sprawl and shows both similarities and complementarities that highlight the complexity of this phenomenon. Indeed, these forms share several common factors, including accessibility through infrastructure development, easier access to vehicles, opportunities for relocation, and, in some cases, the effects of public policies. Consequently, these forms of urban sprawl, whether diffuse, fragmented, or polarized, do not only produce a morphological transformation of territories. They also lead to a profound restructuring of territories, lifestyles, and the organization of activities. This raises the question of the ability of such territories to retain or

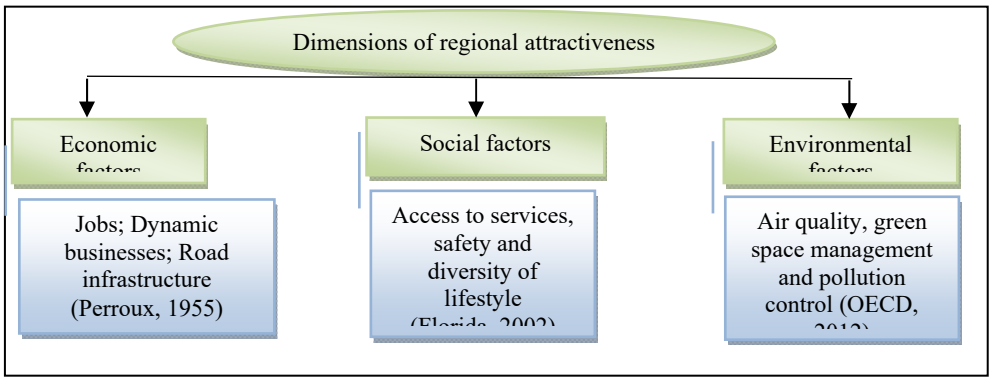
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attract populations and investment, and therefore brings the issue of territorial attractiveness to the forefront. In other words, territorial attractiveness can encourage urban sprawl through the growth of peripheral areas and the development of infrastructure (Fan & Zhou, 2019).

Similarly, urban sprawl can lead to the destruction or degradation of the environment and, consequently, to a decline in territorial attractiveness (Naserddine, 2021). Although this concept was not initially central to geographical thinking, it has recently become a key concern in territorial studies. It is "often linked to investment, or rather to a territory's capacity to attract investment" (Echattabi, 2024, p. 7), which explains why most studies on this concept focus more on the productive sector than on the residential or tourism sectors. Chaze (2017, p. 3) defines territorial attractiveness as "a territory's capacity to attract due to the appeal it generates." It can also be understood as the capacity of a place or territory to attract or retain populations or businesses (Hamidi & Zandiatashbar, 2019). Servillo et al. (2011) specify that territorial attractiveness is not limited to economic competitiveness, but also incorporates territorial cohesion and the ability to provide a better quality of life for residents. Territorial attractiveness is based on three major interdependent dimensions, generally presented as economic, social, and environmental factors, as shown in Figure 2.

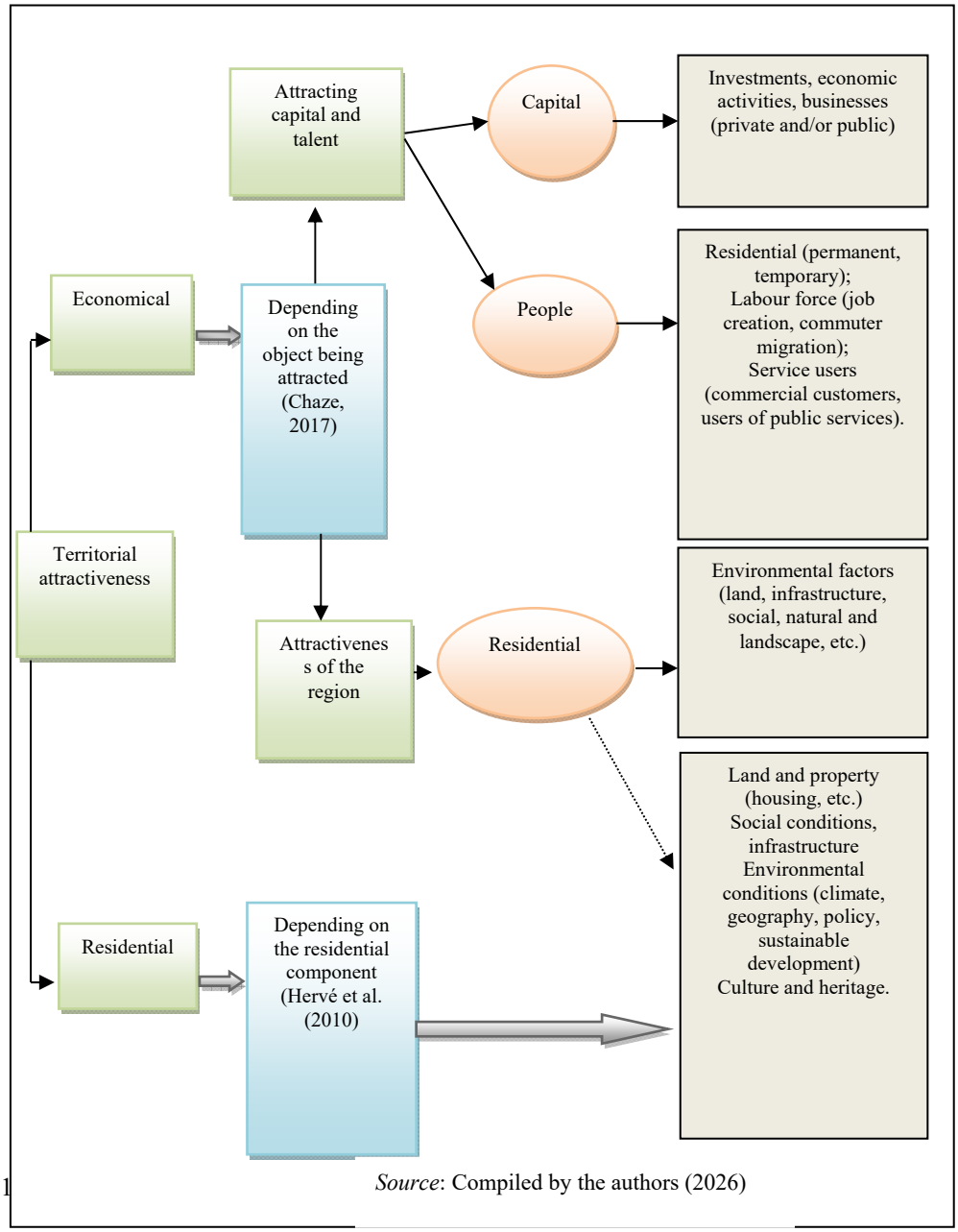
Figure no. 2. Interdependent dimensions of territorial attractiveness



Source: Compiled by the authors (2026)

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Figure no. 3. Typology of territorial attractiveness



Source: Compiled by the authors (2026)

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Cities offering a pleasant living environment attract more talent and investors (Glaeser, 2011). By contrast, excessive and poorly planned urbanization can undermine this attractiveness (Newman & Kenworthy, 1999). Based on these dimensions, several authors have proposed typologies of territorial attractiveness that reflect different territorial realities. The following figure provides an overview of the typology of territorial attractiveness (Figure 3).

Broadly speaking, territorial attractiveness can be divided into two main types, depending on the characteristics and specific features of the territory. However, these types are also complementary: economic attractiveness can generate residential attractiveness and, conversely, both can contribute to tourism attractiveness. In other words, investment plays a role in territorial management and supports local development, particularly through the creation of businesses, the development of economic activities, and the search for dynamic territories. Residents, employees, consumers, and users may therefore be attracted to a territory for residential, professional, or consumption-related purposes, as well as by the public and private facilities and services it offers. Similarly, a territory can attract people or investment through its residential components and/or the environment it provides, including land, cultural, social, and economic assets. These elements can also act as drivers of tourism attractiveness.

2.1. Impact of urban sprawl on territorial attractiveness

One of the key challenges of territorial development is the attractiveness of the territory concerned, which is now regarded as a strategic objective (Echa ttabi, 2024). Urban sprawl, defined as the expansion of urbanized areas toward the periphery, influences territorial development in an ambivalent way. On the one hand, it can promote economic growth by stimulating the construction sector, increasing the supply of land, and improving residents' quality of life through a less dense environment (Broitman & Koomen, 2015). It can also attract new investment and encourage the diversification of economic activities. On the other hand, the negative effects of urban sprawl are numerous. The expansion of urban infrastructure generates high costs for local authorities and leads to spatial fragmentation, which exacerbates territorial disparities (Brueckner, 2000). In addition, increased car dependency worsens road congestion and pollution, thereby compromising environmental sustainability (Sofronov, 2017). Finally, the excessive consumption of natural and agricultural land alters traditional landscapes and reduces the resilience of territories to ecological and agricultural challenges (Antoni, 2013).

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Urban sprawl can therefore have a negative impact on territorial attractiveness through the loss of green spaces, environmental degradation, and the emergence of social conflicts, which may reduce the appeal of territories for both residents and investors (Nasreddine, 2021). In addition to social conflicts and territorial fragmentation, Servillo et al. (2011) also highlight the complex governance challenges generated by urban sprawl, particularly the ability of governance systems to meet the needs of populations living in dispersed territories. Similarly, a territory's attractiveness is directly linked to accessibility, ease of movement through transport, and the availability of road infrastructure (Celi & Viti, 2018). In dispersed territories, this often leads to car dependency, with negative consequences for the environment and residents' quality of life (Ibimilua et al., 2020).

Consequently, unplanned urban sprawl can undermine territorial attractiveness by generating significant environmental and social costs. The link between urban sprawl and territorial attractiveness is therefore complex: strong attractiveness can encourage peripheral urbanization, while poorly managed urbanization can, in turn, weaken attractiveness.

In addition to the common difficulties faced by small and medium-sized towns, these towns are confronted with specific problems because of their vulnerability to the effects of urban sprawl. While urban sprawl may, in some cases, enhance their attractiveness by encouraging the development of new neighbourhoods and infrastructure, it also tends to increase their dependence on neighbouring major cities, thereby reducing their economic autonomy. One of the main challenges for these towns is the dispersion of facilities and services, which increases the costs of developing and managing public infrastructure.

Furthermore, their distance from economic centres and employment hubs makes their development more difficult and limits their ability to retain a skilled workforce (Charmes, 2019). Finally, urban sprawl can weaken the historic centres of small and medium-sized towns by encouraging the relocation of shops and services to the outskirts, thereby accelerating their decline. In response to these challenges, a more balanced approach to urban development is needed to strengthen the competitiveness and resilience of small and medium-sized towns while limiting the negative impacts of urban sprawl.

3. Methodology

To address our research question, we adopted a qualitative approach based on targeted observation of urban dynamics in specific areas of the wilaya of Tizi-

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Ouzou, namely six municipalities: Aïn El Hammam, Azazga, Fréha, Boghni, Drâa Ben Khedda (DBK), and Larbaa Nath Irathen (LNI). These municipalities were selected because of their diverse topography and territorial dynamics. We also conducted a documentary analysis of various local urban planning documents, namely the local Master Plan for Development and Urban Planning (PDAU) and the Wilaya Territorial Development Plan for 2030 (PATW2030). It should be noted that the case study in this article is primarily based on projections and data from the PATW2030. An in-depth literature review also made it possible to contextualize the challenges and identify innovations in sustainable planning.

To this end, we conducted semi-structured interviews with representatives of the Transport Department, the Bus Stations Department, the National Centre for Studies and Urban Planning (CNERU), the Tourism and Crafts Department (DTA), and the Agricultural Services Department (DSA) of the wilaya of Tizi-Ouzou. These interviews had a twofold objective. The first was to understand perceptions of urban sprawl and its effect on the territorial attractiveness of the wilaya. The second was to identify real opportunities, based on the capacities and constraints of these secondary towns, for developing sustainable attractiveness. The interviews focused mainly on the dynamics of urban sprawl observed in the towns of the wilaya of Tizi-Ouzou, their impacts on transport infrastructure, the tourism offer, barriers to the region's attractiveness, particularly accessibility constraints, and the planning policies envisaged or implemented. A thematic analysis was conducted to ensure the integration of a comprehensive view of this diverse region.

3.1. Urban sprawl in the small and medium-sized towns of Tizi-Ouzou

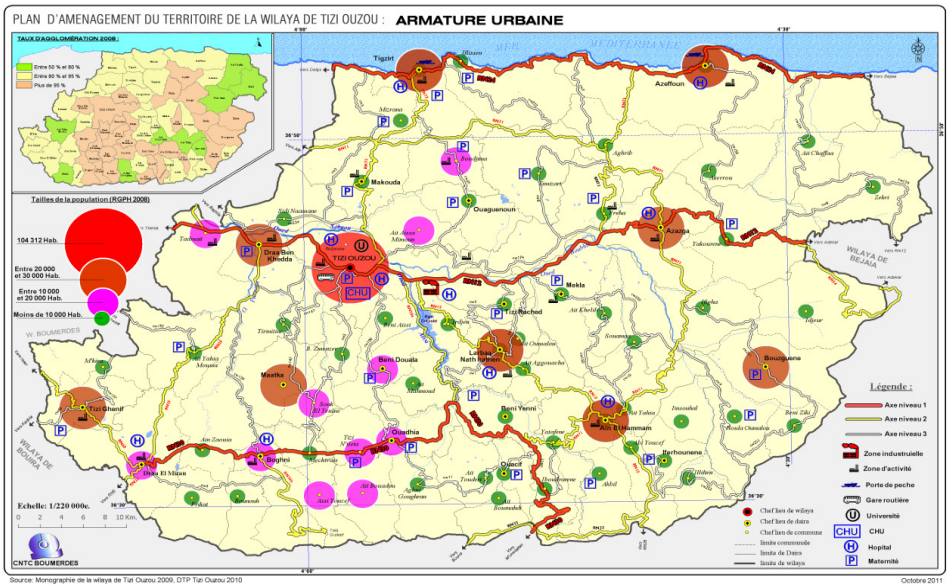
The development of the Tizi-Ouzou region has taken place mainly since Algeria's independence, placing it within a context of accelerated urban, economic, and demographic growth (Agharmiou, 2011). Its population is estimated at 1,205,436 over an area of 2,958 km² (ONS, 2020). This coastal region, centred around the city of Tizi-Ouzou (PATW2030), comprises several small towns that play a key role in its territorial development. According to the National Statistics Office (ONS, 2018) in Algeria, a large town has at least 100,000 inhabitants, a medium-sized town has between 20,000 and 50,000 inhabitants, and a small town has fewer than 20,000 inhabitants. The Tizi-Ouzou region, comprising 67 municipalities, has a single large town, with a population of 124,717 out of a total population of 161,514, serving as the wilaya capital, alongside other towns classified as small towns.

Consequently, to compare the models of urban sprawl presented above with the realities of the Tizi-Ouzou region, this research focuses on a sample of six

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municipalities: Aïn El Hammam, Azazga, Fréha, Boghni, Drâa Ben Khedda (DBK), and Larbaa Nath Irathen (LNI). These municipalities were selected because of their diverse topography, ranging from plains and valleys to mountainous areas and foothills, as well as their attractiveness and urban sprawl dynamics (Figure 4).

Figure no. 4. Map of the urban framework and location of towns



Source: Tizi-Ouzou Province Spatial Planning Strategy 2030

Figure 4 shows the urban framework of the wilaya of Tizi-Ouzou and the location of the selected towns, which occupy strategic positions within the regional structure. The towns of DBK, Azazga, and Boghni are located on first-class roads, namely National Roads (RN), while Fréha, LNI, and Aïn El Hammam are located on second-class road networks, namely Wilaya Roads (CW). This gives them accessibility and a diverse range of urban functions in terms of services and facilities. For this reason, the analysis examines how urban sprawl influences the territorial attractiveness of the wilaya in different ways. The selected sample of towns makes it possible to directly link the urban dynamics theorized above with the distribution of the population between structured centres and scattered settlements (Table 2).

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Table no. 2. Population distribution in selected towns of Tizi-Ouzou

Municipality	Total population	Population in urban areas			Rural scattered	Area km²	Population density per km²	Urban population %	Rural population %
		ACL	AS	TOTAL					
Aïn El Hammam	20 647	7 666	12 129	19 795	852	38.55	536	37.13	62.87
Azazga	40 021	30 597	7 507	38 103	1 917	77.05	519	76.45	23.55
Fréha	27 301	9 189	16 802	25 991	1 310	68.55	398	33.66	66.34
Boghni	32 022	16 632	14 441	31 073	948	51.50	622	51.94	48.06
DBK	35 362	33 132	1 557	34 688	674	33.41	1 058	93.70	6.30
LNI	30 089	8 479	18 790	27 269	2 820	39.28	766	28.18	71.82

Note: ACL = main urban agglomeration; AS = secondary agglomeration.

Source: ONS, 2020; Statistical Yearbook of the Wilaya of Tizi-Ouzou.

Table 2 shows how the population is distributed across different settlement types, including main urban centres, secondary urban centres, and rural or scattered areas. These towns are located in different parts of the wilaya and represent contrasting territorial contexts: some are highly urbanized, others are characterized by a dispersed settlement pattern, while others show a more balanced distribution.

According to Table 2 and ONS data, the wilaya of Tizi-Ouzou is mainly composed of small towns. However, in Aïn El Hammam, Fréha, and Larbaa Nath Irathen (LNI), most of the population does not reside in the central core but in secondary urban areas, reflecting a dispersed urbanization model. This is a familiar pattern in the mountainous regions of Kabylia, where villages surround the centre. The paradox is that these areas remain predominantly rural, although their economy relies only to a limited extent on agriculture (PATW2030). Conversely, Azazga and Drâa Ben Khedda (DBK) concentrate most of their population in the urban centre, mainly due to the development of administrative, commercial, and road infrastructure. Boghni, by contrast, shows a more balanced distribution of its population. These differences confirm that the forms of urban sprawl observed in the selected towns are closely linked to topography, morphology, accessibility, and local urban functions.

The geographical distribution of these towns makes it possible to identify several zones and to highlight different forms of urban sprawl. DBK is located in a lowland area; its urban sprawl, characterized by a high concentration of activities and networks, is facilitated by its proximity and connection to the wilaya capital, Tizi-Ouzou. Fréha and Azazga function as transit and service hubs. Located in relatively

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flat, lowland areas, Azazga's position as a commercial crossroads on the RN12, from which Fréha also benefits because of its proximity, illustrates a form of linear sprawl along the road axis. Boghni, a mountainous town with rugged topography, is characterized by fragmented sprawl. Finally, ridge-top towns such as Aïn El Hammam and LNI, which are attractive because of their history and natural areas, including forests and the Taksebt dam in the case of LNI, are directly affected by sprawl that impacts the natural landscape.

3.2. Factors contributing to urban sprawl in Tizi-Ouzou

Several factors have contributed to urban sprawl in the wilaya of Tizi-Ouzou, whether from the main town toward its outskirts or from small towns toward the surrounding villages, thereby blurring the distinction between urban and rural areas (Agharmiou, 2011). The first factor is population growth, which has generated significant pressure on land. This pressure has had a major impact on housing demand, especially given the land constraints imposed by the wilaya's topography, which consists of 6% mountains, 30% hills, and 10% valleys (Dahmani et al., 1993).

The second factor is urban planning. In response to national demand, the Algerian government has implemented several plans to meet social needs and promote development. The Tizi-Ouzou region has also benefited from this planning in order to support rapid urban expansion. However, this strategy has not succeeded in curbing uncontrolled urbanization, which has even encroached on agricultural land following the opening of the property market to the private sector from the 1990s onward. This situation reflects the failure of urban planning instruments, particularly the Master Plans for Development and Urban Planning (PDAUs) and land-use plans (POS), to effectively control urban expansion (Agharmiou, 2012). This setback highlights the difficulty faced by local public policies and the regulatory framework in addressing uncontrolled spatial growth.

The third factor is the development of road infrastructure, which has facilitated migration and mobility toward peripheral areas, particularly between the main town and neighbouring municipalities. Migration flows are estimated at 41.3% toward the east, including LNI, Ouaguenoun, Tizi-Rached, and Beni Douala, and 58.7% toward the west, including DBK, Drâa El Mizan, Maatkas, and Boghni (Louani, 2020). This increased accessibility, combined with the widespread use of cars, has significantly reduced commuting times and made it possible to live outside the city centre. Nevertheless, road infrastructure remains insufficient in scattered and peripheral areas, which continue to face difficulties, particularly in terms of public transport. This urban sprawl has had significant consequences,

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including social and territorial fragmentation, increased car dependency, and, above all, growing pressure on public infrastructure and services.

3.3. Impact on accessibility and mobility

One of the primary consequences of urban sprawl is the increase in distances travelled between home and work and between home and leisure activities. This leads to greater distance from urban centres, a situation often compounded by inadequate public transport infrastructure. Small and medium-sized towns do not have a sufficiently developed public transport system, particularly because local authorities lack the resources needed for such projects. Yet public transport represents an effective means of addressing fragmented urban development. Although it remains the most accessible option for many citizens, mobility continues to be problematic and tends to worsen despite the rise in car use and the expansion of the road network.

Table 3 shows that the lack of public transport is often linked to insufficient road infrastructure. The poor condition of roads connecting small towns to villages, particularly those with visitor or tourism potential, discourages transport operators from investing in such routes, according to the Railway Stations Department. This situation exacerbates difficulties in accessing economic and tourism hubs and further discourages investors and tourists from visiting them.

Table no. 3. Public transport capacity per 1,000 inhabitants

Municipality	Population	Area (km²)	Number of minibuses	Minibuses per 1,000 inhabitants	Minibuses per km²	Number of departures
Aïn El Hammam	20,647	38.55	66	3.19	1.71	/
Azazga	40,021	77.05	60	1.49	0.78	170
Fréha	27,301	68.55	35	1.28	0.51	133
Boghni	32,022	51.50	30	0.93	0.58	91
Drâa Ben Khedda (DBK)	35,362	33.41	65	1.83	1.94	/
Larbaa Nath Irathen (LNI)	30,089	39.28	89	2.95	2.26	/

Source: Data collected by the authors (2026)

The data collected provide an overview of the disparities in the spatial distribution of transport services in the municipalities studied and, above all, of

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their inadequacy. The ratio of minibuses per 1,000 inhabitants ranges from 0.93 in Boghni to 3.19 in Aïn El Hammam, while most municipalities fall within a range of 50 to 100 places per 1,000 inhabitants. The data on departures also highlight disparities between Azazga, Fréha, and Boghni, even though the ratio of minibuses per km² is below 1 in these towns.

Boghni appears to be the most disadvantaged municipality, with only 91 departures using 30 minibuses, compared with 133 departures using 35 minibuses in Fréha and 170 departures using 60 minibuses in Azazga. The latter municipalities benefit from greater accessibility, particularly because of their proximity to the wilaya capital, approximately 30 km away, via the RN12, which is connected westward to the southern ring road and helps bypass the town centre. By contrast, Boghni is located at almost the same distance from the wilaya capital, approximately 37 km, but is served by a more rugged road because of its position at the foot of the Djurdjura.

Interviews with the Bus Stations Department indicate that these constraints are also linked to the priority given to school transport. This means that the few existing buses are often requisitioned by the commune's local council to provide school transport, particularly because Boghni consists of a cluster of villages. Another important point reinforcing this observation is that Aïn El Hammam has not only minibuses, but also 55 shared taxis and an inter-wilaya bus service from Algiers, making it more accessible in terms of transport. Similarly, LNI has a higher number of minibuses than the other municipalities, with 89 vehicles, making it the best-served town in the sample.

3.4. Impact on economic and tourism development

The choice of location depends largely on accessibility and mobility (Aydalot, 1985). As shown in the previous section, urban sprawl can negatively affect these factors when it is accompanied by insufficient infrastructure. This has direct economic and tourism-related consequences for town centres, particularly through a loss of competitiveness. These centres were previously attractive because of the services they offered, including retail, administration, and local facilities. However, reduced accessibility and dispersed development can weaken their role, limit access to heritage and cultural sites, and discourage both investors and visitors.

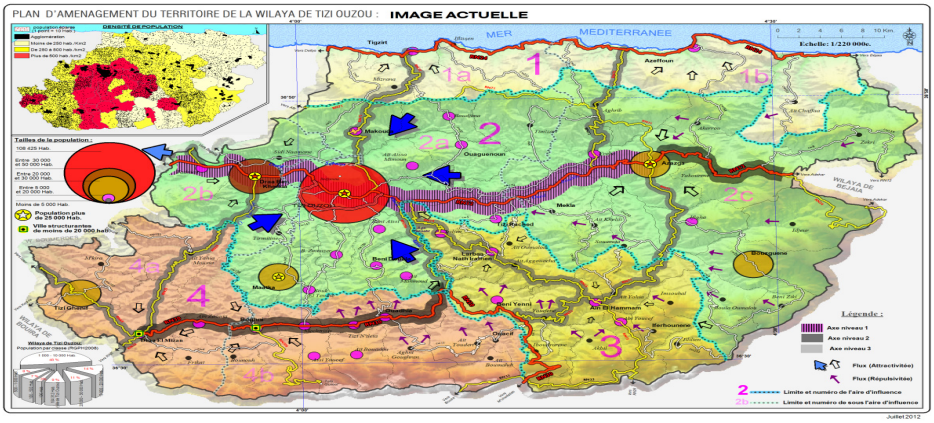
This situation can be illustrated through the small and medium-sized towns examined in this study. Road infrastructure has improved traffic flow, particularly through the construction of the northern bypass, which is 12,800 m long, and the southern bypass, which is 7,000 m long. Both have a carriageway width of 10 × 2 m and a 50-m right-of-way, according to the Transport Department Traffic Plan.

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Proximity to the wilaya capital also encourages investment and enhances the attractiveness of towns that were previously less accessible. According to the final PATW 2030 report, Azazga has an electronics industrial zone covering 34 ha. Drâa Ben Khedda (DBK) has a business park of 46.93 ha, of which 35.83 ha are already occupied, making it almost saturated and encouraging expansion onto other sites. Fréha, with 11.27 ha occupied out of a total area of 13.44 ha, has also benefited from investment, particularly through the development of business activities and the industrial sector.

Consequently, road infrastructure is not only a means of opening up territories, but also a lever for enhancing their economic value through improved mobility and accessibility, despite the effects of urban sprawl. The following map from the PATW for the wilaya of Tizi-Ouzou illustrates the structure of the region around its road network and highlights the concentration of attractiveness in town centres and, above all, in the wilaya capital (Figure 5).

Figure no. 5. Structure of the territory of the wilaya of Tizi-Ouzou around road axes



Source: Tizi-Ouzou Province Spatial Development Plan 2030

Figure 5 illustrates the structure of the wilaya of Tizi-Ouzou, which is organized around a main road axis linking the wilaya capital to secondary centres, namely Azazga, DBK, and Fréha. The centres best served by this axis account for a large share of economic activity, confirming the importance of accessibility for territorial attractiveness. Business and industrial zones have seen their economic potential

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improve as a result of enhanced mobility and the construction of ring roads. Thus, in a context of urban sprawl, road infrastructure can help offset the loss of attractiveness by maintaining local economic dynamism.

3.5. Social and environmental consequences

Urban sprawl in the wilaya of Tizi-Ouzou is characterized by uncontrolled urbanization in mountainous areas, posing a significant challenge to territorial attractiveness. This is particularly visible in some areas with tourism potential, such as the municipality of Boghni, where urbanization has reached 50%, according to the PATW 2030 summary report. This expansion fragments the landscape and exacerbates territorial inequalities, which are already reinforced by limited road access resulting from the region's topography.

In addition to exacerbating territorial inequalities, urban sprawl contributes to the degradation of natural and agricultural areas. Paradoxically, however, according to data collected from the Agricultural Services Directorate (DSA) for the period 2022-2025 and compared with data from the PATW2030 and the 2018 statistical yearbook of the wilaya of Tizi-Ouzou, urban sprawl appears to have had no negative impact on the total agricultural area. This area amounts to 258,252 ha, as shown in Table no. 4, although this appears to contradict the observed reality.

Table no. 4. Breakdown of the total agricultural area in the wilaya of Tizi-Ouzou (2015-2025)

Useful agricultural area (ha)	Unproductive land (ha)	Forest area (ha)	Grazing land / rangeland (ha)	Total agricultural area (ha)
98,842	21,859	112,181	25,370	258,252

Source: Agricultural Services Directorate, 2025.

Public policies implemented by the authorities have also affected these areas by contributing to territorial fragmentation and landscape deterioration. In response to growing housing demand, new urban residential areas and urban centres have been created, often producing fragmented urban spaces. Moreover, under the 2010 housing construction program, including subsidized promotional housing and social housing, a total of 6,941 housing units were planned for the municipalities studied.

These housing areas, established in most towns, whether large, medium-sized, or small, often lack adequate infrastructure. This situation has been further exacerbated by the liberalization of the property market from the 1990s onward. The final report of the spatial planning scheme considers the municipalities of LNI

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and Azazga to be saturated in terms of developable land. Similarly, coastal tourist towns such as Tigzirt, where 6.69% of the area is urbanized (CNERU, 2026), are affected by significant visual pollution, which detracts from the authenticity of the old town.

4. Towards sustainable territorial attractiveness: strategies and recommendations

To foster sustainable territorial attractiveness and ensure equity, balance, and the development of territorial potential, several strategies can be implemented through the involvement of central government and local authorities. In this context, Tizi-Ouzou has benefited from the Wilaya Territorial Development Plan for 2030 (PATW2030). This strategic planning tool is designed to ensure consistency and coordination between upstream instruments, including SNAT, SEPT, and SDS, and downstream instruments, particularly the PDAU.

Among its main objectives are the preservation of natural habitats and cultural heritage, the promotion of equity and social cohesion, the establishment of an urban and infrastructure network to support territorial rebalancing, and the exploration of opportunities to strengthen the economic foundations of the wilaya of Tizi-Ouzou and make it more attractive and competitive. The PATW2030 also serves as a dashboard that brings together action and implementation plans by sector. In other words, it provides a roadmap for the various PDAUs and acts as a coordinating framework for sectoral policies within the SDS. Strategies designed to promote sustainable territorial attractiveness require coordination across all public sectors.

4.1 Controlled and sustainable urban development for local areas

Sustainable and controlled management of urban growth

A model of sustainable urban planning and controlled urban growth should be established in order to reduce the excessive concentration of population in major urban centres and create conditions that promote a more balanced territorial distribution. This can be achieved through the control of urbanization and the reorganization of the urban structure of the Tizi-Ouzou region. Such an approach would help address land-related issues, stabilize the rural population through upgrading programs, reduce development disparities between municipalities, and strengthen infrastructure.

With this in mind, the PATW2030 provides for the implementation of a scenario setting out the steps needed to achieve this rebalancing. This scenario is supported by growth hubs, based on the grouping of certain urban areas to form

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centres of excellence, such as Tadmaït, Tizi-Ouzou, DBK, Azazga, Fréha, and Aghribs. This rebalancing also aims to manage population growth in areas under significant pressure, such as Tizi-Ouzou, DBK, Azazga, and Drâa El Mizan, while reviving demographic growth in more vulnerable municipalities, particularly those located on the coast, such as Azeffoun and Tigzirt.

A compact city for the efficient use of space, energy and resources

In the context of sustainable development, the objective is to promote urban forms that consume less space, energy, and resources while still meeting household demand (PATW2030). To this end, it is important to incorporate urban sprawl into planning strategies by promoting urban densification, sustainable housing, and, above all, compact and mixed-use urban development. These strategies should also ensure social and territorial equity and improve the quality of the urban fabric. It is also necessary to preserve the structure of villages by limiting conurbation, safeguarding the typical architecture that constitutes cultural heritage, and reducing territorial inequalities.

4.2. Strengthening and developing road infrastructure and sustainable mobility in urban and rural areas

Rebalancing and territorial cohesion in transport and mobility

Mobility is regarded both as a resource and as a tool for territorial regeneration, as it interacts with spatial planning and land use (Ramdini, 2020). As previously noted, transport networks play a structuring role in fostering social and territorial cohesion and represent a key driver of territorial attractiveness. Therefore, the development of public transport and road infrastructure is necessary to rebalance this sector and, more broadly, the territories concerned. It can help address the lack of attractiveness of certain deprived and neglected areas and ensure better connectivity between centres and peripheral areas.

To this end, the PATW2030 has established three principles centred on connectivity: roads, transport, and mobility. It aims to rebalance, strengthen, and develop road infrastructure and the urban network, improve connections, and boost local dynamism between urban and rural areas. Its implementation falls under the responsibility of the Transport Department and the Public Works Department, under the supervision of the APW Commission for Spatial Planning and Transport and subject to approval by the Wali (the governor of the wilaya).

Modernisation and development of sustainable transport

The integration or development of cable car systems may provide an appropriate mobility solution in some areas. The first system, installed in the town

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of Tizi-Ouzou, has a capacity of 2,400 passengers per hour and 8,000 passengers per day (Zidane, 2025). It is necessary to make certain areas, particularly tourism destinations, more accessible to visitors and tourists. This is the case for Tala Guilef, where the cable car system needs to be completely restored. According to discussions with the transport authorities, the stations department, and the CNERU, such a project is feasible provided that the environmental dimension is properly addressed. This type of transport is particularly suitable for mountainous or rugged terrain.

Furthermore, the development of public transport could provide an alternative for managing mobility in the towns of the wilaya of Tizi-Ouzou and help reduce car dependency, especially given the estimated vehicle fleet of 189,080 between 2018 and 2023, according to the bus Stations Department. This type of solution could contribute significantly to reducing territorial inequalities and enhancing the attractiveness of these areas.

4.3. Promoting local strengths and innovative initiatives

According to an interview with the Department of Tourism and Crafts, the wilaya of Tizi-Ouzou has considerable tourism potential, including historical, natural, and cultural sites (see Table no. 5). Promoting these assets is an important step toward enhancing the region's attractiveness.

Table no. 5. Tourism potential of six municipalities in the wilaya of Tizi-Ouzou

Municipality	Historic sites	Natural sites	Cultural sites
Azazga	/	ZRAIEB District Forests (east of the town, along the RN12 toward Yakourene).	/
Fréha	/	/	/
Larbaa Nath Irathen	Abane Ramdane Museum	/	/
Aïn El Hammam	/	/	Tomb of Si Mohand Oumhand (at the entrance to Michelet).
Boghni	/	Tala Guilef; Thabourth El Ainsser	/

Source: Tourism and Crafts Department, May 2026.

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Balancing sustainable development with territorial attractiveness is a major challenge. It requires, first and foremost, the protection and promotion of cultural and natural heritage. The PATW2030 addresses this issue by proposing an action plan for the conservation of natural resources, environmental management, and major-risk management involving all stakeholders. It also aims to address current or potential environmental crises, including the management of household and industrial waste, while protecting and promoting mountain and forest assets, as well as sensitive resources and ecosystems, including mountains, coastlines, forests, wetlands, and biodiversity, particularly from the harmful effects of urban sprawl.

Second, strategies should be developed to attract businesses and tourists, particularly through ecotourism and heritage circuits. To this end, the PATW2030 proposes endogenous economic development capable of fostering local growth in complementarity with the regional economy. This involves encouraging local development, including SMEs and micro-enterprises, the mountain economy, tourism, and crafts, in order to achieve greater equity between urban and rural centres. It also requires upgrading transport infrastructure to improve mobility, which is essential for strengthening local dynamism, as noted in the previous section.

Upgrading tourist sites would help diversify employment opportunities. For example, Tala Guilef has significant agricultural and tourism potential and is also a major destination for hikers. One of the initiatives implemented by the Ministry of Tourism and Crafts was the reopening of the El Arz hotel on January 25, 2024.

Finally, sustainable attractiveness also requires a shared development project among stakeholders, ensuring complementarity and coherence between territories and actors. The objective is to promote cohesion, solidarity, and social equity across the entire wilaya by strengthening the human, technical, and financial resources needed to improve the effectiveness of public action.

Overall, public policies and local stakeholders play an important role in balanced territorial development. Their actions should include regular evaluation of implemented policies and their territorial impacts, so that adjustments can be made where necessary. However, the interviews conducted with the different departments show a gap between the strategies set out in planning documents and the realities observed on the ground. This gap is reflected in the considerable delay, or even near absence, of implementation of the spatial planning scheme, which is currently under review. It is mainly linked to insufficient investigation and, above all, weak coordination between sectors, as well as a lack of clarity regarding the

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actions to be carried out. In this context, decision-makers should show greater commitment to implementing the various plans and adopt a clear strategy and action plan with defined deadlines, supported by genuine engagement from local officials.

The wilaya of Tizi-Ouzou is rich in ecosystems, natural and cultural resources, and economic and tourism potential. Enhancing its small and medium-sized towns, as well as its villages, by controlling urban sprawl, strengthening the balance between rural and urban areas, promoting cultural and heritage assets, and preserving ecosystems would contribute significantly to territorial attractiveness in all its dimensions, including economic, social, and tourism-related dimensions.

5. Conclusions

The impact of urban sprawl on territorial attractiveness is ambivalent. It can be both positive and negative depending on local dynamics, land-use management, and the public policies implemented. Controlled urbanization that incorporates sustainable mobility strategies and balanced resource management can enhance territorial attractiveness. Conversely, uncontrolled sprawl can generate dysfunctions that undermine competitiveness, quality of life, access to services, and the preservation of natural and cultural heritage.

In the wilaya of Tizi-Ouzou, urban sprawl represents a major challenge for the territorial attractiveness of small and medium-sized towns. Although this phenomenon reflects a dynamic of urbanization and development, it also has negative effects on mobility, territorial balance, infrastructure provision, environmental quality, and access to economic and tourism opportunities. These effects are particularly significant in towns whose development is constrained by mountainous topography, dispersed settlement patterns, and insufficient public transport.

The analysis highlights the urgent need for more controlled spatial planning adapted to local specificities. Strengthening infrastructure, particularly transport networks and public facilities, appears essential to reduce spatial fragmentation and ensure better connectivity between urban centres, peripheral areas, and rural settlements. Sustainable development strategies combining environmental preservation, economic revitalization, heritage enhancement, and improved governance are also necessary to strengthen the attractiveness of these territories.

The Wilaya Territorial Development Plan for 2030 (PATW2030) provides a relevant strategic framework for addressing these issues. However, its effectiveness depends on stronger intersectoral coordination, clearer implementation

mechanisms, regular policy evaluation, and the active involvement of local stakeholders. An integrated and balanced approach, combining the regulation of urban expansion with the promotion of harmonious development, is therefore essential to reconcile urbanization with territorial attractiveness and to make the wilaya of Tizi-Ouzou a more dynamic and competitive territory while preserving its identity and resources.

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IS THERE A U-SHAPED RELATIONSHIP BETWEEN URBANISATION AND INCOME INEQUALITY? EVIDENCE FROM EMERGING AND DEVELOPING ECONOMIES

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Abstract

This study examines the nexus between urbanization and income inequality in 28 sub-Saharan African (SSA) countries from 1990 to 2022. The study was motivated, on the one hand, by the high levels of income inequality prevailing in these countries and, on the other hand, by the rapid rate of urbanisation experienced across the region in recent years. Departing from some previous studies, this study employed four cross-sectional dependence tests, second-generation unit root and cointegration tests, a slope homogeneity test, and the robust Driscoll–Kraay (D-K) estimator, which accounts for cross-sectional dependence. The findings of the study show that there is a distinct U-shaped relationship between urbanisation and income inequality in the SSA countries studied. This finding is robust across the Pooled OLS, Fixed Effects, and Random Effects models. The results also show evidence of a bidirectional Granger-causal relationship between urbanisation and income inequality. The findings of this study, therefore, show that an increase in urbanisation initially leads to a decrease in income inequality, but subsequently results in an increase in income inequality at higher levels of urbanisation.

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Keywords: *urbanisation; income inequality; sub-Saharan African countries, Driscoll–Kraay (D-K) estimator; second-generation cointegration test*

JEL Classification: D63, O18, O55

1. Introduction

The nexus between urbanisation and income inequality has been a subject of debate over the years. A number of theories have been advanced to explain the relationship between urbanisation and income inequality. Earlier theories, such as Lewis (1954) dual-sector theory, for example, argue that urbanisation may lead to an increase in income inequality due to the rural-to-urban labour movement as structural transformation. According to Lewis (1954), as a country develops, workers in the rural agricultural areas tend to migrate to urban industrial areas. This migration from rural to urban tends to increase income inequality because urban industrial workers earn higher wages than rural agricultural workers. Moreover, as a large population moves to urban areas, rural population remains crowded in low-productivity activities, thereby widening the gap between the urban population and rural population.

The theoretical link between urbanisation and income inequality can also be explained by the Harris–Todaro (1970) model. According to Harris–Todaro (1970), workers tend to move from rural areas to urban areas to search for higher-income jobs in urban areas. Hence, workers are likely to migrate to urban areas even if there is high unemployment in urban areas. According to Harris and Todaro (1970), due to an increase in the urban–rural income gap, the expected income in urban areas is expected to increase, which ultimately promotes urbanisation as workers move from rural areas to urban areas. In other words, urbanisation in this case is largely driven by the gap between the expected urban income and the rural income. Hence, according to Harris–Todaro (1970), urbanisation is likely to worsen income inequality by fuelling rural–urban migration due to higher urban earning expectations.

Apart from these theories, there is another theory that posits that urbanisation and income inequality reinforce each other. According to Myrdal's (1957) cumulative causation theory, urbanisation and inequality may reinforce each other. For example, initial differences in economic opportunities can generate self-reinforcing processes that could possibly eventually attract investment and economic activity to more developed urban areas, thereby potentially widening income disparities. This implies that the movement of labour and capital toward

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economically expanding regions could strengthen those regions while weakening less-developed areas, thereby widening inequalities.

Previous studies, such as by Kannappan (1989) have shown that some migrants from rural areas who sought for employment in the formal urban sectors may not be absorbed by those sectors, which ultimately leave them with three options. First, they could return to their villages, second, they could remain in the urban areas but accept lower-paid work in the informal sector, or they could chose to remain unemployed in the urban areas, thereby increasing the unemployment rate in the urban areas, which ultimately leads to high urban unemployment and high polarised urban income distraction (see Kannappan, 1989:46). Other studies have also found that income inequality in both urban and rural areas is largely driven by high levels of land inequality. This is because high land inequality creates congestion in the urban subsistence sector, which ultimately reduces wages in the urban capitalist sector (see also Oyvat, 2016).

The link between urbanisation and income inequality has also been covered in Kuznets' (1955) analysis on the nexus between inequality and development (see Kanbur and Zhuang, 2013). According to Kuznets' inverted U-shaped curve, income inequality initially increases in the course of a country's economic development and only declines after a certain income level has been attained. Some of the drivers of income inequality in this case include, inter alia, urbanisation, which helps to reduce inequality as a country becomes more and more developed. Some recent studies have, however, shown that the impact of urbanisation may be moderated by the quality of governance. In particular, some previous studies have found that while an increase in urbanisation may lead to an increase in income inequality, an improvement in governance quality may contribute to spurring a positive urbanization, which could promote urban economic growth, thereby ultimately reducing income inequality (Dossou, 2023).

In sub-Saharan Africa (SSA), urbanisation has increased substantially and persistently in recent decades. The percentage of SSA population in urban areas has increased significantly from approximately 28.4% in 1990 to 40.3% in 2016, and 44.7% in 2025 (see World Bank, 2026 - World Development Indictors – https://databank.worldbank.org/source/world-development-indicators). This implies that more than 44% of the region's total population now lives in urban areas when compared with less than 30% in 1990, which indicates a significant shift of population from rural areas to urban areas. According to the World Bank (2026), the population of all people living in urban areas in SSA increased from approximately 148.1 million in 1990 to approximately 222.3 million in 2000, and

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thereafter from 492.6 million in 2020 to 590.2 million in 2025 (World Development Indicators, 2026). These trends show the rate of urban development and socio-economic transformation in Sub-Saharan Africa. Although the SSA level of urbanisation has significantly increased in recent decades, the region's income inequality has remained persistently high, thereby posing a major socio-economic challenge to many SSA countries. Since the reduction of income inequality is one of the United Nations Sustainable Development Goals, i.e., Sustainable Development Goal 10, and many SSA countries are signatories to the UN Sustainable Development Goals, SSA countries have, over the years, taken various measures to reduce income inequality, but the inequality rate still persists. According to the World Inequality Database (2023), income inequality in SSA remains very high, with the richest 10% in the region controlling almost 56% of total income.

The region also houses some of the most unequal countries in the world based on their Gini coefficients. According to the World Bank's (2022) report, the Southern African Customs Union (SACU), which consists of five SSA countries, namely Botswana, Eswatini, Lesotho, Namibia, and South Africa, represents the world's most unequal region, with South Africa and Namibia having the highest inequality when compared to Lesotho and Eswatini.

Although there is an undeniable link between urbanisation and income inequality from a theoretical front, empirical studies on the nexus between these two economic variables remain scant. Moreover, the majority of the previous studies were largely based on a linear model (Sulemana et al., 2019), while others did not account for cross-sectional dependence, which has been found to be inherent in many panel data studies (Dossou, 2023). Others focused, inter alia, on the role of equality and social inclusion in economic development (Gârdan and Gârdan, 2016) and the nexus between income inequality, clientelism, and government effectiveness (Isayomi et al., 2023).

It is against this background that the present study aims to examine the impact of urbanisation on income inequality in sub-Saharan African (SSA) countries. The study aims to answer two critical questions: (i) Does an increase in urbanisation lead to a reduction in income inequality? and (ii) Is the relationship between urbanisation and income inequality linear or non-linear? Sub-Saharan Africa (SSA) has been selected as the focus of the study because the region has experienced a sustained and rapid increase in urbanisation in recent decades.

Unlike some previous studies, the present study employs a wide range of panel-data techniques to examine this relationship. These include four cross-sectional

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dependence tests, second-generation panel unit-root and cointegration tests, a slope homogeneity test, and the robust Driscoll–Kraay (D-K) estimator, which accounts for cross-sectional dependence. In addition, the study employs the Dumitrescu and Hurlin (2012) panel causality test to examine the causal relationship between urbanisation and income inequality.

The remainder of the paper is organised as follows. Section 2 reviews the empirical literature underpinning the relationship between urbanisation and income inequality. Section 3 presents the methodology and data, while Section 4 presents the empirical analysis and discusses the results. Section 5 concludes the study.

2. Literature Review

Despite the established link between urbanisation and income inequality, very few empirical studies have directly examined the relationship between these two variables. Some of those studies include, studies such as Sodik et al. (2025), Su et al. (2015), Chen et al. (2016), Kollamparambil (2017), Wu and Rao (2017), Adams and Klobodu (2019), Ha et al. (2019), Sulemana et al. (2019), Ali et al. (2022), Ekeocha (2021), Nkoa et al. (2021), Wan et al. (2022), Dossou (2023), Kim and Ryu (2023), Maket et al. (2023), Do et al. (2024) and among others.

Sodik et al. (2025), while examining the impact of urbanization on income inequality in Indonesia using data from 33 provinces between 2010 and 2023, found that urbanization has no significant effect on income inequality nationally. Su et al. (2015), while examining whether urbanisation narrows the gap between urban and rural income in 30 Chinese provinces during the period from the 1990s to 2010s, found inter alia that the interaction between urbanisation and the urban-rural income gap in China depends on the regions, and that urbanisation Granger-causes an urban-rural income gap mainly in the Eastern region of China. Chen et al. (2016), while examining a causal link between urbanisation and income inequality in post-reform China during the period between 1978 and 2014, found that urbanisation has an immediate inequality-reducing effect but a lagged inequality-increasing effect. Castells-Quintan (2018), while examining the relationship between inequality and the size and distribution of cities, found that there is a U-shaped relationship between average city size and inequality. This implies that inequality first falls and then increases with average city size. The results were found to be robust to different estimation techniques and identification strategies. Kollamparambil (2017), while examining the impact of internal in-migration on income inequality in receiving areas in South Africa, found, inter alia, that rising urban inequality in urban areas can be attributed, at least in part, to rural-

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urban migration. Wu and Rao (2017), while examining the relationship between urban agglomeration and income inequality in China using panel data analysis, found that there is an inverted U-shaped relationship between urban agglomeration and income inequality. Adams and Klobodu (2019) examined the link between urbanization, economic structure, political regime, and income inequality in 21 Sub-Saharan African countries during the period between 1984 and 2014. Using Pooled Mean Group (PMG) and Common Correlated Effects (CCE) - Mean Group estimation techniques, the authors found that although urbanisation has a positive effect on income inequality in the studied countries, the results failed to support a simple Kuznets hypothesis. Ha et al. (2019), while examining the impact of urbanisation on income inequality in 63 provinces in Vietnam during the period from 2006 to 2016, found that urbanisation has an impact on reducing income inequality in the long run, while in the short run, it has a negligible impact on income inequality.

While examining the relationship between urbanisatiom and income inequality in 48 SSA countries during the period from 1996 to 2016, Sulemana et al. (2019) found that there is a positive and significant relationship between urbanisation and income inequality. Hence, greater urbanisation is associated with higher income inequality. Ali et al. (2022), while examining the effect of urbanisation and industrialisation on income inequality using the method of moments quantile regression in low-, middle- and high- income countries during the period 1990–2014, however, found mixed results about the distributional effects of urbanisation in the studied countries. While examining the nexus between urbanisation, inequality, economic development and ecological footprint in African countries during the period from 1996 to 2024, Ekeocha (2021) found that urbanisation complemented with employment creation has a reducing effect on inequality. Nkoa et al. (2021) examined the link between urbanization, industrialization and inequalities in Africa using data from 48 African countries during the period between 1980 and 2016. Using the Generalized Method of Moments-System (GMM-S), the study found that income inequality tends to increase as urbanisation increases. Wan et al. (2022), while examining whether urbanization can help to reduce income inequality in developing countries using cross-country empirical analysis, found that it is possible for urbanisation to reduce income inequality under appropriate development conditions. Dossou (2023) examined the moderating effect of governance quality on the nexus between urbanisation and income inequality across 46 African economies from 1996 to 2020. Using the two-step System GMM technique, the study found that while urbanisation significantly

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increases income inequality in the studied countries, governance quality tends to moderate the relationship. Kim and Ryu (2023), while examining the impact of urbanisation on income inequality in 29 OECD countries during the period from 2003 to 2020, found that urbanisation in OECD countries has an inverted U-shaped effect on income inequality. Maket et al. (2023), while using various panel data techniques to examine the link between urban agglomeration and income inequality in 22 SSA countries during the period between 2000 and 2020, found that there is an inverted-U relationship between urbanisation and inequality, which implies that inequality initially increases with urban agglomeration and decreases after a turning point. Do et al. (2024), in examining the link between urbanisation and income inequality in Vietnam using provincial data between 2010 and 2018, found that urbanisation tends to increase income inequality in localities, but it can reduce inequality between the rich and the poor under the influence of human capital. Table 1 provides a summary of some of the previous studies on the relationship between urbanisation and income inequality in both developed and developing countries.

Table 1: Summary of Empirical Literature Review

Authors	**Countries / Region**	**Period**	**Methodology**	**Main finding**
Su et al. (2015)	30 Chinese provinces	1990s - 2010s	bootstrap panel Granger causality test,	- The interaction between urbanization and the urban-rural income gap in China depends on the regions. - Urbanization Granger-causes an urban-rural income gap, mainly in the Eastern region of China.
Chen et al. (2016)	China	1978 - 2014	Vector autoregression (VAR) analysis	- Urbanisation has an immediate inequality-reducing effect but a lagged increasing income inequality effect.

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Authors	**Countries / Region**	**Period**	**Methodology**	**Main finding**
Kollamparambil (2017)	South Africa	2008, 2012 and 2014 (district level data)	system GMM regression analysis	-Rising urban inequality in urban areas can be attributed at least in part to rural-urban migration.
Wu and Rao (2017)	China	1987–2010 (Provincial level data)	OLS, fixed and random effects models,	- There is an inverted U-shaped relationship between urban agglomeration and income inequality.
Castells-Quintan (2018)	Various countries around the world	Historical data from Mitchel (2013)	Panel data estimation techniques	- A U-shaped relationship exists between average city size and inequality.
Adams and Klobodu (2019)	21 Sub-Saharan African countries	1984 - 2014	Pooled Mean Group (PMG) and Common Correlated Effects (CCE) - Mean Group estimation techniques	- Urbanisation has a positive effect on income inequality in the studied countries.
Ha et al. (2019)	Vietnam (63 provinces)	2006-2016	Driscoll-Kraay and Pooled Mean Group	- Urbanization has an impact on reducing income inequality in the long run, while in the short run, it has a negligible impact on income inequality.
Sulemana et al. (2019)	48 SSA countries	1996-2016	FE, RE, FGLS, Difference-GMM, System-	- A positive association between

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Authors	**Countries / Region**	**Period**	**Methodology**	**Main finding**
			GMM	urbanization and income inequality is found to exist in the region.
Ekeocha (2021)	Africa	1996–2014	A wide range of panel data techniques	- Urbanization, complemented by employment creation, strictly reduces inequality.
Nkoa et al. (2021)	48 African countries	1980 - 2016	Generalized Method of Moments-System	- Urbanization inter alia increases income inequality in Africa.
Ali et al. (2022)	Low-, middle- and high-income countries	1990–2014	Method of moments quantile regression (MMQR)	- The study found, inter alia, mixed results regarding the distributional effects of urbanisation in the countries studied.
Wan et al. (2022)	Developing countries	2011–2015	County groupings	- Urbanisation reduces income inequality under appropriate development conditions. A well-managed urbanization can lead to growth with equality.
Dossou (2023)	46 African economies	1996-2020	System GMM technique	- Urbanisation significantly increases income inequality in the studied countries.

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Authors	**Countries / Region**	**Period**	**Methodology**	**Main finding**
Kim and Ryu (2023)	29 OECD countries	2003- 2020	Driscoll-Kraay estimation method	-Urbanization in OECD countries has an inverted U-shaped effect on income inequality.
Maket et al. (2023)	22 SSA countries	2000-2020	A dynamic panel data analysis	- There is an inverted-U relationship between urbanisation and inequality, which implies that inequality initially increases with urban agglomeration and decreases after a turning point.
Do et al. (2024)	Vietnam (63 provices and cities)	2010-2018	Fixed-effects regression model estimation method with the standard error of Driscoll and Kraay (1998)	- Urbanization tends to increase income inequality in localities, but it can reduce inequality between the rich and the poor under the influence of human capital.
Sodik et al. (2025)	Indonesia (33 provinces)	2010–2023	Panel data analysis	-Urbanization has no significant effect on income inequality nationally.

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3. Empirical Model Specification

The basic model used in this study to examine the impact of urbanisation on income inequality can be presented as follows:

$$INEQUAL = f(Urban, Urban^2, YPC, INF, FDI, GFCF, Glob) \quad (1)$$

where:

- INEQUAL = Income inequality
- Urban =Urbanisation
- $Urban^2$ =Urbanisation squared
- YPC = GDP per capita – proxy for economic growth
- INF = Inflation (measured by the percentage change in the Consumer Price Index (see also, Ufoeze et al., 2018).
- FDI = Foreign direct investment
- GFCF = Gross fixed capital formation
- GLOB = Economic globalisation

The above model can be re-parameterised as follows

$$INEQUAL_{it} = \sigma_0 + \sigma_1 Urban_{it} + \sigma_2 Urban2_{it} + \sigma_3 YPC_{it} + \sigma_4 INF_{it} + \sigma_5 FDI_{it} + \sigma_6 GFCF_{it} + \sigma_7 GLOB_{it} + \varepsilon_{it} \quad (2)$$

where: i = ranges from 1 to N, t = ranges from 1 to T, σ_0 = represents an intercept, $\sigma_1 - \sigma_4$ = represent regression coefficients to be estimated; and ε = error term.

The inclusion of control variables, such as economic growth, inflation, foreign direct investment, gross fixed capital formation, and globalization, was justified by the important role these variables play in income-inequality nexus in SSA countries. The present study employs the Driscoll–Kraay (D-K) estimator, which was proposed by Driscoll and Kraay (1998), to examine the non-linear impact of urbanization on income inequality in the studied countries. The advantage of the D-K is that it accounts for cross-sectional dependence, which has been found to be inherent in many SSA countries. Apart from accounting for cross-sectional dependence, the D-K also addresses other statistical challenges, such as heteroskedasticity and autocorrelation (see Driscoll and Kraay 1998; Hoechle 2007).

The D-K's mathematical form can be expressed as follows (see also Sheraz et al., 2021):

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$$y_{i,t} = \mu_0 + Z^{*}_{i,t}\tau + \varepsilon_{i,t} \quad (3)$$

Where:

Y= Dependent variable; Z = Independent variables; i = countries; and t = time period.

3.2 Data

The data used in the current study were sourced from 28 SSA countries between 1990 and 2022. The 28 countries covered in this study include Benin, Botswana, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Congo, Dem., Congo, Rep., Cote d'Ivoire, Eswatini, Gabon, Ghana, Guinea-Bissau, Kenya, Madagascar, Mali, Mauritania, Mauritius, Niger, Rwanda, Senegal, Seychelles, South Africa, Sudan, Tanzania, Togo, and Uganda. The definitions of the variables used in this study, as well as the data sources, are summarised in Table 2.

Table 2: Definitions of Variables and Data Sources

Variables	**Definitions of variables (Measurements)**	**Data Source**
INEQUAL	Income inequality	
Urban	Urbanization (Urban population /total population)	World Bank
YPC	GDP per capita	World Bank
INF	Inflation	World Bank
FDI	Foreign direct investment inflows	World Bank
GFCF	Gross fixed capital formation (% of GDP)	World Bank
GLOB	Economic globalization index	KOF Swiss Economic Institute

4. Empirical Analysis

4.1Cross-Section Dependence Test

To test the existence of cross-sectional dependence (CD), the study used a number of CD tests, including the Pesaran CD, Bias-corrected scaled LM, the Breusch-Pagan LM, and the Pesaran scaled LM. The results of these tests have been summarised in Table 3.

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TABLE 3 Cross-Section Dependence Test

Series	Breusch-Pagan LM	Pesaran Scaled LM	Bias-corrected Scaled LM	Pesaran CD
Inequal	3977.416*** (0.0000)	130.9095*** (0.0000)	130.4720*** (0.0000)	5.096937*** (0.0000)
Urban	11177.21*** (0.0000)	392.7634*** (0.0000)	392.3259*** (0.0000)	90.18093*** (0.0000)
Urban2	11202.19*** (0.0000)	393.6721*** (0.0000)	393.2346*** (0.0000)	90.47511*** (0.0000)
YPC	5804.191*** (0.0000)	197.3487*** (0.0000)	196.9112*** (0.0000)	33.65717*** (0.0000)
INF	2786.680*** (0.0000)	87.60285*** (0.0000)	87.16535*** (0.0000)	40.86958*** (0.0000)
FDI	1294.567*** (0.0000)	33.33520*** (0.0000)	32.89770*** (0.0000)	21.39170*** (0.0000)
GFCF	1880.544*** (0.0000)	54.64700*** (0.0000)	54.20950*** (0.0000)	9.293646*** (0.0000)
ECG	3187.575*** (0.0000)	102.1832** (0.0000)	101.7457*** (0.0000)	38.90404*** (0.0000)

Note: *** denotes statistical significance at the 1% level.

Based on the results reported in Table 3, the CD has been found in all series included in this study. This finding has been supported by all CD tests employed, which have rejected the null hypothesis of no cross-sectional dependence at the 1% significance level. Apart from cross-sectional dependence, it is also vital to examine the existence of slope heterogeneity. For this purpose, the current study employs a slope homogeneity test proposed by Pesaran and Yamagata (2008) to assess slope heterogeneity. The results of the slope homogeneity test are summarised in Table 4.

TABLE 4: Slope Homogeneity Test

		Statistics	P-Value
Model: Inequal	Delta (Δ)	25.239	0.000
	Delta Adj. (Δ Adj)	29.595	0.000

As indicated in Table 4, it is clear that there is slope heterogeneity in the model. This has been confirmed by the delta (Δ) and adj (Δ) test results, which have

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rejected the slope homogeneity at the 1% level. Consequently, we can conclude that there is slope heterogeneity in our model.

4.2 Unit Root Test

Given the presence of the CD uncovered in our series, it is vital that the 2nd generation stationary tests are used in this study. The current study, therefore, uses CIPS (Cross-sectionally Augmented Im–Pesaran–Shin), which is one of the most popular panel unit root tests to examine the stationarity status of all variables included in this study. The results of CIPS are reported in Table 5.

TABLE 5: The results of the second-generation panel unit root tests - CIPS panel unit test

	Level	First Difference
Inequal	-1.81201	-3.10993***
Urban	-1.24658	-8.23834***
Urban2	-1.12900	-4.84341***
YPC	-1.80953	-3.28736***
INF	-1.65461	-6.11356***
FDI	-1.57885	-3.15318***
GFCF	-1.02904	-4.97308***
ECG	-1.52328	-5.77845***

Note(s): *** indicates rejection of the null hypothesis at the 1 level of significance.

As shown in Table 5, the CIPS results show that all variables are found to be non-stationary in levels but became stationary after first differencing. Consequently, we can conclude that all the variables are I(1).

4.3 Cointegration Test

Since the unit root test confirmed that all the variables are I(1), we can proceed and test for the existence of a cointegration relationship among the variables employed in this study. However, given the existence of CD was found in our series, it is important that we do not just rely on the first-generation cointegration. Consequently, the study employs the second-generation cointegration test based on Westerlund (2008) alongside the first-generation tests to examine the existence of a cointegration relationship among the variables included in this study. The results of

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the first-generation cointegration tests based on Westerlund (2005) and Kao (1999) are reported in Table 6, while the results of the second-generation test, i.e., Westerlund (2008) Durbin-Hausman cointegration test, are reported in Table 7.

Table 6: First-Generation Cointegration Tests

Cointegration Test			
Westerlund (2005) Test	Statistic	p-value	Conclusion
Variance ratio	-4.2718	0.0000	Cointegration exists
Kao (1999) Test	Statistic	p-value	Conclusion
ADF	-4.5537	0.0000	Cointegration exists

Table 7: Second-Generation Cointegration Test - Westerlund (2008) Durbin-Hausman Cointegration Test

Test	Statistics	p-value
DHg	7.6630	0.0324
DHp	1.5464	0.8496

As shown in Table 6, the results of the Westerlund (2005) cointegration test reject the null hypothesis of no cointegration at the 1% level of significance. Likewise, the results of the Kao cointegration test reject the null hypothesis at the 1%. This shows that both Westerlund (2005) and Kao (1999) confirm that there is a long-run relationship among the variables used in this study. Turning to the second-generation test, the Westerlund (2008) Durbin-Hausman cointegration test reported in Table 7 indicates that cointegration exists in at least some units in the panel. This has been confirmed by the Group Statistic (DHg), which has been found to be statistically significant at the 5% level. Although the results of the second Westerlund (2008) statistic, i.e., Panel statistic (DHp), were found not to be statistically significant, this is not surprising given the heterogeneous structure of our panels, which has also been confirmed by the slope homogeneity test.

4. Empirical analysis

In order to satisfactorily address the CD that has been found in our series, the study used the D-K estimator to examine the non-linear impact of urbanisation on income inequality in the studied countries. The results of the D-K are reported in Table 8.

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Table 8: Driscoll-Kraay (D-K) Estimators

	D–K Pooled OLS			D–K Fixed Effects			D–K Random Effects		
	Coefficient	**t-value**	**Prob.**	**Coefficient**	**t-value**	**Prob.**	**Coefficient**	**T-value**	**Prob.**
Urban	-0.0006503	-2.21	0.034	-0.0044175	-4.29	0.000	-0.003649	-6.58	0.000
Urban^2	0.00000917	2.97	0.006	0.0000201	2.13	0.041	0.0000171	4.44	0.000
YPC	0.000000183	0.17	0.864	-0.00000407	-1.19	0.241	-0.00000147	-0.33	0.740
INF	-0.00000108	-2.29	0.029	-0.00000128	-1.90	0.066	-0.0000012	-2.05	0.048
FDI	-0.0012916	-2.52	0.017	-0.0000849	-0.23	0.819	-0.0001134	-0.29	0.777
GFCF	-0.0003721	-1.03	0.310	0.0000376	0.10	0.919	0.00000192	0.00	0.996
ECG	0.0005418	2.90	0.007	0.0006864	1.84	0.075	0.00045	1.40	0.172
Cons	0.5092477	92.67	0.000	0.6237309	47.55	0.000	0.6048453	40.06	0.000
Root MSE	0.0597								
F- statistic / Wald chi2	16.88			33.35			195.67		
Prob. F-statistic / Prob. Chi2	0.0000			0.0000			0.0000		

The results reported in Table 8 show that there is a U-shaped relationship between urbanisation and income inequality in SSA. This has been confirmed by all the estimators used in this study, namely D-K Pooled OLS, D-K Fixed Effects and D-K Random Effects. When Pooled OLS is used, the coefficient of urbanization (i.e., Urban) in the income inequality equation was found to be negative and statistically significant, while the coefficient of urbanisation squared (i.e., Urban^2) was found to be positive and statistically significant. This implies that an increase in urbanisation in SSA initially leads to a decrease in income inequality, but beyond a certain level of urbanisation, it tends to increase rather than reduce income inequality. Similar to the results of Pooled OLS, the results of Fixed Effects show that the coefficient of urbanization (i.e., Urban) is found to be

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negative and statistically significant, implying that an increase in urbanisation initially leads to a decrease in income inequality. However, the coefficient of the squared urbanisation term is negative, implying that, beyond a certain level of urbanisation, further increases in urbanisation result in an increase rather than a decrease in income inequality.

The results of the Pooled OLS and Fixed Effects models are also corroborated by those of the Random Effects model, which similarly finds that urbanisation has a reducing effect on income inequality, while the squared urbanisation term has an increasing effect, thereby confirming the existence of a U-shaped non-linear relationship between urbanisation and income inequality. The results of Dumitrescu Hurlin panel causality tests reported in Table 9 also confirm the existence of bi-directional Granger causality between urbanisation and income inequality. The null hypothesis that urbanisation does not Granger-cause income inequality has been rejected at the 1% significance level, as confirmed by the Z-bar statistic of 9.75040 (p = 0.0000). Likewise, the null hypothesis that income inequality does not Granger-cause urbanisation has been rejected at the 1% significance level, with a Z-bar statistic of 18.3347 (p = 0.0000).

Table 9: Dumitrescu Hurlin Panel Causality Tests

Null Hypothesis:	W-Stat.	Zbar-Stat.	Prob.
URBAN does not homogeneously cause INEQUAL	6.50688	9.75040	0.0000
INEQUAL does not homogeneously cause URBAN	10.3280	18.3347	0.0000

Other results show that economic growth has no significant impact on income inequality in the countries studied. This applies irrespective of whether the estimation is conducted using Pooled OLS, Fixed Effects, or Random Effects. An increase in inflation rate has been found to reduce income inequality in SSA countries. This finding is not surprising given that inflation disproportionately affects the real financial assets of wealthier households, thereby narrowing the gap between the poor and the rich. Although the coefficient of FDI was found to be negative when all three estimators were used, it was found to be significant only when Pooled OLS was used as an estimator. FDI can reduce income inequality through a number of channels, including employment creation when foreign

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investors establish new businesses, factories, or service operations. This leads to an increase in the employment of relatively large numbers of low- and middle-skilled workers, thereby reducing income inequality in the countries studied. Contrary to expectations, gross fixed capital formation has been found to have no impact on income inequality across all the estimators. This finding, however, is consistent with some other previous studies, such as Ayyash and Fuqaha (2024) for the case of lower-middle-income countries. Finally, an increase in economic globalisation has been found to increase income inequality in two of the three estimators, namely Pooled OLS and Fixed Effects.

5. Conclusion

This study examines the impact of urbanization on income inequality in SSA countries during the period from 1990 to 2022. The study aims to answer two critical questions: i) Does an increase in urbanization lead to a decrease in income inequality? and (ii) Is the relationship between urbanisation and income inequality linear or non-linear? Sub-Saharan Africa has been selected for this study because the region has recorded a sustained, significant increase in rapid urbanization in recent decades. The region has some of the most unequal countries in the world, including the Southern African Customs Union (SACU), which has been found to represent the world's most unequal region. Departing from some of the previous studies, the study employs robust Driscoll-Kraay estimators that account for cross-sectional dependence, heteroskedasticity, and Serial correlation (autocorrelation). Employing data from 28 countries, the study found that there is a U-shaped relationship between urbanisation and income inequality in the SSA countries studied. This finding applies, irrespective of whether the analysis is conducted using Pooled OLS, Fixed Effects, or Random Effects. The findings of this study, therefore, show that an increase in urbanisation initially leads to a decrease in income inequality, but subsequently results in an increase in income inequality at higher levels of urbanisation. The results of the D-H Granger causality test also confirmed the existence of a causal relationship between urbanization and income inequality. In particular, the results show that there is a feedback causal relationship between urbanization and income inequality in the studied countries.

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Appendix 1:

Variable	Obs	Mean	Std. dev.	Min	Max
INEQUAL	924	0.5118255	0.0601586	0.3865	0.6911
URBAN	924	37.54604	16.93691	5.416	90.735
ECG	924	41.18826	11.43207	19.2888	85.1372
YPC	924	2184.985	2888.598	190.35	16747.36
INF	924	45.70322	799.7196	-11.68611	23773.13
FDI	924	2.682867	4.673814	-17.29224	56.26384
GFCF	924	20.84929	9.303168	2.1	93.54746

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THE IMPACT OF RENEWABLE ENERGY CONSUMPTION ON CARBON DIOXIDE EMISSIONS: THE MODERATING ROLE OF ECONOMIC GROWTH

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Abstract

This study aims to analyze the impact of renewable energy consumption on carbon dioxide emissions. It also explores the interaction between economic growth and its moderating role in the relationship between renewable energy consumption and carbon dioxide emissions. The study was conducted on a sample of 15 MENA countries during the period 2000-2024 using panel data.

The results showed a significant positive impact of renewable energy consumption, GDP, trade openness and energy consumption on carbon

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dioxide emissions. Conversely, the study found a significant negative impact of the interaction between renewable energy consumption and economic growth on carbon dioxide emissions. Therefore, the study concludes that simply increasing the use of renewable energy is insufficient to reduce carbon emissions in MENA countries; it is also linked to these countries' economic capacity. The study recommends accelerating the transition to renewable energy, strengthening investment in infrastructure, and integrating economic growth policies with more sustainable energy and environmental policies.

Keywords: *renewable energy, CO2 emissions, economic growth, MENA countries, panel data.*

Jel Classification : Q42, Q53, O47, O53, C23.

Introduction

In light of the global transformations witnessed in the twenty-first century, environmental issues, especially the topic of renewable energy, have become a major focus in the economic and environmental policies of countries, as a result of climate changes that have led to economic, social and environmental problems, and what has increased this is the continuous rise in greenhouse gas emissions in general and carbon dioxide (CO_2) in particular,

In this context, climate change intersects with various economic, social, and environmental dimensions, necessitating integrated policies that account for these multifaceted aspects. **(Dragomir & Dragomir, 2019)**

According to the report by the Intergovernmental Panel on Climate Change (IPCC) **(Intergovernmental Panel on Climate Change(IPCC), 2022)**, human activity and over-reliance on oil, gas, and coal for electricity generation, transportation, and industry are the primary drivers of climate change. Therefore, the transition to sustainable energy sources has become essential. This transition is not merely an environmental response, but also a key economic driver, as outlined in the Paris Agreement.

According to the International Energy Agency **(International Energy Agency (IEA), 2024)**, the largest part of global emissions is related to energy production and consumption. This is because some countries still rely on fossil fuels to meet the growing demand for energy. In parallel, renewable energies have emerged as one of the promising options to achieve this balance. As a clean and inexhaustible energy source, renewable energy combines the potential to reduce carbon emissions with providing a diversified and robust base for economic growth.

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Furthermore, the continuous decline in the cost of electricity production from solar and wind power has accelerated the global expansion of renewable energy projects. **((IRENA), 2024)**, this transition aligns with a broader shift toward more sustainable production and consumption patterns aimed at mitigating environmental pressures and enhancing resource efficiency, in accordance with the principles of the circular economy and sustainable development. **(Mohajan, 2020)**

North African and Middle Eastern countries are of particular importance, given their unique characteristics that combine developmental challenges and enormous energy opportunities. These countries are characterized by an abundance of fossil fuel resources such as oil and gas, which they have adopted as a primary driver of economic growth. Of course, this has led to the creation of carbon-intensive growth models and has also curbed consumption efficiency. This result shows that the structure of energy consumption is an important interpreter of the region's environmental performance, as agreed upon by **(Arouri, Ben Youssef, M'Henni, & Rault, 2012)**.It also faces increasing environmental and social challenges that drive it to strengthen its investments in renewable energies. The region is one of the most vulnerable to the effects of climate change, such as drought, rising temperatures, and the degradation of agricultural lands **(waha & al, 2017)**

Given its enormous potential to exploit renewable energy sources, it finds itself at a crossroads between its historical reliance on bioenergy and its desire to achieve an energy transition that ensures the sustainability of its economic growth **((IRENA), 2024)** . The Middle East and North Africa region has long been known for its vast oil and gas reserves, which have contributed to economic growth. However, the intensive use of fossil fuels has increased carbon emissions. **(Mahmood, Saqib, Adow, & Abbas, 2023)**

Despite the significant efforts made by some countries in the region to promote the consumption of renewable energy, the economic impact of this shift remains a controversial topic. Some argue that investing in renewable energy improves environmental performance and reduces the carbon footprint **(Alofaysan, 2024)**. From another perspective, some argue that renewable energy has a positive impact on reducing CO2 emissions, but this is conditional on a specific threshold **(Chen, Pinar, & Stengos, 2022)**. They emphasize that this impact varies depending on the economic and institutional characteristics of countries **(Yahyaoui & Ghandri, 2024)**.

In this context, this research paper aims to analyze the impact of energy consumption on carbon dioxide emissions in a sample of Middle Eastern

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and North African countries during the period 2000-2024, and to test the moderating role of economic growth in the relationship between renewable energy consumption and carbon dioxide emissions through the interaction variable, in addition to measuring the impact of control variables (such as GDP, trade openness, and energy consumption) on carbon emissions, and then to provide recommendations to help decision-makers promote renewable energy in the face of the effects of carbon emissions.

The central question this research seeks to address is:

To what extent does renewable energy consumption affect carbon dioxide emissions in the MENA countries under study, and does economic growth contribute to modifying the impact of renewable energy on carbon emissions during the period 2000–2024?

To answer the research problem, we can formulate the following main hypotheses:

H_1: There is a statistically significant effect of renewable energy consumption on carbon dioxide emissions in the countries under study during the period 2000–2024.

H_2: There is a statistically significant effect of GDP on carbon dioxide emissions in the countries under study.

H_3: Economic growth modifies effect of renewable energy on carbon dioxide emissions in the countries under study during the period 2000–2024.

H_4: There is a statistically significant effect of trade openness on carbon dioxide emissions in the countries under study.

H_5: There is a statistically significant effect of urbanization on carbon dioxide emissions in the countries under study.

H_6: There is a statistically significant effect of the energy consumption variable on carbon dioxide emissions for the countries under study.

1- Literature Review

Researchers and economic and environmental policymakers have increasingly focused on analyzing the relationship between renewable energy consumption, carbon dioxide emissions, and economic growth, given the importance of this field today. Consequently, many studies have assessed the feasibility of transitioning to renewable energy sources. It can be said that the majority of research findings have varied in terms of statistical and economic significance, in addition to differences in the countries and methodologies employed.

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In this context, the study by **(Gurgu, 2010)** addressed the relationship between climate change, renewable energy, and the environment, highlighting the importance of developing the renewable energy sector as one possible pathway to mitigating the environmental impacts resulting from reliance on non-renewable energy sources.

This discrepancy is consistent with the study by **(Farhani, 2013)** which emphasized the lack of a clear causal relationship between renewable energy, economic growth, and CO2 in the short term, except for a unidirectional causal relationship from renewable energy consumption to carbon dioxide emissions. This reflects the absence of optimal pricing policies for renewable energy in the countries of the region. While studies have shown a positive impact of renewable energy on improving environmental quality, a study by **(Dogan & Seker, 2016)** found that increased consumption of renewable energy, trade openness, and financial development reduce carbon dioxide emissions, while increased consumption of non-renewable energy contributes to higher emissions. **(Ito, 2017)** also confirmed that renewable energy consumption contributes to reducing emissions and has a positive impact on long-term economic growth in developing countries. In the same year **(Zoundi, 2017)**, through his study of 25 African countries during the period 1980-2012, concluded that carbon dioxide emissions increase with the increase in per capita income. He also found that renewable energy negatively affects CO2 emissions, and in addition to its increasing long-term impact, it remains an important option. Similarly, **(Surugiu & al, 2018)** examined the effects of climate change on households in rural areas of Romania, highlighting how the impacts of climate change extend across multiple economic and social sectors, underscoring the multidimensional nature of the environmental problem.

As the literature developed, studies expanded to use broader databases and more advanced econometric models, showing that the impact of renewable energy on CO2 reduction varies according to the level of economic development of the country. This is consistent with the study by **(Dong, Dong, & Jiang, 2020)** of the relationship between emissions, growth and renewable energy for global data including 120 countries and four income-classified subgroups during the period 1995-2015. It also concluded that this effect is weak and not statistically significant, and that increasing economic growth and consumption of non-renewable energy may mask the mitigation effect.

At the EU level, another study **(Busu & Nedelcu, 2021)** concluded that biofuels, bioenergy production, and renewable energy consumption contribute to

reducing carbon dioxide emissions, while urbanization has a negative relationship with carbon dioxide emissions, with a recommendation to encourage and support public government policies for the consumption of renewable energy and biofuels.

Similarly, a study by **(Charfeddine & Kahia, 2021)** concluded that information and communication technology indicators, along with renewable energy consumption, reduce carbon dioxide emissions in Middle Eastern and North African countries, thus improving environmental quality. This underscores the importance of integrating digital transformation with energy transition policies. Similarly, a study by **(wen & al, 2022)** supported this finding, using quantile regression on a group of MINT countries. They concluded that information and communication technologies and renewable energy are inversely related to carbon dioxide emissions, and that renewable energy contributes to improving environmental quality. Therefore, the integration of digital and energy transformation can be strengthened to reduce environmental damage. **(Tomic & Andjelic, 2022)** also examined electricity generation from renewable energy sources in the Republic of Srpska, emphasizing the importance of developing renewable energy production as a key challenge for policymakers, given its potential economic and environmental impacts, including reducing reliance on fossil fuels and enhancing energy security.

In Algeria, **(Elbadri & al, 2023)** re-examined the relationship between renewable energy consumption, economic growth, and carbon dioxide emissions during the period 1990–2018 using a Fourier-Bootstrap ARDL model. The results revealed a long-run relationship among these variables, while rejecting the Environmental Kuznets Curve (EKC) hypothesis in the case of Algeria. The findings also indicated a unidirectional causality running from economic growth to both renewable energy consumption and CO2 emissions.

In another study of particular relevance to the moderating role under investigation, **(Kwakwa, 2023)** examined the effect of renewable energy consumption and institutional quality on CO2 emissions in 32 African countries during the period 2002–2021. The study explicitly tested the moderating role of institutional quality in the relationship between renewable energy and emissions using FMOLS. The results showed that renewable energy consumption contributes to reducing CO2 emissions, and that most institutional quality indicators reinforce this effect, with the exception of government effectiveness. This study highlights the importance of moving beyond the direct effects of renewable energy to consider the factors that may moderate the magnitude of its impact on environmental performance.

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From another perspective, **(Ionescu, 2024)** addressed the topic of carbon accounting within the framework of the circular economy, emphasizing the importance of measuring and monitoring greenhouse gas emissions in order to support emission-reduction efforts and improve operational efficiency. This underscores the importance of adopting institutional and accounting mechanisms that support the transition toward a low-carbon economy.

In a recent study, **(Işık & al, 2024)** used data from 27 OECD countries during the period 2001–2020 to analyze the effect of economic growth, renewable energy consumption, internet use, and mineral resource rents on CO2 emissions using panel quantile regression. The results revealed a negative relationship between renewable energy consumption and CO2 emissions, with the effect varying across different pollution levels, underscoring the importance of accounting for heterogeneity when analyzing the relationship between energy, growth, and environmental performance.

The study **(Al-Zubairi , AL-Akheli, & ELfarra, 2025)** also confirmed, according to its results, that financial development and political stability enhance the positive impact of renewable energy in reducing emissions within Arab economies, which confirms the role of strong financial institutions in promoting sustainability and the need to shift to clean energy sources to contribute to building a sustainable future globally.

From a different angle, he studied the non-linear effect of renewable and non-renewable energy consumption and economic growth on per capita carbon dioxide emissions, and it was found that the effect of per capita renewable energy consumption on the growth of per capita carbon dioxide emissions is negative, and increased consumption will not reduce per capita carbon dioxide emissions unless countries exceed a certain threshold of renewable energy consumption. this idea is supported by the study **(Chen, Pinar, & Stengos, 2022)**, while recent studies have focused on explaining the discrepancies and differences in the results of previous studies. The study **(Rahman, Woahid Murad, Mohsin, & Wang, 2024)** confirmed that the quality of the environment in countries with low carbon dioxide emissions is significantly affected by the consumption of renewable energy. Therefore, renewable energy represents an effective mechanism for reducing carbon dioxide emissions, especially if accompanied by environmental innovation and reducing reliance on fossil fuels to promote a cleaner and better environment.

The study **(Perone, 2024)** also aimed to determine the optimal mix of renewable energy sources to reduce carbon dioxide emissions in developed countries, by studying the long-term relationship between fragmented renewable

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energy production and carbon dioxide emissions per capita in 27 OECD countries, during the period from 1965 to 2020 using autoregressive distributed (ARDL) models for cross-sectional data, and the results concluded that electricity production from renewable energy sources (solar, hydroelectric, and Wind is linked to lower emissions in OECD countries, which indicates the need to accelerate the energy transition to achieve environmental sustainability.

The study **(Wang & Khan, 2024)** also indicated that developing countries experience an increase in per capita carbon dioxide emissions if their use of renewable energy exceeds their production capacity. Therefore, the impact of renewable energy varies between developing and developed countries depending on the level of economic development. Other recent studies have focused more heavily on the role that income levels and economic growth can play in shaping the relationship between energy and the environment. Within this framework, **(Prakash, 2025)** investigated the moderating role of income in the long-run relationships between energy consumption, economic growth, and environmental degradation, using data for 190 countries over the period 1990–2020, employing PMG, AMG, and CCEMG estimators that account for cross-sectional dependence and slope heterogeneity. The study found that the relationship between growth and emissions varies according to income level, and also found that innovation enhances the mitigating effects of renewable energy on emissions, supporting the importance of accounting for the level of economic development when interpreting the relationship between energy and environmental performance. **(Pal & al, 2025)** also examined the effect of renewable energy consumption, GDP, industrialization, and human development on carbon emissions in a group of Asian countries during the period 1997–2023 using a Panel ARDL model. The results showed that economic growth is associated with increased carbon emissions in the long run, while renewable energy consumption contributes to reducing emissions, confirming the importance of the energy pattern accompanying the economic growth path in determining environmental outcomes.

On the other hand, **(Zhao, 2025)** provided evidence more directly related to the idea of the moderating role of economic growth, using a Panel Threshold VAR model to analyze the dynamic and nonlinear relationships between foreign investment, renewable energy consumption, economic growth, and CO2 emissions in 27 countries during the period 1971–2021. The results showed that the effect of renewable energy consumption in reducing carbon emissions is significant in the long run, and that the magnitude of this effect depends on the level of economic growth, suggesting that the relationship between renewable energy and emissions

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may vary according to countries' economic level. **(Isayomi, Akomolafe, & Danladi, 2025)** also examined the effects of globalization, technological innovation, and renewable energy consumption on environmental pollution in 23 developed countries during the period 1990–2022, using a Time-Averaged Common Correlated Effects estimator and the Dumitrescu-Hurlin causality test. The results showed that renewable energy consumption is associated with reduced environmental pollution in the long run, with a bidirectional causal relationship between renewable energy consumption and environmental pollution, reinforcing the importance of renewable energy in explaining differences in environmental performance.

More recently, a study by **(Addis, 2026)** emerged, examining the factors affecting environmental pollution in the Middle East and BRICS countries during the period from 1995 to 2020. The results revealed a unidirectional causal relationship from renewable energy consumption to carbon dioxide emissions, suggesting that increased use of renewable energy effectively reduces emissions in the BRICS countries. However, the results in the Middle East showed a bidirectional causal relationship between renewable energy and carbon dioxide emissions. An increase of one unit in renewable energy reduces carbon dioxide emissions by 0.22% in the Middle East and by 0.66% in the BRICS countries. Therefore, the impact of renewable energy consumption in the Middle East region is not truly significant and remains relatively limited until a certain threshold of renewable energy consumption is exceeded. This result is consistent with **(Chen, Pinar, & Stengos, 2022)**, which underscores the importance of policies that encourage renewable energy. From here, **(Nguyen, 2026)** posed the question of whether renewable energy consumption is truly environmentally friendly and how it affects growth. Using a sample of 98 developing countries between 2002 and 2021, he concluded that while renewable energy consumption directly reduces carbon dioxide emissions, it indirectly contributes to their increase by stimulating economic growth. Therefore, the overall impact of renewable energy consumption on carbon dioxide emissions is negative in developing countries. These findings suggest a positive interaction between renewable energy and economic growth in mitigating environmental impacts.

Through our review of previous literature, we discovered that most of it focused on analyzing the binary relationship between renewable energy and CO2 emissions, or between economic growth and CO2 emissions, without integrating the two variables into a unified model. It also limited itself to estimating the direct effects of renewable energy or economic growth, while neglecting the indirect or

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interactive effects that may explain the different responses of countries to energy transition policies.

To the best of our knowledge, there are no econometric studies that have directly tested the moderating role of economic growth in the relationship between renewable energy consumption and carbon dioxide emissions, using panel data and covering a long period (2000-2024) and a considerable number of MENA countries (15 countries). From this standpoint, we seek through this study to fill these gaps by including an interaction threshold between the renewable energy consumption and economic growth to test whether a higher level of economic growth modifies the effect of renewable energy consumption on carbon emissions.

2- Methods and Materials

2-1 Methodology and Study Sample

Based on theoretical literature, this study will employ an econometric methodology to examine the nature of the relationship between renewable energy consumption and carbon dioxide emissions, in addition to an interactive determinant that clarifies the moderating role of economic growth in this relationship. The sample consists of 15 countries from the Middle East and North Africa. The study sample was selected based on several considerations, most importantly the availability of data throughout the study period. A review of previous literature revealed the economic and energy importance of these countries, as well as the variation in growth and income levels. Some economies in the region are heavily reliant on fossil fuels, while others have more diversified economies. Therefore, this sample was chosen. Based on the World Bank's classification **(worldbank, 2026)**, the countries of the region were categorized according to income level, as shown in the following table:

Table No (01): Sample countries under study

Income Group	Countries	N
High-income	The United Arab Emirates, Qatar, Kuwait, Saudi Arabia, Bahrain, Oman	6
Upper-middle	Algeria, Libya, Iraq, Jordan, Lebanon	5
Lower-middle	Egypt, Tunisia, Morocco, Iran,	4

Source: Prepared by researchers

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2-2 Study Variables and Justification for Their Selection

Upon reviewing a number of previous studies, we found several variables, some of which we adapted, while others were selected for reasons relevant to the study. These are detailed in the following table:

Table No (02): Study Variables and Reasons for Their Selection

Variable Type	Symbol	Measuring variable	Reasons for Its Selection	Data Source
Independent	REC	Renewable energy consumption	It was adopted as the main independent variable to assess the extent to which the shift towards renewable energy sources contributes to reducing carbon emissions.	(worldbank, 2026)
Independent	REC*GDP	/	The impact of renewable energy consumption on CO2 emissions is not uniform across countries, but rather varies depending on the level of economic growth. Countries with high economic growth have greater investment capacity, leading to increased energy demand and carbon emissions.	/
Dependent Variable	CO_2	CO_2 emissions per capita	It is considered one of the most important indicators used in the literature to measure environmental stress related to economic activity and energy consumption, and its	(worldbank, 2026)

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Variable Type	Symbol	Measuring variable	Reasons for Its Selection	Data Source
			importance increases in MENA countries as a result of their large energy consumption and excessive reliance on fossil fuels.	
Control Variable	GDP	GDP per capita	The level of economic growth is reflected and linked to increased production and consumption (investment in technology and infrastructure), which are factors that affect carbon emissions.	(worldbank, 2026)
Control Variable	TO	Trade Openess	It is a structural variable and can transfer clean technology that reduces CO2 emissions, or the opposite, thus increasing emissions.	(worldbank, 2026)
Control Variable	URB	Urbanization	It reflects demographic and economic shifts, and urbanization is linked to increased energy demand.	(worldbank, 2026)
Control Variable	EU	Energy use	Because it is one of the direct factors of emissions, especially in countries dependent on fossil fuel energy sources,	(worldbank, 2026)

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Variable Type	Symbol	Measuring variable	Reasons for Its Selection	Data Source
			and to know the impact more accurately (is it due to renewable energy only or to the general increase in demand for all energy, whether renewable or non-renewable).	

Source: Prepared by researchers based on previous studies

2-3 The Model Adopted for the Study

Since the study uses a multiple linear regression model based on panel data, the following mathematical model was adopted:

$$(CO2)_{it} = \beta_0 + \beta_1 (REC)_{it} + \beta_2 (GDP)_{it} + \beta_3 (REC \times GDP)_{it} + \beta_4 (TO)_{it} + \beta_5 (URB)_{it} + \beta_6 (EU)_{it} + \mu i + \varepsilon it$$

To apply this model, we will use a combined database (cross-section and time series) where the panel units represent the number of countries, N = 15. Regarding the time period,

T = 25 years will be used, so our study extends from 2000 to 2024. Therefore, the number of observations we use in our econometric analysis (T*N) is 375 observations for all panel units and all time periods.

2-4 Descriptive Study of Study Variables

Before estimating and analyzing the results, it is necessary to describe the data for the study variables. The following table illustrates this:

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Table No (03): Descriptive Statistics for Study Variables

Variables	Mean	Median	Std. Dev.	Maximum	Minimum
CO2	13.05919	7.464704	13.04375	53.59926	1.181018
REC	3.265592	0.700000	4.701440	22.40000	0.000000
GDP	17030.94	6696.374	18341.38	83533.50	1957.141
REC_GDP	15269.64	5536.358	17876.00	81130.56	0.000000
TO	4.404229	4.466973	0.396418	5.293531	3.396418
URB	4.338338	4.383965	0.220635	4.605170	3.748294
EU	7.954755	7.874022	1.190274	10.05621	5.873080

Source: Prepared by researchers using EViews 13 software

From this table, we observe that the average CO2 emissions were estimated at 13.06, while the average renewable energy consumption was estimated at 3.27, with the lowest value recorded at zero in some cases. This is due to the significant differences in reliance on renewable energy among the countries studied. The average GDP reached approximately 17,031, with a large variation between the minimum and maximum limits. This reflects the differences in economic growth levels among the sample countries. The interaction variable REC×GDP recorded a minimum value of zero due to the varying interaction between the two variables across the countries. We note that the average TO was 4.40, the average URB was 4.34, and the EU was approximately 7.95. Therefore, we conclude that there are economic, energy, and environmental disparities and differences among the countries of the region.

2-5 Correlation Analysis Between Explanatory Variables

We performed the Variance Inflation Coefficient (VIF) test. If the VIF coefficient is less than or equal to 10, then the problem of multiple linear correlation between the independent variables is not present. **(Gujarati & Porter, 2009, p. 340)** The following table shows the results of this test:

Table No (04): Multicollinearity Test

Variables	REC	GDP	REC_GDP	TO	URB	EU
VIF	5.042	4.121	3.971	1.611	2.643	8.086
1/VIF	0,1983339	0,2426595	0,2518257	0,6207324	0,378357	0,1236705

Source: Prepared by researchers based on the outputs of the Gretl program.

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The VIF test results for all variables do not exceed 10, indicating that the model does not suffer from multiple correlation (there is no multicollinearity issue between the variables). Therefore, no variable should be excluded.

2-6 Results of Estimating the Cross-Series Time Series Models

Using Eviews13 software, and after entering the data, the following results were obtained, which show the outputs of estimating the three models, namely the pooled regression model (PME), the fixed effects model (FEM), and the random effects model (REM). The following table shows the estimation results.

Table No (05): Panel estimation regression results for PRM, FEM and REM

		Estimated models		
		PRM	**FEM**	**REM**
C	Coeff	-46.44745	-40.64526	-42.23286
	prob	0.0000	0.0000	0.0000
REC	Coeff	0.713725	0.486624	0.477994
	prob	0.0000	0.0000	0.0000
GDP	Coeff	0.000455	0.000199	0.000220
	prob	0.0000	0.0000	0.0000
REC_GDP	Coeff	-0.000170	-7.21E-05	-7.36E-05
	prob	0.0000	0.0000	0.0000
TO	Coeff	-1.744779	0.7819224	0.776319
	prob	0.0002	0.0224	0.0206
URB	Coeff	6.504330	-6.393974	-4.880352
	prob	0.0000	0.0023	0.0102
EU	Coeff	3.957395	9.318044	8.657606
	prob	0.0000	0.0000	0.0000
R^2		0.954	0.991	0.672
DW		0.102	0.444	0.393
Prob (F-statistic)		0.0000	0.0000	0.0000

Source: Prepared by researchers using EViews 13 software.

Based on the table above, the estimated models can be tentatively accepted from a statistical standpoint, given that all three models are statistically significant overall. The probability values for Fisher's statistic are less than 0.05, thus

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accepting the alternative hypothesis of Fisher's test, which states that the three models are statistically significant. Furthermore, the model estimation results showed that the majority of the estimated parameters are statistically significant, thus fulfilling the partial statistical requirement. All probability values for the coefficients are generally significant, being less than 0.05, and their explanatory power is good, exceeding 50% for all three models. The only drawback of the estimated models is their autocorrelation problem.

After evaluating the results, we move to the stage of comparing the stationary panel models.

2-7 Selecting the Appropriate Study Model

The appropriate study model is selected by comparing the three panel models through three tests:

- Fisher's Constrained Test (F): To choose between the pooled regression model and the fixed-effects model, where:
  H_0: The pooled regression model is the appropriate model.
  H_1: The fixed-effects model is the appropriate model. **(Harkati, 2018, p. 225)**
- Breusch-Pagan Test: To choose between pooled and random models. If the LM is greater than the tabulated statistic, we reject the null hypothesis, and the random model is the appropriate model. The type of effect is determined using the Hausmann test. **(Benjoual, 2024, p. 154)**
- Hausmann Test: To choose between the fixed-effects and random methods, based on:
  H_0: The random-effects model is the appropriate model.
  H_1: The fixed effects model is the appropriate model. **(Halimi, Belachi, & Abou elfoutouh, 2021, p. 188)**

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Table No (06): Comparison between the three models

Test	Test Results			Appropriate Model
	Calculated Value	Tabulated Value	Probability Value	
Fisher's Constrained Test For comparing the pooled regression model and the fixed-effects model	106.45	1.75	(0.0000)	The Fixed Effects model is the appropriate model.
Breusch-Pagan test Lagrange double test Breusch-Pagan test For comparing cumulative and random methods	Value		Probability Value	The Random Effects model is the appropriate model
	1629.776		(0.0000)	
Hausman's test to compare fixed effects with a random effects model.	Value		Probability Value	The fixed effects model is best suited for the study.
	21.235387		(0.0017)	

Source: Prepared by researchers using EViews 13 software.

From the table above, we observe that, according to Fisher's bounded test, the calculated value of 106.45 is greater than the tabulated value of 1.75 at a significance level of less than 0.05. Therefore, we accept the alternative hypothesis that the fixed-effects model is the appropriate model. The results of the Lagrange multiplier test showed that the p-value (0.0000) is less than the 5% significance level, thus the random-effects model is the appropriate model. However, the results of the Hausmann test showed that the fixed-effects model is the most suitable for the study, as the p-value (0.0017) is less than the 5% significance level. Therefore, we accept the alternative hypothesis, meaning that the fixed-effects model is the appropriate model for the study.

2-8 Econometric Model Quality Testing

After statistically confirming the model's fit, we standardize it to determine its consistency and conformity with the study's hypotheses, as follows:

a- Autocorrelation Test of the Errors

Wooldridge's test is considered one of the best modern tests for measuring autocorrelation in static panel models. Its results are shown in the following table:

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Table No (07): Autocorrelation Test of the Errors

Test	Test statistic	Probability value
Wooldridge test	139.14	0.0000

Source: Prepared by researcher based on Gretl program.

The Wooldridge test shows that the probability value is approximately 0.0000, which is less than 0.05. Therefore, the test results are significant, meaning the null hypothesis, which states that there is no autocorrelation of the residuals in the study model, is rejected. Thus, there is an autocorrelation problem.

b- Heteroskedisticity Test

The Wald test is used to measure the reliability of the variance. The results are shown in the following table:

Table No (08): Wald Test for Heteroskedisticity

The statistical test	Chi square value (21)	Probability value
Wald test	3538.55	0.0000

Source: Prepared by researcher based on Gretl program.

We observe that p-value = 0 is less than the 5% significance level. Therefore, the null hypothesis is rejected, and the alternative hypothesis is accepted. This indicates that there is also inconsistency in the variance of errors in the fixed-effects model.

Based on the above, it can be said that the fixed-effects model suffers from the autocorrelation problem and also the inconsistency of variance. To correct these problems, we resort to the White cross-section (period cluster) method for standard errors and covariance. The results of the corrected study model can be presented as shown in the following table:

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Table No (09): Results of Estimating the Corrected Fixed-Effect Model

Dependent Variable= CO2			
Variable	**Coefficient**	**Std.error**	**Prob**
REC	0.486624	0.052547	0.0000
GDP	0.000199	4.73E-05	0.0003
REC_GDP	-7.21E-05	8.77E-06	0.0000
TO	0.781922	0.276447	0.0093
URB	-6.393974	2.036206	0.0044
EU	9.318044	0.700290	0.0000
Constant	-40.64526	7.937051	0.0000
R-squared =0.9913			
Adjusted R-squared =0.9908			
F-statistic = 2019.821			
Prob(F-statistic) = 0.0000			

Source: Prepared by researchers based on the outputs of the Eviews 13 software.

2-9 Discussion of the results

Looking at the estimated model, we find that all parameters of the variables are statistically significant because the probability values of the student statistic for all variables are less than the critical value of 0.05. We note that the calculated Fisher statistic value reached 2019.821, which is a high and statistically significant value, considering that the probability value of the Fisher statistic is less than 0.05, indicating that the estimated model is entirely significant. Moreover, the explanatory power of the model is very high, as evidenced by the coefficient of determination, which reached a value of 0.99. This indicates that the change in the index representing CO2 emissions is due to 99% of the independent variables used in the study, while the remaining 1% is due to other factors not included in the model. Overall, we can accept the model from a statistical standpoint.

The study results, as shown in Table (09), indicate a positive effect of the renewable energy consumption variable on the dependent variable, CO2 emissions, with a probability value of 0.0000, meaning it is significant. Therefore, this result is not considered conclusive evidence of the relationship but rather a marginal indicator only. Its actual interpretation is primarily linked to the presence of the

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interaction limit with GDP within the model, not its isolated effect. In addition, there are control variables whose effect was positive and significant, which weakens the net residual effect of REC after controlling for them. We also see that renewable energy consumption does not necessarily mean a decrease in emissions. This explains why MENA economies still rely heavily on oil and gas for energy production. Consequently, their share remains relatively weak in the energy mix, as fossil fuels are affected or compensated for due to the expansion in their consumption in parallel with population growth and economic growth. There is a positive relationship between the GDP variable and CO2 emissions in the countries of the study sample, where the probability value reached 0.0003, and with a weak positive coefficient of 0.00019, meaning there is a direct relationship between the two variables, such that a 1% increase in GDP leads to an increase in CO2 emissions of about 0.019%, with the rest of the factors being constant. In our opinion, this is because countries with a larger GDP have a wider production base, greater industrial capabilities, and more resources that allow them to expand their economic activity. This is consistent with economic theory, as the early stages of economic growth depend on industrial expansion and therefore on large energy consumption (factories, transportation, production, etc.). This result shows that many MENA countries are still dependent on energy-intensive industries such as extractive industries (mining, oil and gas extraction) and petrochemical industries (refining, processing of petroleum derivatives), and therefore increase carbon emissions. The corrected fixed model also indicates that the interaction variable between renewable energy consumption and GDP is statistically significant, with a probability value of 0.0000, which is less than the statistical significance level of 5%, and with a negative coefficient, which confirms the existence of a moderating effect of renewable energy consumption on the relationship between GDP and CO2 emissions. This is a logical explanation in our opinion, as the increase in renewable energy consumption reduces the negative environmental impact of GDP on CO2 emissions. That is, countries that consume more renewable energy have a greater ability to adapt, diversify, and achieve economic growth without a sharp increase in pollution, by enhancing the ability of economies to diversify, decoupling economic expansion from emissions, and reducing the carbon intensity of productive activity. There is a positive relationship between the trade openness variable and CO2 emissions in the countries of the study sample, where the probability value reached 0.0093, which is less than 1%, and with a positive coefficient of 0.7819, meaning there is a direct relationship between the two variables, as a 1% increase in trade openness is associated with an increase in CO2 emissions of about 78.19%. This is

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attributed to the fact that increased integration of countries in international trade enhances their economic activity (industry, transportation), as the trade of MENA countries is of the type that depends on exporting raw materials and energy, and therefore they are more likely to attract polluting industries, and this is consistent with the pollution haven hypothesis. There is a negative effect between the urbanization variable and carbon dioxide emissions, with a probability value of 0.0044, which is less than 1%, and a negative coefficient of -6.3939. This means there is an inverse relationship between the two variables. In our opinion, this is because urbanization in MENA countries is contrary to expectations. Urban expansion in them, such as smart cities, has not increased pollution; on the contrary, it has helped to reduce it. Organized urban expansion has led to more optimal and efficient use of energy, and thus reduced emissions per capita compared to unorganized rural life.

Finally, there is a significant positive effect between the energy consumption variable and carbon dioxide emissions, with a probability value of 0.0000, which is less than 1%, and a positive coefficient of 9.3180. This means there is a direct relationship between the two variables, which is consistent with economic theory. This explains why the total energy consumption of MENA countries, especially oil-producing ones, is still excessively dependent on fossil fuels (oil, gas, coal). Of course, an increase in this consumption means greater dependence on fossil fuels, which is directly reflected in higher carbon emissions. Therefore, the transition to a low-carbon economy is not enough with investment in renewable energy alone, but it is necessary to improve the efficiency of using this energy and rationalize consumption.

Conclusion

This study investigated the relationship of the moderating effect of economic growth in the sample countries on the relationship between renewable energy consumption and carbon dioxide emissions during the period 2000 to 2024, by including the interaction variable. The study concluded that the fixed effects model is appropriate for this study, and its results revealed that the direct effect of renewable energy consumption on carbon dioxide emissions was positive and statistically significant. However, the limit of the interaction between renewable energy and economic growth was significant and with a negative coefficient, indicating the existence of an inverse relationship, this reveals that the negative impact of renewable energy consumption on carbon dioxide emissions decreases with higher levels of economic growth. Therefore, it indicates that renewable

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energy consumption alone is not strongly correlated with reduced emissions, but rather remains linked to income levels, increasing emissions in low-income countries and decreasing them after exceeding a certain threshold, which aligns with the findings of (Wang & Khan, 2024).

This result challenges the prevailing view that economies that make greater use of renewable energy are necessarily lower in carbon dioxide emissions.

Regarding the control variables, all were statistically significant and consistent with theoretical expectations, except for urbanization. Per capita GDP showed a positive coefficient, reflecting the correlation between higher income levels and increased CO2 emissions. Higher income levels enable greater energy consumption, which directly impacts emissions. Trade openness (TO) also showed a positive and significant coefficient, indicating enhanced access to foreign markets. Furthermore, some economies in the region continue to engage in activities related to traditional energy and emissions-intensive industries.

As for urbanization, despite its statistical significance, it has a negative coefficient. We explain this result by the adoption and application of energy efficiency in the more urbanized areas, such as the abundance of size, improved shared infrastructure and public services such as transportation, and the structural transformation of the economy (change in the nature of activities, knowledge economy and services), in addition to innovation and strict environmental policies.

Finally, energy consumption is positively and significantly related to carbon emissions, and this is explained by the fact that economies that are more dependent on non-renewable energy sources tend to have higher emissions compared to economies that have completed a structural shift towards renewable energy. This result also confirms that, despite the increase in renewable energy consumption, it remains insufficient to achieve a tangible reduction in carbon emissions without regulating demand for it and improving the efficiency of its use.

Based on the above, we can make some recommendations, such as stimulating investment in renewable energy sources, especially in countries with high economies, to benefit from the moderating effect of economic growth, and providing financial and technological support to countries with weak economies to benefit from these investments and achieve a clean environment, building strategies and setting goals to increase the share of renewable energy consumption in the energy mix, as a goal of the COP28 conference, which calls for accelerating the energy transition and reducing emissions significantly before 2030, promoting trade openness while setting environmental standards and laws, encouraging urbanization while taking into account and regulating the increasing demand for

energy, and building strong institutions by eliminating corruption and regulating governance.

In light of the study's limitations, the researchers recommend expanding the scope of the research and applying well-established economic models to study the relationship between renewable energy consumption, CO2 emissions, and moderating role of economic growth rates, while including additional variables such as environmental innovation, governance, and green finance.

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