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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.

In addition, the journal benefits from the expertise of international academics and researchers from countries such as Australia, Azerbaijan, Algérie, Bosnia and Herzegovina, Bulgaria, France, Germany, Greece, Iceland, India, Indonesia, Italy, Lithuania, Northern Ireland, Norway, Poland, North Macedonia, Serbia, Russia, Slovenia, South-Africa, the Netherlands, Turkey, Ukraine, and the United Kingdom.

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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Each issue of the journal focuses on a specific theme, which serves as a subfield within the journal's overarching areas of coverage, offering an in-depth exploration of targeted topics.

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Issue 2/2026

FOREWORD
Navigating a Changing Global Economy: Research, Resilience, and Sustainable Transformation

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It is our pleasure to introduce *Issue 2/2026* of the *Annals of Spiru Haret University. Economic Series* at a time when the global economy continues to evolve under the influence of profound geopolitical, technological, environmental, and socio-economic transformations. The period between April and July 2026 has been marked by renewed economic uncertainty, while simultaneously offering opportunities for innovation, institutional adaptation, and international cooperation.

The international economic environment has remained highly dynamic throughout the second quarter of 2026. The *International Monetary Fund (IMF)*, in its *World Economic Outlook* released in April 2026, emphasized that the world economy is facing renewed challenges generated by geopolitical tensions, disruptions in energy markets, persistent inflationary pressures, and increased uncertainty regarding global trade. Although the global economy has demonstrated remarkable resilience over recent years, growth prospects have been revised downward as a consequence of the conflict in the Middle East and its implications for commodity markets, supply chains, and investment decisions. According to the IMF, global economic growth is projected to reach approximately 3.1% in 2026, while inflation remains above the levels targeted by most central banks, highlighting the complexity of balancing price stability with economic expansion.

Complementing the IMF's assessment, the *World Bank*, in its *Global Economic Prospects* report published in June 2026, underlined that global growth remains constrained by high financing costs, weak productivity growth, elevated public debt, demographic pressures, and increasing climate-related risks. The report stresses that while several emerging economies continue to display encouraging resilience, long-term sustainable growth will depend on structural reforms, investments in digital transformation, green technologies, education, and institutional quality.

During this period, geopolitical developments exerted considerable influence on the world economy. The escalation of tensions in the Middle East during the first half of 2026 temporarily disrupted energy markets and increased uncertainty regarding global trade routes, particularly those linked to maritime transportation. Although

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diplomatic efforts later contributed to easing tensions and energy prices began to stabilize, international organizations continued to warn that the global economy remains vulnerable to geopolitical shocks capable of rapidly affecting inflation, investment, and financial stability.

Inflation continued to represent one of the defining challenges for policymakers worldwide. While price pressures gradually moderated in several advanced economies, central banks—including the European Central Bank and the Federal Reserve—maintained a cautious approach regarding monetary policy. Policymakers emphasized that the progress achieved in reducing inflation should not lead to premature policy relaxation, as external shocks and volatile commodity markets could quickly reverse recent gains.

Another defining characteristic of the current economic landscape is the continuing transformation of global trade. Supply chain diversification, regionalization of production, strategic industrial policies, and the acceleration of digital commerce continue to reshape international business models. At the same time, trade fragmentation generated by geopolitical considerations has encouraged countries to establish new strategic partnerships while strengthening regional economic integration. International organizations increasingly recognize that long-term competitiveness will depend not only on comparative advantages but also on technological capabilities, innovation ecosystems, institutional resilience, and the ability to adapt to rapidly changing global conditions.

Artificial intelligence, digitalization, and technological innovation remain among the most influential drivers of economic transformation in 2026. Governments, businesses, and academic institutions continue investing in advanced digital infrastructure, data governance, cybersecurity, automation, and intelligent decision-support systems. These developments generate unprecedented opportunities for productivity growth while simultaneously raising complex questions concerning labor markets, education, regulation, ethics, and digital inclusion.

Equally important is the growing recognition that sustainable development can no longer be separated from economic performance. Climate adaptation, renewable energy investments, circular economy models, ESG reporting, sustainable finance, and responsible corporate governance continue to occupy a central position in both public policy and business strategies. International organizations consistently emphasize that resilience against future crises requires integrated approaches combining economic competitiveness with environmental sustainability and social inclusion.

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Against this global background, the articles included in this issue of the *Annals of Spiru Haret University. Economic Series* address many of the contemporary challenges confronting researchers, policymakers, and practitioners. The contributions examine topics related to sustainable economic development, entrepreneurship, innovation, finance, digital transformation, public administration, education, marketing, business management, governance, and emerging economic policies. Together, they provide valuable theoretical insights and practical recommendations that contribute to understanding an increasingly interconnected and rapidly evolving global economy.

Highlights of the articles included in Part I - Artificial Intelligence, Digitalization, Data, and Socio-Technical Systems

The first thematic section of this issue reflects one of the most dynamic areas of contemporary economic research: the transformative impact of artificial intelligence, digitalization, data governance, and socio-technical systems on organizations, markets, institutions, and society. The collected papers offer multidisciplinary perspectives, bringing together contributions from economics, management, law, marketing, information systems, education, human resources, engineering, and public policy.

The section opens with **Melina Allegro's** paper, *Humor Leadership and Generative AI: Sustainable Strategies for Team Management in Digital Transformation*, which explores how emotional intelligence, humor-based leadership, and generative artificial intelligence can be combined to foster resilient organizational cultures and improve team performance during digital transformation.

In *A Scoping Review of AI-Powered Business Intelligence Used in HR Selection Strategies*, **Samuel Bangura** and **Melanie Elizabeth Lourens** provide a comprehensive review of the rapidly evolving role of artificial intelligence in recruitment and talent acquisition, highlighting both the opportunities and ethical challenges associated with AI-supported human resource management.

The relationship between sustainability and technological innovation is further examined by **Dušan Stojaković** in *AI and ESG: From Mindset Shift to Business Opportunities*, where the author demonstrates how artificial intelligence increasingly supports Environmental, Social and Governance (ESG) objectives while creating new business models and competitive advantages.

Legal aspects of artificial intelligence receive significant attention throughout this issue. **Gino Fontana**, in *Human Machine Negotiation, Computational Consent and Algorithmic Opacity in Contemporary Contract Law*, investigates how AI systems

challenge traditional legal concepts such as consent, contractual autonomy, and transparency in digital transactions.

Similarly, **Valentino Vincenzo Giulio Vescio di Martirano** explores highly innovative legal and philosophical questions in *Freedom of Thought: Principle of Logical Causality and Theory of the Acausal. Predictably, Neurorights and Development of New Technologies. Legal Subjectivity of Artificial Intelligence in the New Business Environment*, addressing the emerging debate on neurorights, AI legal personality, and the ethical implications of increasingly autonomous intelligent systems.

The article by **Elena Gurgu, Victor-Nicholas Gurgu, Ioana-Andreea Gurgu, Milena Ilić, and Valentin Kuleto**, *What Comes in Business After Generative AI: The Future of Value, Work, and Intelligence*, proposes a forward-looking framework for understanding the next stage of business evolution beyond current generative AI technologies. The authors discuss the transformation of organizational value creation, human work, and intelligent decision-making in an economy increasingly shaped by advanced artificial intelligence.

Technology diffusion and innovation adoption are examined by **Dragan Ilić** in *Market Adoption and Technology Diffusion in the Era of AI*, where classical innovation diffusion theories are revisited in the context of accelerated digital transformation and AI-driven market dynamics.

The market implications of digital transformation are further explored by **Roxana Paun** in *Digitalization and Market Transformation under the Pressure of Competitive Relations*, emphasizing how digital technologies reshape competition, consumer behavior, and strategic business positioning.

Marketing and communication receive particular attention through the contribution of **Zorica Lola Jelić** and **Nevenka Popović Šević**, *Generative AI and the Globalization of Marketing: The Role of English as a Lingua Franca in AI-Driven Campaigns*. Their paper investigates how generative AI influences international marketing communication while reinforcing the strategic importance of English as the dominant language of global digital interaction.

Closely related, **Alexandra Radu**, in *Do Algorithms Flatten Language? Generative AI and the Erosion of Linguistic Identity in the Context of Digital Economy and Global Communication Markets*, raises important questions regarding the cultural consequences of algorithmic language standardization and its impact on linguistic diversity within the digital economy.

Education and pedagogy are represented by **Alessandro Sola**, whose article *Artificial Intelligence as a Tool for Pedagogical Innovation: Economic and Social*

Implications analyzes how AI technologies are transforming educational systems, teaching methodologies, and future workforce development.

The technological infrastructure required for Europe's digital future is discussed by **Vanja Stanković** in *AI-Enabled Critical Infrastructure Development in Europe: Towards Adaptive Digital Ecosystem Architectures*, offering valuable insights into resilient infrastructure, cybersecurity, and intelligent public systems.

One of the most theoretically ambitious contributions belongs to **Stephen I. Ternyik**, whose paper *Generative AI as Epistemic Infrastructure within the Economy: Reconfiguring the Conditions of Knowledge and Coordinated Action* conceptualizes artificial intelligence not merely as a technological tool but as a new infrastructure shaping knowledge production, coordination mechanisms, and economic organization.

Artificial intelligence in education is further explored by **Chinaza Uleanya, John Olayemi Okunlola, and Winston Hendricks** in *Leadership Roles in Empowering and Transforming Teaching for Sustainability through Artificial Intelligence (AI)*. Their study highlights the strategic role of educational leadership in integrating AI to achieve sustainable learning outcomes.

Data governance and digital trust are addressed by **Emmanuel Abiodun Aikulola, Esther Ifeoluwa Aikulola-Bolaji, Ganiyu Oluwaseyi Quadri, and Wilfred Isioma Ukpere** in *Data Privacy, Regulatory Compliance, and Rehabilitant Trust in Electronic Health Record Systems*, examining the intersection between technological innovation, regulatory compliance, cybersecurity, and public confidence in digital healthcare.

Beyond artificial intelligence, this section also addresses broader organizational and industrial challenges. **C. O. Idiake, F. O. Awomuse, O. A. Ologbosere, and D. A. Morakinyo** investigate *The Influence of Human Resource Management Practices on Employee Engagement in Manufacturing Organisations*, emphasizing the continuing importance of effective HR practices in enhancing workforce productivity and organizational performance.

Finally, **Ngozi Vivian Ikeogu, Henry Babatunde Akinfiro, Christopher Chiedozie Ikeogu, Chidiebere Uche Ekeugo, and Wilfred Isioma Ukpere** present *Operational Trends and Growth Analysis of Offshore Service Vessels in the Oil and Gas Sector*, offering an industry-focused analysis of operational performance, technological development, and growth prospects within one of the world's strategically significant industrial sectors.

Taken together, the papers included in this first thematic section illustrate the increasingly interdisciplinary nature of economic research in the era of artificial

intelligence. They demonstrate that digital transformation extends far beyond technological innovation, influencing business models, legal systems, education, governance, labor markets, sustainability, communication, and industrial development. Collectively, these contributions provide valuable theoretical perspectives and practical implications for scholars, policymakers, business leaders, and practitioners seeking to understand and navigate the rapidly evolving digital economy.

Highlights of the articles included in Part II. Economics, Finance, Markets, and Development

The second thematic section of this issue brings together a diverse collection of studies addressing some of the most pressing challenges facing contemporary economies. The contributions examine fiscal sustainability, financial reporting, digital finance, banking innovation, public debt, economic complexity, corporate performance, and the institutional foundations of economic development. Together, these papers offer valuable theoretical insights and empirical evidence for understanding the evolving dynamics of national and international economic systems.

The section begins with the contribution of **Ivan Todorov** and **Irina Atanasova**, *Does Public Finance Stability Affect Economic Growth? Empirical Evidence from the Euro Area Founding Countries*. The authors investigate the relationship between fiscal stability and long-term economic growth within the founding members of the Euro Area, providing empirical evidence on the importance of sound public finance management for macroeconomic stability and sustainable development. Their findings contribute to ongoing debates concerning fiscal discipline, public expenditure, and economic resilience within the European Union.

A historical and legal-economic perspective is introduced by **Gerardo Marco Bencivenga** in *The Efficiency of the Periculum: Risk Allocation and Incentives for Custody in the Roman Emptio Venditio*. By revisiting the Roman law doctrine of *periculum*, the author demonstrates how ancient legal principles concerning risk allocation continue to provide valuable insights for modern contract law, economic efficiency, and institutional design.

Financial reporting and corporate transparency are explored by **Saheed Akande Shittu** in *Fair Value Measurement under IFRS 13 and Earnings Volatility: Empirical Evidence from Listed Mining Firms in Emerging Markets*. The study examines the implications of fair value accounting for earnings volatility in resource-intensive industries, contributing to the broader discussion on accounting standards, financial reporting quality, and investor decision-making in emerging economies.

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Digital finance continues to reshape global financial markets, as illustrated by **Rachid Allab** in *Gold-Backed Cryptocurrencies: A Stable Digital Solution for Modern Corporate Finance*. The paper analyzes the potential of asset-backed digital currencies to combine the technological advantages of blockchain with the stability traditionally associated with gold, opening new perspectives for corporate treasury management, financial innovation, and digital asset governance.

Innovation in the banking industry is further examined by **Francis E. Monyei** and **Ruth E. Ufomba** in *Analysing the Innovativeness in FinTech Applications of the Banking Sector: The Influence of Transformational Leadership*. Their research highlights the strategic role of transformational leadership in fostering technological innovation, organizational adaptability, and the successful implementation of FinTech solutions within financial institutions.

Public debt and its socio-economic implications constitute another major research theme in this section. In *Does Sub-National Debt Affect Poverty and Unemployment? Panel Data Estimation*, **Eugene A. Okpe, Clever A. Gbanador, and Simeon G. Nenbee** investigate the relationship between sub-national borrowing and key development indicators, providing empirical evidence on how fiscal management at regional and local levels influences poverty reduction and employment outcomes.

Complementing this analysis, **Clement Olalekan Olaniyi**, in *Does Economic Complexity Offer a Solution to the Resource Curse? New Insights from an Emerging Economy*, explores whether economic diversification and increasing productive sophistication can help resource-rich countries overcome the well-documented challenges associated with excessive dependence on natural resources. The paper contributes to the growing literature on structural transformation, industrial policy, and sustainable economic development.

Corporate finance within extractive industries is revisited by **Saheed Akande Shittu** and **Lourens J. Erasmus** in *Leverage and Financial Performance in the Mining Sector*. Through an empirical investigation, the authors examine how capital structure decisions influence firm performance, offering practical implications for financial managers, investors, and policymakers operating in capital-intensive industries.

The section concludes with **Eugene Okpe's** contribution, *Sub-National Debts and Economic Development*, which further expands the discussion on fiscal decentralization by analyzing the developmental consequences of regional public debt. The paper highlights both the opportunities and risks associated with sub-national borrowing and emphasizes the importance of responsible fiscal governance in supporting long-term economic growth and inclusive development.

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Collectively, the papers included in this section demonstrate the complexity of today's economic environment, where macroeconomic stability, financial innovation, institutional quality, fiscal responsibility, and sustainable development are increasingly interconnected. By combining rigorous empirical analyses with conceptual and historical perspectives, the authors provide valuable contributions to contemporary debates on finance, markets, governance, and economic policy, offering both academic insights and practical recommendations for decision-makers operating in an increasingly complex global economy.

Highlights of the articles included in Part III. Human Resources, Labor, Industrial Relations, and Organizational Behavior

The third thematic section of this issue is dedicated to one of the most valuable assets of every economy—**human capital**. In a rapidly changing labor market shaped by digitalization, demographic transitions, technological innovation, globalization, and evolving employment relationships, the featured contributions examine critical issues related to workforce development, organizational behavior, industrial relations, labor governance, and employee well-being. Together, these studies provide timely insights into the opportunities and challenges confronting contemporary organizations and labor markets.

The section opens with the contribution of **Titus Olakunle Ajiye, Ganiyu Oluwaseyi Quadri, and Wilfred Isioma Ukpere**, *Peer and Media Influence on Drug Misuse and Its Implications for Human Capital Development among Female Undergraduates*. The authors investigate the social determinants of drug misuse among female university students and analyze its long-term implications for education, employability, productivity, and human capital formation. The study emphasizes the importance of preventive educational policies and social support systems in safeguarding the future workforce.

The changing nature of employment is further explored by **Wilfred Isioma Ukpere, Jeremy Mitonga-Monga, and Nyasha Mapira** in *Exploring Strategies Used by Atypical Workers to Counter Career Traps*. As non-standard forms of employment become increasingly common, the authors examine the strategies adopted by workers to overcome career stagnation, employment insecurity, and limited professional development opportunities. Their findings contribute to current discussions on labor market flexibility, employability, and career resilience.

International trade and workforce development intersect in the paper by **Oluchukwu F. Anowor, Chisom G. Okorie, Nneka F. Chikwendu, and Wilfred Isioma Ukpere**, *Trade Barriers and Export Performance: The Moderating Role of Human Capital Investment*. The authors demonstrate that investments in education,

skills development, and workforce capabilities can significantly mitigate the negative effects of trade barriers on export competitiveness, highlighting human capital as a strategic driver of international economic performance.

The importance of continuous professional development is examined by **Adeola Arotiba** and **Wilfred Isioma Ukpere** in *Values of Workplace Learning on Employment Relations in Organisations*. The study argues that organizational learning not only enhances employees' competencies but also strengthens trust, collaboration, communication, and overall employment relations, ultimately contributing to organizational sustainability and competitiveness.

Compensation management, one of the most debated topics in contemporary human resource management, is addressed by **Andrew Kanjanda, Tebogo Kefilwe Molotsi, and Jeremy Mitonga-Monga** in *Shifting Compensation Landscape: Perceptions of Transformation, Transparency, and Institutionalisation from Stakeholders*. Their research investigates how evolving compensation systems influence employee perceptions of fairness, organizational justice, motivation, and institutional legitimacy in an increasingly complex employment environment.

Industrial relations receive considerable attention throughout this section. In *Exploring the Workplace Contributions of Minority Trade Unions*, **Xavier Knight** and **Wilfred Isioma Ukpere** examine the often-overlooked role of minority trade unions in promoting employee representation, workplace democracy, and constructive labor-management dialogue. The study offers valuable insights into the diversity of employee representation mechanisms within modern organizations.

The institutional framework of labor dispute resolution is further analyzed by **Michael Sean Koorapetse** and **Wilfred Isioma Ukpere** in *Establishment of the Commission of Mediation and Arbitration: A Reflection of Renewed Government Political Will to Strengthen Labour Dispute Resolution Mechanisms*. The paper discusses the significance of strengthening mediation and arbitration institutions as essential components of efficient labor market governance and industrial peace.

The challenges associated with non-standard employment are revisited by **Jeremy Mitonga-Monga, Wilfred Isioma Ukpere, and Nyasha Mapira** in *Factors Perpetuating the Overwork Cycle among Non-Standard Employees*. Their research explores the structural and organizational factors that contribute to excessive workloads, work-life imbalance, and employee burnout among workers engaged in flexible or atypical forms of employment. The study raises important questions concerning occupational health, organizational responsibility, and sustainable workforce management.

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The section concludes with **Wilfred Isioma Ukpere** and **Michael Sean Koorapetse**, whose paper *The Role of Social Partners in Strengthening the Effectiveness of Labour Dispute Resolution Systems: A Focus on Trade Unions and Employers* emphasizes the strategic importance of social dialogue in promoting industrial harmony. The authors argue that effective collaboration between employers, trade unions, and public institutions remains fundamental for developing resilient labor market institutions capable of responding to contemporary economic and social challenges.

Taken together, the contributions in this section demonstrate that the future competitiveness of organizations depends not only on technological innovation but also on their ability to attract, develop, protect, and retain human capital. They underline the growing importance of lifelong learning, employee well-being, equitable employment practices, effective leadership, social dialogue, and inclusive labor market institutions. By integrating perspectives from human resource management, organizational behavior, industrial relations, education, and labor economics, these studies provide valuable guidance for researchers, managers, policymakers, and practitioners seeking to build more resilient, productive, and people-centered organizations in an increasingly dynamic global economy.

Highlights of the articles included in Part IV. Education, Training, and Learning Systems

The fourth thematic section of this issue focuses on the strategic role of education in shaping resilient societies, innovative economies, and sustainable development. In an era characterized by digital transformation, technological disruption, labor market reconfiguration, and lifelong learning, education has become one of the most important drivers of economic competitiveness and social inclusion. The papers included in this section explore various dimensions of educational systems, ranging from financial literacy and pedagogical innovation to educational leadership, food security, entrepreneurial education, and the quality of learning experiences in higher education.

The section begins with the contribution of **Alessandro Sola** and **Stefano Cavallini**, *The Mathematics of Financial Education: Economic Models and Pedagogical Strategies to Develop Critical Thinking*. The authors propose an interdisciplinary approach that combines economic reasoning, mathematical modelling, and innovative pedagogical strategies to strengthen financial literacy and critical thinking skills. Their work highlights the growing importance of financial education in preparing individuals to make informed economic decisions within increasingly complex financial environments.

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Educational leadership and institutional governance are addressed by **Nikho Fayindlala** and **Theodore Nkadimeng Mahosi** in *Strategies to Enhance School Discipline through Proper Leadership and Management Practices: A Case of Three Selected Secondary Schools*. Through a case-study approach, the authors examine how effective leadership, sound management practices, and organizational culture contribute to improving school discipline, educational quality, and student development. The study emphasizes that successful educational institutions rely not only on academic excellence but also on effective governance and collaborative leadership.

The relationship between social inequalities and educational outcomes is explored by **Thandokazi Majali** and **Robertson Tengeh** in *Food Insecurity and Academic Performance among Marginalised Students: A Qualitative Study at a University*. Their research highlights how food insecurity negatively affects students' academic performance, psychological well-being, and overall educational experience. By addressing one of the often-overlooked determinants of educational success, the study calls for more inclusive institutional policies capable of supporting vulnerable student populations and promoting equitable access to higher education.

The international dimension of entrepreneurship education is examined by **Ayanda Sibiya** in *Entrepreneurial Education in BRICS Economies: A Comparative Analysis of Governance, Pedagogy, and Ecosystem Alignment*. The paper offers a comparative perspective on how BRICS countries design and implement entrepreneurship education through different governance models, pedagogical approaches, and innovation ecosystems. The study demonstrates that fostering entrepreneurial competencies requires not only curriculum reform but also close collaboration between universities, governments, businesses, and innovation networks.

The section concludes with the contribution of **Ganiyu Oluwaseyi Quadri, Taofeek Gbolahan Muibi, Oluwaranti Alo, and Wilfred Isioma Ukpere**, *Postgraduate Students' Learning Experience and Effectiveness at the National Open University, Framed as a Strategy of University Leadership*. The authors investigate postgraduate students' perceptions of learning effectiveness within an open and distance learning environment, emphasizing the strategic role of university leadership in ensuring educational quality, student engagement, and institutional performance. Their findings contribute to current debates concerning digital education, flexible learning models, and the future of higher education in an increasingly technology-driven academic landscape.

Collectively, the papers included in this section reaffirm that education extends far beyond knowledge transmission. It represents a strategic investment in human capital, innovation capacity, social mobility, and sustainable economic development. By addressing topics such as financial literacy, educational leadership, social inclusion, entrepreneurial competencies, and the digital transformation of higher education, the authors provide valuable insights for educators, university leaders, policymakers, and researchers committed to building more inclusive, adaptive, and future-oriented learning systems. Together, these contributions illustrate how education remains one of the most powerful instruments for empowering individuals, strengthening institutions, and fostering resilient economies capable of responding to the challenges of the twenty-first century.

Highlights of the articles included in Part V. Supply Chain, Business, and Sustainable Management

The fifth thematic section of this issue addresses the evolving landscape of business management, sustainable supply chains, and corporate responsibility in an increasingly interconnected global economy. Recent geopolitical disruptions, digital transformation, environmental challenges, and changing stakeholder expectations have fundamentally reshaped the way organizations design their business strategies and manage value creation. The papers gathered in this section examine how sustainability, well-being, digitalization, and responsible governance are becoming central pillars of contemporary business practice.

The section opens with the contribution of **Chinedu Canice Okwara, Rufus Tochukwu Okwara, and Maurice Eyo**, *Building Sustainable Supply Chain: Opportunities and Challenges*. The authors provide a comprehensive analysis of the opportunities and constraints associated with the transition toward sustainable supply chain management. Their study discusses how organizations can integrate environmental responsibility, social accountability, and economic efficiency throughout the entire supply chain while addressing challenges related to supplier collaboration, risk management, regulatory compliance, and resilience. The paper contributes to the growing body of research emphasizing that sustainable supply chains are no longer merely a competitive advantage but a strategic necessity for long-term organizational success.

The relationship between employee well-being and corporate performance is explored by **Gino Fontana** and **Mario Fontana** in *From Well-Being Theory to Business Practice: A Comparative Analysis of Benefit Models and New Accounting Standards*. The authors investigate how organizations increasingly incorporate employee well-being into their business models and examine the implications of

emerging accounting standards for measuring and reporting social value. By linking organizational behavior, corporate governance, and financial reporting, the study illustrates how investments in human well-being can enhance productivity, organizational resilience, and long-term value creation while promoting more responsible and transparent business practices.

The section concludes with the paper by **Chinedu Canice Okwara, Rufus Tochukwu Okwara, and Kelvin Chijioke Iwuagwu**, *Sustainability in Digital Supply Chain Management: A Comparative Analysis of Environmental Impact*. The authors examine how digital technologies—including data analytics, automation, artificial intelligence, and intelligent logistics systems—can contribute to reducing the environmental footprint of supply chain operations. Their comparative analysis highlights both the opportunities and challenges associated with digital transformation, emphasizing that technological innovation should be accompanied by sustainable management practices capable of balancing operational efficiency with environmental protection.

Collectively, the contributions included in this section demonstrate that the future of business competitiveness depends increasingly on organizations' ability to integrate sustainability into every stage of their operations. Whether through resilient supply chains, employee-centered business models, or environmentally responsible digital transformation, the featured studies underline that economic performance and sustainable development are no longer competing objectives but mutually reinforcing dimensions of long-term organizational success. These papers offer valuable theoretical insights and practical recommendations for managers, policymakers, and researchers seeking to develop more resilient, responsible, and future-oriented business ecosystems.

Highlights of the articles included in Part VI. Society, Governance, Inequality, and Critical Studies

The final thematic section of this issue broadens the analytical perspective by examining the complex interactions between economic development, governance, social inclusion, human rights, entrepreneurship, and community resilience. The papers assembled in this section recognize that economic performance cannot be understood solely through traditional macroeconomic or financial indicators. Instead, sustainable development increasingly depends on the capacity of societies to address inequality, strengthen institutions, promote inclusive governance, and empower local communities. The contributions therefore offer interdisciplinary perspectives that integrate economics, sociology, public policy, law, management, and development studies.

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The section opens with the paper by **Stefano Amodio**, *Social Inequalities and Labor Market Transformations in the Digital Economy: A Comparative Socio-Economic Analysis between Italy and Romania*. Through a comparative analysis of two European countries experiencing different trajectories of digital transformation, the author investigates how technological change reshapes labor markets, employment structures, and social inequalities. The study highlights the opportunities generated by digitalization while drawing attention to the risks of labor market polarization, digital exclusion, and unequal access to emerging economic opportunities. By comparing Italy and Romania, the paper offers valuable insights into the policy measures required to ensure a more inclusive digital transition.

Ethical and legal challenges associated with emerging technologies are further explored by **Marian Ilie** and **Roxana Paun** in *Future's Dilemma – Human Rights in the Age of Civilian and Military Drones*. The authors examine one of the most pressing debates of the twenty-first century: balancing technological innovation with the protection of fundamental human rights. By analyzing the expanding use of civilian and military drones, the paper raises important questions concerning privacy, security, accountability, international law, and ethical governance, emphasizing the necessity of developing robust regulatory frameworks capable of responding to rapidly evolving technological capabilities.

The realities of entrepreneurship in marginalized communities are addressed by **Alpheaus Litheko, Faan Pelser, and Godknows Gomwe** in *Barriers that Impede Business Growth in Rural Communities: Informal Micro-Businesses*. The authors investigate the structural constraints faced by informal entrepreneurs operating in rural areas, including limited access to finance, inadequate infrastructure, regulatory challenges, and market exclusion. Their findings underline the importance of inclusive development policies that strengthen entrepreneurial ecosystems and create opportunities for sustainable local economic growth.

Alternative development paradigms are explored by **Amukelani Mathebula** in *Ubuntu Economics in Action: Community-Centric Sports Entrepreneurship as a Sustainable Development Pathway*. Drawing upon the African philosophy of Ubuntu, the paper demonstrates how sports entrepreneurship can foster social cohesion, community empowerment, economic participation, and sustainable local development. By integrating indigenous knowledge with contemporary entrepreneurship theory, the study offers an innovative framework for understanding community-based economic development.

The relationship between informal economic activity and social resilience is further examined by **Zuziwe Mpanza** and **Nalini Moodley-Diar** in *Informal Trading*

as a Structural Cushion against Gender-Based Violence: Evidence from Black Women Traders in Developing Economies. Their research highlights the critical role played by informal entrepreneurship in enhancing women's economic independence and reducing vulnerability to gender-based violence. The paper illustrates how economic empowerment can become an effective instrument for advancing gender equality, social protection, and inclusive development.

Governance and sustainable tourism are the focus of **Botshelo Sesinyi, Tsitsi Chipfuva, Alice Njoroge, Rewai Mutoko, and Brian Mahosi** in *Navigating Governance Complexity: The Compass Framework for Leadership and Sustainable Community-Based Tourism*. The authors propose an innovative governance framework designed to support leadership, stakeholder collaboration, and institutional coordination within community-based tourism initiatives. Their study demonstrates that sustainable tourism development requires effective governance structures capable of balancing economic growth, environmental conservation, and community participation.

The section concludes with **Chinedu Canice Okwara** and **Tochukwu Rufus Okwara**, whose paper *Market Segmentation Basis and Performance of Hotels* examines one of the fundamental strategic tools in hospitality management. The authors analyze how different approaches to market segmentation influence hotel performance, customer satisfaction, and competitive positioning within an increasingly dynamic tourism industry. Their findings provide practical recommendations for managers seeking to enhance organizational performance through more effective market-oriented strategies.

Taken together, the contributions in this final section illustrate that sustainable economic development is inseparable from broader societal concerns, including social justice, institutional quality, human rights, community empowerment, gender equality, and responsible governance. They remind us that economic progress must ultimately be measured not only by productivity and growth, but also by its capacity to improve people's lives, reduce inequalities, strengthen democratic institutions, and foster resilient communities. By embracing interdisciplinary perspectives and addressing some of the most significant social and governance challenges of our time, these papers successfully conclude the present issue with a comprehensive vision of development that places people, institutions, and sustainability at the center of economic analysis.

The six thematic sections that compose *Issue 2/2026* collectively demonstrate the richness and diversity of contemporary economic research. From artificial intelligence and digital transformation to finance, education, human capital,

sustainable business, governance, and community development, the contributions published in this volume reflect the interdisciplinary character of modern economics and its growing engagement with the complex challenges of an increasingly interconnected world. Together, they reaffirm the mission of the *Annals of Spiru Haret University. Economic Series* to promote rigorous scientific research, international academic dialogue, and innovative ideas that contribute to building more resilient, inclusive, and sustainable economies and societies.

The contributions brought together in *Issue 2/2026* of the *Annals of Spiru Haret University. Economic Series* provide a comprehensive reflection of the major transformations shaping today's global economy and society. Although they address diverse themes—from artificial intelligence and digital transformation to finance, labor markets, education, sustainable business, governance, and community development—they share a common objective: to better understand the challenges and opportunities emerging from an increasingly interconnected, digitalized, and sustainability-oriented world.

The six thematic sections collectively demonstrate that contemporary economic research has become profoundly interdisciplinary. Artificial intelligence is no longer viewed solely as a technological innovation but as a transformative force reshaping business models, labor markets, legal systems, education, governance, and social interactions. At the same time, the papers dedicated to finance and economic development emphasize the continuing importance of sound public policies, responsible fiscal management, financial innovation, and institutional resilience in promoting sustainable economic growth.

The studies focusing on human resources, organizational behavior, and industrial relations remind us that technological progress must remain centered on people. Human capital, employee well-being, lifelong learning, inclusive workplaces, and effective labor institutions continue to represent fundamental drivers of organizational competitiveness and social prosperity. Similarly, the contributions devoted to education reaffirm that universities and educational institutions play a pivotal role in preparing future generations to successfully navigate the rapidly evolving knowledge economy.

The issue also highlights the increasing strategic importance of sustainability. Whether discussed in relation to supply chains, corporate governance, environmental responsibility, entrepreneurship, or community development, sustainability emerges not as a separate policy objective but as a guiding principle that permeates every dimension of economic activity. Responsible business practices, resilient institutions,

and socially inclusive development are presented as essential prerequisites for long-term competitiveness.

Equally significant are the papers addressing governance, inequality, human rights, and social transformation. These contributions broaden the scope of economic analysis by recognizing that economic development cannot be separated from democratic institutions, ethical leadership, social justice, gender equality, and community resilience. They remind us that successful economies are ultimately those capable of generating prosperity while preserving social cohesion and ensuring equal opportunities for all citizens.

Another distinctive feature of this issue is its remarkable international character. The volume brings together contributions from scholars representing universities and research institutions across Europe, Africa, Asia, and beyond. This diversity of academic traditions, methodological approaches, and geographical perspectives enriches the scientific dialogue and reinforces the journal's mission of promoting international collaboration and interdisciplinary research capable of addressing global challenges through local and regional experiences.

The Editorial Board sincerely thanks all authors for entrusting the *Annals of Spiru Haret University. Economic Series* with the dissemination of their research. We also express our deep appreciation to the reviewers, members of the Scientific Committee, Editorial Committee, Technical Committee, Conference Chairs, Panel Chairs, and all collaborators whose professionalism and dedication have ensured the high scientific quality of this issue. Their invaluable contribution continues to strengthen the journal's academic reputation and international visibility.

As we move further into an era characterized by rapid technological innovation, geopolitical uncertainty, environmental pressures, and profound socio-economic change, the need for rigorous scientific research has never been greater. Academic inquiry remains one of the most powerful instruments for understanding complexity, informing evidence-based policymaking, fostering responsible innovation, and promoting sustainable and inclusive development.

We hope that the articles published in this issue will stimulate new ideas, inspire future research projects, encourage interdisciplinary dialogue, and contribute to the advancement of economic science and related fields. Above all, we trust that they will support researchers, educators, business leaders, and policymakers in addressing the complex realities of the twenty-first century with knowledge, creativity, and responsibility.

We warmly invite our readers to engage with the rich and diverse perspectives presented throughout this volume and to continue contributing to the international

scientific dialogue fostered by the *Annals of Spiru Haret University. Economic Series*.

On behalf of the Editorial Board, I would like to express our sincere appreciation to all authors, reviewers, members of the Scientific Committee, Editorial Committee, and Technical Committee whose dedication and professionalism have made this issue possible. Their commitment to maintaining rigorous academic standards ensures the continued development and international visibility of the journal.

We sincerely hope that the studies published in this issue will stimulate further academic debate, inspire new international collaborations, and contribute meaningfully to the advancement of economic science.

We remain committed to maintaining high academic standards and to fostering an inclusive platform for original research that advances knowledge and responds to real-world challenges. Readers interested in exploring the full scope of our publications and editorial objectives are encouraged to consult our website at http://anale-economie.spiruharet.ro/.

Constructive feedback plays an essential role in the development of both individual research and the journal as a whole. Observations, comments, and suggestions may be addressed to ashues@spiruharet.ro. Scholars wishing to contribute to future issues are invited to submit their manuscripts through our online submission system at: http://anale.spiruharet.ro/index.php/economics/login.

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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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HUMOR LEADERSHIP AND GENERATIVE AI SUSTAINABLE STRATEGIES FOR TEAM MANAGEMENT IN DIGITAL TRANSFORMATION

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Abstract

Digital transformation, accelerated by the development of generative artificial intelligence, represents one of the most significant discontinuities in contemporary organizational systems. This transformation does not simply redefine technologies and operational processes, but profoundly reshapes cognitive mechanisms, relational dynamics, communication practices, and decision-making processes within workplaces. In this context, organizations increasingly require leadership models capable of integrating technological innovation with human-centered approaches, avoiding purely technocentric perspectives and promoting sustainable and inclusive organizational cultures.

This paper proposes an integrated theoretical framework combining Primal Leadership, developed by Daniel Goleman, Richard Boyatzis, and Annie McKee, with humor education as a cognitive, emotional, and relational strategy. The central hypothesis is that humor, far from being a marginal or merely entertaining element, represents an advanced form of intelligence

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capable of fostering cognitive flexibility, emotional regulation, creativity, and social cohesion in digitally mediated work environments.

The study adopts an interdisciplinary perspective integrating contributions from psychology, organizational sociology, psycholinguistics, digital communication studies, and leadership theory. Particular attention is devoted to the transformation of language within digital environments, where human-machine interaction has generated hybrid communicative forms based on symbols, emojis, memes, visual irony, and humorous digital narratives. These elements perform expressive, emotional, and relational mediation functions within organizational communication.

Through the analysis of theoretical models and organizational case studies, including Google, Microsoft, and Zappos, this contribution demonstrates how emotionally intelligent leadership supported by humor education practices may improve psychological safety, resilience, creativity, and collaborative performance within AI-driven teams.

The paper also examines the relationship between generative artificial intelligence and human communication, emphasizing how humor remains a distinctly human competence. Although AI systems are increasingly capable of generating apparently humorous content, they still struggle to interpret contextual ambiguity, emotional nuance, irony, symbolic references, and cultural meanings. This limitation highlights the irreplaceable role of human emotional intelligence in digitally transformed organizations.

Finally, the article argues that organizational sustainability cannot be reduced to technological efficiency or economic performance alone. Instead, sustainable innovation requires the integration of emotional well-being, relational quality, symbolic communication, and collaborative creativity. In this perspective, humor emerges as a strategic resource for the future of leadership and teamwork in the age of generative artificial intelligence.

Keywords: *primal leadership; emotional intelligence; organizational humor; generative artificial intelligence; digital transformation; sustainability; teamwork; creativity; digital communication; psychological safety.*

JEL Classification: M14; O33; J24; D83

INTRODUCTION

Digital transformation currently represents one of the most influential and disruptive forces reshaping economic, social, and organizational structures worldwide. Over the last two decades, technological innovation has progressively

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modified production systems, communication practices, decision-making processes, and professional identities. However, the recent emergence of generative artificial intelligence has accelerated this transformation at an unprecedented pace, introducing systems capable not only of automating repetitive activities but also of generating linguistic, visual, and symbolic content traditionally associated with human creativity and cognition. Technologies based on advanced machine learning models are now able to produce texts, images, analyses, predictive simulations, and conversational interactions that increasingly resemble human communication processes.

This transformation has produced significant consequences for organizations, which are now required to rethink not only their operational structures but also their leadership models, communication strategies, and relational dynamics. As emphasized by Erik Brynjolfsson and Andrew McAfee (2014), technological innovation alone cannot guarantee sustainable organizational development. The effectiveness of digital transformation depends fundamentally on the capacity of organizations to integrate technological progress with the evolution of human competencies. In particular, competencies related to emotional intelligence, creativity, communication, adaptability, and relational management are becoming increasingly central within highly digitalized environments.

The growing integration between humans and intelligent technologies is generating what many scholars define as hybrid organizational ecosystems, in which decision-making processes emerge from continuous interactions between algorithmic systems and human interpretation. This hybridization profoundly modifies the role of leadership. Traditional leadership models, primarily based on hierarchical control and technical supervision, appear increasingly inadequate within contexts characterized by uncertainty, complexity, rapid innovation, and distributed collaboration. Consequently, contemporary organizations require leadership approaches capable of integrating cognitive, emotional, and relational dimensions.

Within this scenario, the theory of Primal Leadership developed by Daniel Goleman, Richard Boyatzis, and Annie McKee (2002) emerges as a particularly relevant framework for understanding organizational dynamics in the age of artificial intelligence. According to the authors, effective leadership is fundamentally grounded in emotional intelligence and in the leader's ability to generate emotional resonance within groups. Leaders influence organizational climate not merely through strategic decisions or technical competencies but primarily through their emotional impact on collaborators. Emotional states such as

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trust, enthusiasm, anxiety, fear, or motivation are contagious within organizations and significantly affect creativity, collaboration, productivity, and resilience.

The concept of resonant leadership becomes particularly important in digitally mediated environments, where interpersonal relationships are frequently filtered through technological platforms and virtual communication systems. Remote work, hybrid collaboration, digital project management tools, and AI-assisted communication have radically transformed the way individuals interact within organizations. Although these technologies increase efficiency and operational flexibility, they may simultaneously generate emotional fragmentation, social isolation, communication ambiguity, and psychological disengagement. In this context, emotionally intelligent leadership becomes essential for maintaining cohesion, trust, and collaborative engagement.

Primal Leadership is structured around four interconnected dimensions of emotional intelligence: self-awareness, self-management, social awareness, and relationship management. Self-awareness refers to the leader's capacity to recognize personal emotions, limitations, values, and behavioral patterns. Self-management concerns emotional regulation and adaptability in challenging situations. Social awareness involves empathy and the ability to understand relational dynamics within groups. Finally, relationship management refers to the ability to inspire, motivate, mediate conflicts, and promote collaboration. In digitally transformed environments, these competencies become increasingly relevant because leaders are required to manage not only operational complexity but also emotional uncertainty and relational fragmentation.

Parallel to the evolution of leadership theories, humor has also acquired renewed relevance within organizational studies. Traditionally considered a secondary or merely entertaining aspect of workplace communication, humor is now increasingly recognized as a strategic cognitive and relational resource. Studies conducted by Rod A. Martin (2007) demonstrate that humor contributes significantly to emotional regulation, stress reduction, resilience development, and interpersonal relationship improvement. Humor facilitates social bonding, reduces communicative barriers, and promotes positive organizational climates.

From a psychological perspective, humor is a highly complex phenomenon involving emotional, cognitive, social, and linguistic processes. Humor requires the perception of incongruity, followed by reinterpretation and resolution. This mechanism activates divergent thinking and cognitive flexibility, allowing individuals to explore alternative perspectives and reinterpret problematic

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situations creatively. Such processes are particularly valuable in organizational contexts characterized by uncertainty and continuous change.

Edward de Bono's theory of lateral thinking (1992) further reinforces this perspective. According to De Bono, innovation frequently emerges from the ability to interrupt rigid cognitive patterns and create unexpected associations between ideas. Humor functions precisely through this mechanism of cognitive disruption and reinterpretation. Consequently, humor should not be interpreted merely as emotional relief or entertainment but as a sophisticated cognitive competence directly related to creativity and problem-solving.

Within digitally transformed organizations, humor also performs important communicative functions. The expansion of virtual communication has generated new forms of symbolic interaction based on emojis, memes, GIFs, and humorous digital language. These communicative elements play a crucial role in reducing emotional distance and maintaining relational cohesion within remote and hybrid teams. In many digital workplaces, humor functions as a compensatory mechanism capable of humanizing technologically mediated communication.

For example, in professional communication platforms such as Microsoft Teams, Slack, and Zoom, employees increasingly use emojis, humorous reactions, and visual irony to soften communicative tone and facilitate social interaction. A smiling emoji, an ironic GIF, or a humorous meme may reduce tension during stressful meetings, clarify communicative intentions, and create emotional proximity among collaborators. This phenomenon demonstrates that digital communication is progressively evolving toward hybrid symbolic systems integrating verbal and visual language.

At the same time, generative artificial intelligence is transforming communication itself. AI systems are increasingly capable of producing coherent texts, simulating conversations, generating creative content, and adapting linguistic styles to specific contexts. However, despite these advancements, artificial intelligence still struggles to fully understand contextual ambiguity, irony, emotional nuance, and symbolic humor. This limitation reveals a fundamental distinction between algorithmic processing and human emotional cognition.

The inability of AI systems to fully interpret humor highlights the enduring importance of specifically human competencies within organizational contexts. Emotional intelligence, empathy, symbolic interpretation, creativity, and humor remain deeply connected to human experience and social interaction. For this reason, the integration between Primal Leadership and humor education may

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represent a particularly effective strategy for sustainable organizational development in the era of generative artificial intelligence.

The present article therefore explores the intersection between leadership theory, humor studies, organizational psychology, and digital transformation. More specifically, it analyzes how emotionally intelligent leadership supported by humor-based practices may improve psychological safety, organizational resilience, creativity, and collaborative performance within AI-driven environments. Particular attention is devoted to the role of humor as a cognitive, emotional, and relational device capable of facilitating adaptation to technological change while preserving human-centered organizational values.

Finally, the article argues that sustainable innovation cannot be achieved exclusively through technological efficiency. Instead, organizational sustainability requires the integration of emotional well-being, relational quality, collaborative intelligence, and symbolic communication. In this perspective, humor emerges not as a marginal or decorative element but as a strategic resource for the future of leadership and human-centered organizational development in digitally transformed societies.

1. PRIMAL LEADERSHIP IN DIGITAL TRANSFORMATION

The theory of Primal Leadership, elaborated by Daniel Goleman, Richard Boyatzis, and Annie McKee in *Primal Leadership: Realizing the Power of Emotional Intelligence* (2002), is based on the assumption that leaders exert a decisive influence on the emotional climate of groups and organizations. According to the authors, leadership effectiveness is not determined exclusively by technical competencies, strategic planning, or operational efficiency, but primarily by the leader's capacity to manage emotions, generate emotional resonance, and influence relational dynamics within teams. Emotional climate, therefore, becomes a fundamental organizational variable directly connected to motivation, productivity, creativity, resilience, and collective well-being.

This perspective represents a significant shift from traditional leadership theories focused primarily on authority, hierarchy, and rational control. In contemporary organizational environments characterized by uncertainty and rapid technological change, leadership increasingly depends on the ability to understand emotional processes and relational interactions. Emotions are no longer considered secondary elements within professional contexts but essential components influencing decision-making, communication, collaboration, and organizational culture.

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Within the context of digital transformation, the relevance of Primal Leadership becomes even more significant. Organizations are currently facing unprecedented levels of complexity generated by globalization, technological acceleration, and the integration of artificial intelligence into operational and communicative processes. The emergence of generative artificial intelligence has intensified these transformations by introducing systems capable of autonomously generating texts, images, analyses, simulations, and conversational interactions. Such technologies are redefining production systems, business models, and organizational structures while simultaneously transforming the nature of work itself.

Digital transformation is not simply a technological process but a profound cultural and relational transformation. The increasing use of remote work systems, virtual collaboration platforms, cloud-based communication, and AI-assisted organizational tools has radically altered the ways individuals interact within workplaces. Although these technologies increase efficiency and flexibility, they may also generate emotional fragmentation, communication ambiguity, relational distance, and psychological disengagement. Employees frequently experience feelings of uncertainty, anxiety, cognitive overload, and fear of technological replacement. Consequently, leadership today must address not only operational challenges but also emotional and psychological complexities.



Figure 1. Primal Leadership model based on the four dimensions of emotional intelligence.

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In this scenario, Primal Leadership offers a particularly effective framework for understanding how organizations may maintain human-centered and sustainable work environments despite technological acceleration. The model proposed by Goleman, Boyatzis, and McKee is structured around four interconnected dimensions of emotional intelligence: self-awareness, self-regulation, social awareness, and relationship management.

As shown in Figure 1, these four dimensions constitute the foundation of resonant leadership and collectively determine the leader's ability to influence organizational climate positively.

Self-awareness refers to the ability to recognize personal emotions, motivations, strengths, limitations, and behavioral tendencies. Leaders characterized by high self-awareness are capable of understanding how their emotional states affect decision-making processes and interpersonal relationships. Within digitally transformed environments, self-awareness becomes particularly important because leaders are continuously exposed to high-pressure situations, rapid changes, and constant informational stimulation. The ability to maintain emotional clarity and psychological balance allows leaders to avoid impulsive reactions and preserve rational and relational effectiveness.

Self-regulation concerns the capacity to manage emotions constructively and maintain behavioral consistency in stressful situations. This competency includes emotional control, adaptability, transparency, resilience, and the ability to tolerate uncertainty. Digital transformation frequently generates organizational instability due to continuous technological innovation and evolving operational demands. In such contexts, leaders capable of emotional self-regulation contribute to creating stability and psychological security within teams. Employees tend to perceive emotionally balanced leaders as more trustworthy and competent, especially during periods of organizational transition.

Social awareness primarily involves empathy and the ability to understand relational dynamics within groups. Empathetic leaders are capable of recognizing emotional signals, understanding collaborators' perspectives, and interpreting collective moods within organizations. In digital work environments, social awareness becomes more difficult but also more necessary. Virtual communication frequently reduces the availability of non-verbal cues such as gestures, tone of voice, and facial expressions, increasing the risk of misunderstandings and emotional disconnection. Consequently, leaders must develop advanced relational sensitivity capable of compensating for the limitations of technologically mediated communication.

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Relationship management refers to the ability to inspire, motivate, influence, mediate conflicts, and facilitate collaboration. This dimension integrates communication competencies, emotional influence, conflict management, and team-building capabilities. Within digitally transformed organizations, relationship management becomes central because teams are increasingly hybrid, geographically distributed, and culturally heterogeneous. Effective leaders must therefore create relational cohesion even when interpersonal interactions occur primarily through digital platforms.

The concept of resonant leadership developed within the Primal Leadership framework is particularly relevant in understanding contemporary organizational dynamics. Resonant leaders create emotional synchronization within groups, generating positive relational climates characterized by trust, motivation, openness, and collaboration. In contrast, dissonant leadership produces emotional tension, anxiety, disengagement, and relational fragmentation. In highly digitalized organizations, where technological systems increasingly mediate communication processes, maintaining emotional resonance becomes essential for preserving collective engagement and psychological well-being.

Research in organizational psychology demonstrates that emotional climate significantly influences cognitive performance and collaborative behavior. Positive emotional environments stimulate creativity, innovation, problem-solving, and adaptability, whereas negative emotional climates increase stress, defensive attitudes, and resistance to change. This aspect is particularly important in organizations implementing generative artificial intelligence systems, where employees may experience fear of obsolescence or uncertainty regarding their professional future.

The relationship between Primal Leadership and digital transformation also involves the redefinition of authority itself. Traditional hierarchical leadership models were primarily based on information control and centralized decision-making. However, digital technologies have democratized access to information and increased organizational interdependence. Contemporary leaders can no longer rely exclusively on formal authority; instead, they must develop relational legitimacy grounded in emotional intelligence, trust, and collaborative competence.

Moreover, generative artificial intelligence introduces ethical and psychological challenges that further increase the importance of emotionally intelligent leadership. AI systems may optimize operational processes and automate cognitive tasks, but they cannot fully replace human emotional understanding, symbolic interpretation, empathy, and relational sensitivity. Employees frequently perceive

artificial intelligence simultaneously as an opportunity and as a threat. Effective leadership must therefore mediate between technological innovation and human needs, facilitating adaptation while preserving organizational cohesion and psychological well-being.

In digitally transformed workplaces, communication itself is evolving toward increasingly hybrid forms integrating verbal language, visual symbols, emojis, and digital interactions. Leaders must therefore develop new communicative competencies capable of combining emotional intelligence with digital fluency. Emotional resonance is no longer generated exclusively through face-to-face interaction but also through virtual meetings, digital messages, symbolic communication, and online collaborative environments.

An important aspect of Primal Leadership within digital transformation concerns the concept of psychological safety, extensively studied by organizational researchers such as Amy Edmondson. Psychological safety refers to the perception that individuals can express ideas, ask questions, admit mistakes, and participate actively without fear of humiliation or punishment. Emotionally intelligent leadership contributes directly to the development of psychologically safe environments by encouraging openness, empathy, trust, and collaborative dialogue. In organizations characterized by rapid technological innovation, psychological safety becomes fundamental because learning and adaptation require experimentation, uncertainty tolerance, and continuous knowledge exchange.

The integration of emotional intelligence and technological competence therefore emerges as one of the most important leadership challenges of the contemporary era. Effective leaders must simultaneously manage operational complexity, emotional dynamics, organizational change, and technological innovation. This multidimensional role requires flexibility, empathy, communication skills, ethical sensitivity, and cognitive adaptability.

Ultimately, Primal Leadership represents not only a leadership model but also a broader vision of organizational sustainability centered on human relationships and emotional well-being. In the age of generative artificial intelligence, organizations increasingly require leaders capable of integrating technological progress with human-centered values. Emotional intelligence becomes the essential element allowing technology to remain aligned with collective well-being, social cohesion, and sustainable organizational development.

For this reason, Primal Leadership may be considered one of the most relevant theoretical and practical frameworks for understanding leadership in digitally transformed societies. Its emphasis on emotional resonance, empathy, relational

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intelligence, and collaborative engagement provides organizations with strategic tools capable of addressing the psychological and relational challenges generated by contemporary technological change.

2. HUMOR AS A COGNITIVE AND EMOTIONAL DEVICE

Traditionally considered a marginal element within organizational contexts, humor is increasingly emerging as a strategic resource for group management, organizational communication, and collaborative problem-solving. For many years, professional environments tended to associate seriousness with competence, efficiency, and authority, while humor was often perceived as potentially distracting or incompatible with formal organizational structures. Contemporary organizational psychology and leadership studies, however, have progressively challenged this perspective, demonstrating that humor may produce significant cognitive, emotional, and relational benefits within workplaces.

According to Rod A. Martin (2007), humor may be classified into several distinct styles, each characterized by different psychological and social implications. Among these, affiliative humor and self-enhancing humor appear particularly relevant within organizational environments. Affiliative humor refers to the use of humor to strengthen social relationships, facilitate communication, reduce interpersonal tension, and promote group cohesion. Individuals who employ affiliative humor tend to create positive relational climates characterized by openness, trust, and emotional proximity. In team-based organizational settings, affiliative humor may therefore contribute to the development of collaborative cultures and psychologically safe environments. Self-enhancing humor, on the other hand, concerns the ability to maintain a humorous perspective even during stressful or difficult situations. This form of humor functions primarily as a psychological coping mechanism, allowing individuals to regulate emotions, reduce anxiety, and reinterpret challenging experiences more constructively. In contemporary organizations characterized by uncertainty, technological acceleration, and constant change, self-enhancing humor may significantly contribute to resilience development and emotional adaptability.

The growing relevance of humor within organizational studies is connected to broader transformations affecting work environments in the digital era. The expansion of virtual communication, hybrid work systems, artificial intelligence, and globally distributed teams has increased the importance of relational competencies capable of maintaining social cohesion and emotional engagement despite physical distance and technological mediation. Humor frequently functions

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as a relational bridge capable of humanizing communication processes and reducing emotional fragmentation within digital environments.

From a cognitive perspective, humor involves a sophisticated process of incongruity perception and interpretative restructuring. Humor emerges when individuals perceive a discrepancy between expectations and reality, followed by a reinterpretation capable of resolving cognitive tension. This mechanism stimulates divergent thinking, flexibility, and creative reinterpretation of situations. Such processes are highly coherent with Edward de Bono's theory of lateral thinking, according to which innovation depends on the ability to interrupt rigid cognitive patterns and generate alternative perspectives.

As illustrated in Figure 2, the cognitive process of humor develops through stages involving incongruity perception, cognitive tension, reinterpretation, and resolution.

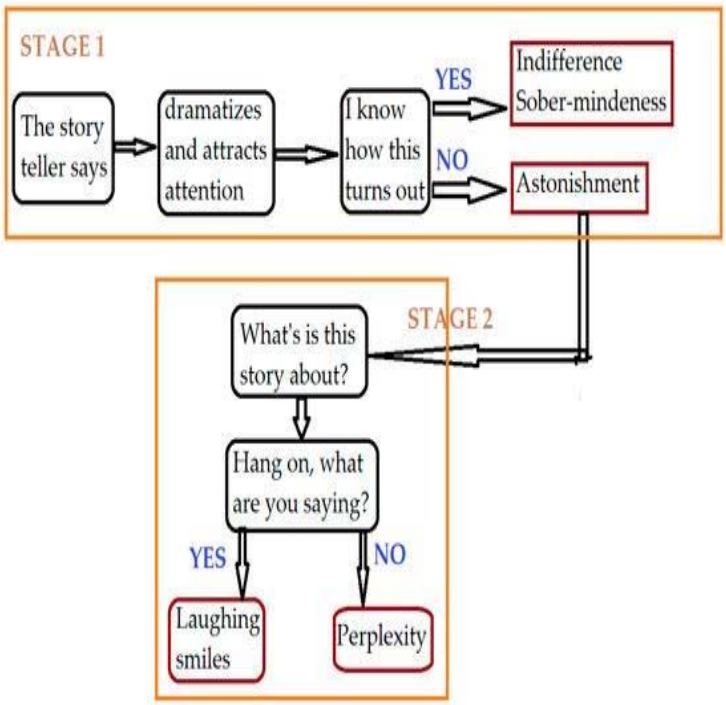


Figure 2. Cognitive process of humor involving incongruity perception and interpretative restructuring.

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The relationship between humor and creativity is particularly significant within organizational contexts characterized by rapid technological innovation and complex problem-solving. Humor facilitates the temporary suspension of rigid logical structures, allowing individuals to establish unexpected connections between ideas. This mechanism is essential for innovation because many creative solutions emerge precisely from the ability to reinterpret problems through unconventional perspectives.

Research in cognitive psychology demonstrates that humorous thinking activates neural processes associated with flexibility, associative thinking, and emotional reward. Humor stimulates curiosity and reduces defensive cognitive rigidity, thereby increasing openness to experimentation and change. In organizational environments where innovation and adaptability constitute strategic priorities, humor may therefore function as an important catalyst for creativity and collaborative learning.

Within digitally transformed workplaces, humor also plays a fundamental role in emotional regulation. Contemporary organizations frequently expose employees to high levels of stress resulting from information overload, accelerated decision-making processes, continuous technological adaptation, and performance pressure. In such contexts, humor may operate as an emotional buffer capable of reducing psychological tension and promoting emotional resilience.

For example, during periods of organizational change involving the implementation of new technologies or artificial intelligence systems, employees often experience uncertainty and fear regarding their future roles. Humor may facilitate adaptation by reducing anxiety and creating more positive emotional climates. Leaders who appropriately use humor often succeed in transforming stressful situations into opportunities for relational cohesion and collaborative engagement.

An additional dimension concerns the communicative function of humor within digital environments. The expansion of remote work and virtual collaboration platforms has transformed organizational communication into increasingly hybrid forms integrating verbal language, visual symbols, emojis, GIFs, memes, and humorous digital interactions. These symbolic elements perform important relational functions because they compensate for the absence of physical proximity and non-verbal communication cues.

In many digital workplaces, employees use emojis and humorous reactions during online meetings or messaging exchanges to soften communicative tone,

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express emotional nuance, and reduce interpersonal distance. A simple smiling emoji or ironic comment may significantly influence the emotional interpretation of a message, preventing misunderstandings and facilitating relational engagement. This phenomenon demonstrates that humor is progressively becoming an integral component of digital organizational communication.

Moreover, humor contributes significantly to the development of psychological safety within teams. Psychological safety, extensively studied by Amy Edmondson, refers to the perception that individuals may express ideas, ask questions, admit mistakes, and participate actively without fear of humiliation or punishment. Humor frequently facilitates psychologically safe environments because it reduces hierarchical distance, encourages spontaneity, and promotes open communication.

Leaders capable of integrating humor into communication strategies often appear more approachable, empathetic, and emotionally intelligent. However, organizational humor must be managed carefully and ethically. Humor may produce positive effects only when used inclusively and respectfully. Aggressive, sarcastic, discriminatory, or humiliating humor may instead generate relational conflict, exclusion, and emotional discomfort.

For this reason, humor should not be interpreted merely as spontaneous entertainment but as a sophisticated relational competence requiring emotional intelligence and contextual sensitivity. Effective organizational humor depends on timing, empathy, interpersonal awareness, and cultural understanding. Particularly in multicultural and international environments, leaders must recognize that humorous expressions may be interpreted differently according to social and cultural contexts.

The relationship between humor and leadership becomes particularly important in the age of generative artificial intelligence. AI systems increasingly perform analytical and operational functions traditionally associated with human cognition. However, humor remains deeply connected to emotional experience, symbolic interpretation, contextual ambiguity, and social interaction. Although artificial intelligence systems may generate apparently humorous content through algorithmic pattern recognition, they still struggle to fully understand emotional nuance, irony, and contextual meaning.

This limitation highlights the strategic importance of specifically human competencies within technologically advanced organizations. Emotional intelligence, empathy, symbolic communication, and humor represent dimensions of human interaction that cannot be fully replicated by machines. Consequently,

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organizations increasingly require leaders capable of integrating technological expertise with relational and emotional competencies.

Humor therefore emerges not as a secondary or decorative organizational element but as a strategic resource for managing complexity, fostering resilience, stimulating creativity, and maintaining human-centered organizational cultures within digitally transformed environments. Its integration into leadership practices may contribute significantly to sustainable organizational development by strengthening emotional well-being, relational cohesion, and collaborative intelligence.

Ultimately, humor represents one of the most authentically human dimensions of organizational life. In an era characterized by technological acceleration and artificial intelligence, the capacity to reinterpret complexity through humor may become an essential competence for preserving creativity, emotional balance, and meaningful social interaction within the workplace.

3. GENERATIVE ARTIFICIAL INTELLIGENCE AND ORGANIZATIONAL CHANGE

Generative artificial intelligence, represented by advanced language-processing and content-generation systems, is radically transforming business activities and organizational structures worldwide. Unlike previous waves of automation primarily focused on repetitive manual or computational tasks, generative AI directly interacts with cognitive, linguistic, and creative processes traditionally considered exclusively human domains. Systems based on machine learning and large language models are now capable of generating texts, reports, visual content, strategic analyses, predictive simulations, software code, and conversational interactions with increasing levels of sophistication. This technological evolution is profoundly redefining not only productivity models but also the nature of professional competencies and organizational relationships.

According to Kai-Fu Lee (2018), artificial intelligence does not simply replace human labor but transforms the role of workers within economic systems, shifting attention toward competencies that remain difficult to automate, such as creativity, emotional intelligence, relational communication, ethical judgment, and strategic thinking. Consequently, organizations are progressively moving from labor models centered primarily on execution and procedural repetition toward models emphasizing innovation, collaboration, adaptability, and cognitive flexibility.

This transformation has accelerated significantly after the global expansion of remote work and digital collaboration systems. Generative AI tools are increasingly

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integrated into organizational activities such as customer service, project management, human resource selection, marketing communication, data analysis, and strategic planning. Companies are adopting AI-driven platforms capable of assisting employees in decision-making processes, automating documentation, facilitating multilingual communication, and optimizing workflow organization. Such technologies increase operational efficiency and reduce time-consuming repetitive tasks, enabling professionals to focus more intensively on creative and relational dimensions of work.

However, the implementation of generative artificial intelligence also introduces complex organizational, psychological, and ethical challenges. One of the principal challenges concerns change management. Technological transformation frequently generates uncertainty among employees, who may perceive AI systems simultaneously as opportunities and threats. Fear of professional obsolescence, anxiety regarding technological adaptation, and concerns about employment stability often accompany the introduction of intelligent systems into workplaces.

For this reason, organizations adopting generative AI technologies must invest not only in technological infrastructures but also in human development strategies. Employee training becomes essential in order to facilitate adaptation and promote digital literacy, emotional resilience, and collaborative flexibility. Workers increasingly require interdisciplinary competencies combining technical understanding with emotional intelligence, communication abilities, and problem-solving skills. In this context, leadership assumes a crucial role in facilitating adaptation and promoting innovation-oriented organizational cultures. Leaders are no longer required merely to supervise operational processes but also to mediate between technological innovation and human needs. Effective leadership must therefore manage emotional responses to change, reduce resistance, encourage participation, and maintain organizational cohesion during periods of transformation.

The integration of generative AI into organizational systems also profoundly modifies decision-making processes. Traditional decision-making models were primarily based on hierarchical structures and human analytical capabilities. Today, intelligent systems increasingly support or influence organizational decisions through predictive algorithms, data analysis, and automated recommendations. While these systems may improve efficiency and accuracy, they also raise important questions regarding autonomy, responsibility, transparency, and ethical accountability.

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As shown in Figure 3, the impact of generative AI extends across productivity, collaboration, communication, and organizational learning.

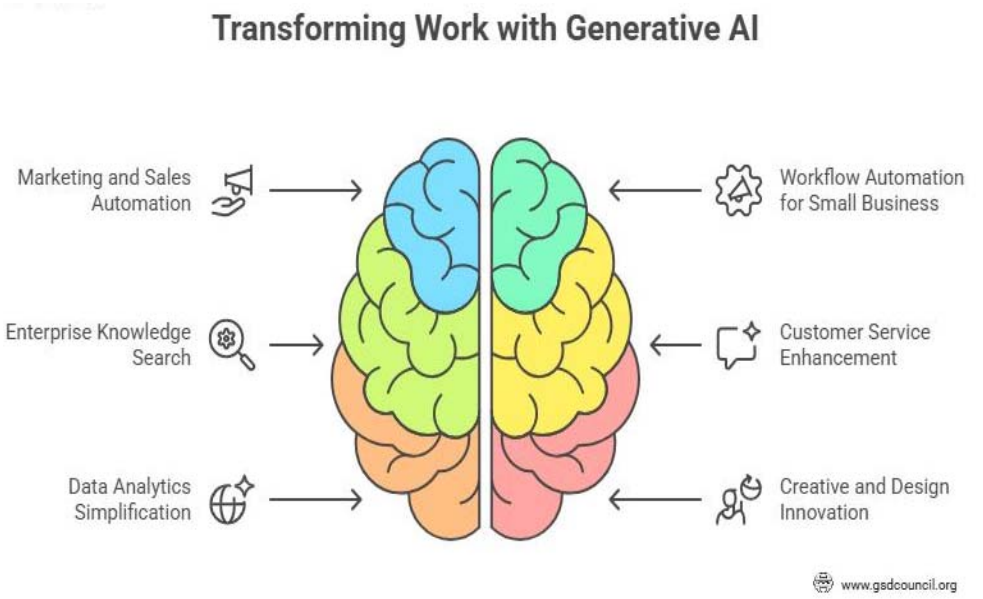


Figure 3. Impact of generative artificial intelligence on organizational processes and collaboration.

The increasing interaction between humans and intelligent systems creates hybrid organizational ecosystems in which human cognition and artificial intelligence operate together. In such environments, employees are progressively shifting from purely operational roles toward supervisory, interpretative, creative, and relational functions. Consequently, organizations must redefine not only professional competencies but also their broader understanding of work, leadership, and organizational identity.

An important aspect of this transformation concerns communication processes. Generative AI systems are increasingly capable of producing human-like linguistic interactions, adapting communication styles, and supporting digital collaboration. Nevertheless, despite their technological sophistication, AI systems still struggle to fully understand contextual ambiguity, emotional nuance, symbolic interpretation,

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and humor. This limitation highlights the continuing importance of distinctly human competencies within organizational communication.

The growing use of artificial intelligence also influences organizational culture. Highly automated environments risk generating depersonalization, emotional distancing, and excessive reliance on algorithmic logic. Employees may experience reduced autonomy, increased monitoring, or feelings of alienation if technological systems dominate workplace interactions. For this reason, sustainable digital transformation requires organizations to preserve human-centered values such as empathy, trust, collaboration, inclusion, and psychological well-being.

The integration between artificial intelligence and human competencies therefore requires a systemic approach in which technology is conceived as an instrument serving human beings rather than an autonomous organizational objective. Technological innovation should support human creativity, relational quality, and collective well-being rather than replacing them. This perspective is particularly important within contemporary discussions concerning organizational sustainability.

Organizational sustainability cannot be reduced exclusively to economic growth, productivity enhancement, or technological efficiency. Sustainable development also involves social, psychological, ethical, and relational dimensions. Employees' emotional well-being, work-life balance, psychological safety, and opportunities for meaningful participation represent essential conditions for long-term organizational effectiveness.

In this regard, emotionally intelligent leadership becomes fundamental for maintaining balance between technological innovation and human sustainability. Leaders capable of integrating empathy, communication, and relational sensitivity into technologically advanced workplaces contribute to creating more inclusive and resilient organizational cultures. The future of digital transformation therefore depends not only on technological progress itself but also on the ability of organizations to preserve human-centered values within increasingly automated systems.

Ultimately, generative artificial intelligence represents both an extraordinary opportunity and a significant organizational challenge. Its successful integration requires not only technical adaptation but also cultural transformation, ethical reflection, and emotional intelligence. Organizations capable of balancing innovation with human development will be better equipped to face the complexities of the digital era while promoting sustainable and collaborative work environments.

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4. INTEGRATION BETWEEN PRIMAL LEADERSHIP AND HUMOR EDUCATION IN DIGITAL TEAMS

The integration between Primal Leadership and humor education represents an innovative and interdisciplinary model for managing work groups, particularly effective in organizational contexts characterized by high complexity, technological acceleration, and digital transformation. Contemporary organizations increasingly operate within environments shaped by uncertainty, hybrid communication systems, artificial intelligence, remote collaboration, and continuous innovation. In such contexts, traditional leadership models based exclusively on hierarchy, technical authority, and procedural control appear progressively insufficient for addressing the emotional, relational, and cognitive challenges generated by digitally mediated work environments.

Primal Leadership, grounded in emotional intelligence theory, offers an important framework for understanding how leaders may positively influence organizational climate and collective engagement. According to Goleman, Boyatzis, and McKee (2002), emotionally intelligent leadership generates emotional resonance capable of fostering trust, motivation, collaboration, and psychological safety within teams. However, in contemporary digital environments, emotional resonance alone may not be sufficient to address the complexity of technologically mediated interactions. For this reason, humor education emerges as a complementary strategic resource capable of strengthening relational cohesion, emotional adaptability, and cognitive flexibility.

Humor does not merely function as emotional relief or entertainment. Rather, it operates as a sophisticated metacognitive competence enabling the reinterpretation and restructuring of problematic situations. Through mechanisms of incongruity perception and reinterpretation, humor facilitates cognitive flexibility and divergent thinking, allowing individuals to overcome rigid mental patterns and generate innovative solutions. In this sense, humor becomes directly connected to creativity, adaptability, and collaborative problem-solving.

This perspective is coherent with Herbert Simon's theory of bounded rationality (1978), according to which organizational decision-making processes are constrained by cognitive limitations, incomplete information, and contextual uncertainty. Individuals rarely make perfectly rational decisions because human cognition operates under conditions of limited attention, emotional influence, and interpretative constraints. The introduction of humor within organizational processes may partially expand these limitations by encouraging openness,

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reducing cognitive rigidity, and facilitating alternative interpretations of complex situations.

Within digitally transformed organizations, humor therefore functions as an important cognitive and relational mediator. Technological environments frequently generate emotional stress, information overload, communication ambiguity, and relational fragmentation. Virtual communication platforms, remote collaboration systems, and AI-assisted workflows may reduce spontaneous social interaction and emotional proximity among employees. Humor contributes to counterbalancing these effects by humanizing communication processes and reinforcing social connection.

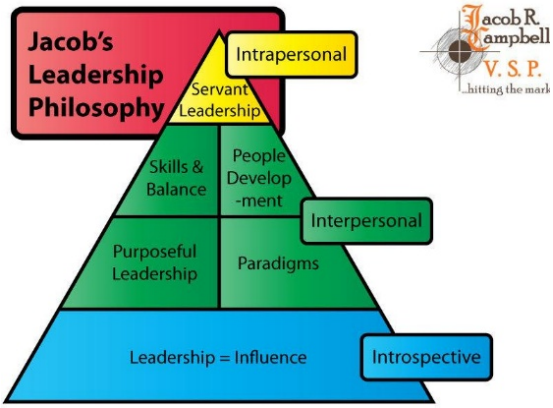


Figure 4. Integrated model of emotional leadership and humor within digital teams.

As illustrated in Figure 4, the integrated model of emotional leadership and humor within digital teams develops across three interconnected dimensions: intrapersonal, interpersonal, and organizational.

The figure illustrates the three interconnected dimensions of the model: intrapersonal processes related to emotional self-regulation, interpersonal dynamics focused on communication and group cohesion, and organizational strategies integrating humor and emotional intelligence into collaborative work systems.

The intrapersonal level concerns emotional awareness and the use of humor as a self-regulation strategy. From a psychological perspective, humor represents an important coping mechanism allowing individuals to manage stress, anxiety, frustration, and uncertainty more effectively. Employees working within highly

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digitalized environments are frequently exposed to accelerated rhythms, continuous technological adaptation, and performance pressure. In such contexts, humor contributes to emotional resilience by helping individuals reinterpret stressful experiences less threateningly.

Self-enhancing humor, as described by Martin (2007), is particularly important within this dimension. Individuals capable of maintaining a humorous perspective during difficult situations often demonstrate higher emotional stability and adaptability. Leaders who appropriately use humor may also model emotional resilience for collaborators, contributing to more balanced and psychologically safe organizational climates. Humor therefore becomes not merely a communicative behavior but a form of emotional intelligence supporting psychological well-being and cognitive flexibility.

The interpersonal level involves the use of humor to facilitate communication, strengthen relational cohesion, and reduce social distance within teams. Digital work environments often limit spontaneous interpersonal interaction because communication occurs primarily through technological mediation. Virtual meetings, emails, collaborative platforms, and AI-assisted communication systems frequently reduce non-verbal cues such as gestures, facial expressions, and tone of voice, increasing the risk of misunderstandings and emotional disengagement.

In this context, humor performs an important relational function. Humorous communication may reduce interpersonal tension, encourage openness, and facilitate collaborative interaction. The use of irony, playful comments, emojis, memes, or symbolic humor within digital communication contributes to creating emotional proximity despite physical distance. Humor also facilitates inclusion because it creates shared symbolic experiences capable of reinforcing group identity and collective participation.

Research in organizational psychology demonstrates that teams characterized by positive emotional climates and psychological safety tend to show higher levels of creativity, engagement, and collaborative effectiveness. Humor contributes significantly to the creation of such climates because it reduces hierarchical rigidity and encourages spontaneous participation. Leaders capable of integrating humor into communication strategies are often perceived as more approachable, empathetic, and emotionally intelligent.

However, the effectiveness of humor depends strongly on context and ethical awareness. Organizational humor must remain inclusive, respectful, and emotionally sensitive. Aggressive sarcasm, discriminatory jokes, or humiliating humor may instead produce relational conflict and emotional discomfort.

Consequently, humor education becomes essential in order to develop conscious and emotionally intelligent forms of humorous communication within organizations.

The organizational level concerns the systemic integration of humorous practices and emotional intelligence within work processes, organizational culture, and leadership strategies. Organizations increasingly recognize that employee well-being, emotional engagement, and relational quality directly influence innovation, productivity, and long-term sustainability. Consequently, some companies are beginning to incorporate humor-based approaches into leadership training, collaborative workshops, team-building activities, and creative problem-solving methodologies.

Within innovation-oriented organizational cultures, humor often functions as a catalyst for experimentation and adaptability. Creative environments require openness to uncertainty, tolerance of mistakes, and willingness to explore unconventional ideas. Humor facilitates these processes because it reduces fear of failure and encourages cognitive exploration. Employees working within psychologically rigid environments frequently avoid risk-taking behaviors due to anxiety or fear of negative evaluation. Humor contributes to reducing such defensive attitudes, thereby stimulating participation and innovation.

The integration between Primal Leadership and humor education becomes particularly relevant in the era of generative artificial intelligence. Although AI systems increasingly perform cognitive and operational functions traditionally associated with human labor, they still struggle to fully understand emotional nuance, contextual ambiguity, symbolic communication, and humor. This limitation highlights the continuing importance of human-centered competencies such as empathy, emotional intelligence, creativity, and relational communication.

Digital transformation therefore requires leadership models capable not only of managing technological innovation but also of preserving emotional and relational dimensions within organizations. The integration of emotional leadership and humor education offers a sustainable framework for addressing this challenge. Humor humanizes digital environments, strengthens social cohesion, facilitates emotional regulation, and promotes collaborative creativity. At the same time, emotionally intelligent leadership ensures that technological systems remain aligned with human well-being and organizational sustainability.

Ultimately, the integration between Primal Leadership and humor education represents more than a communication strategy; it constitutes a broader organizational philosophy centered on human relationships, emotional intelligence,

collaborative resilience, and sustainable innovation. In increasingly automated and technologically mediated workplaces, humor may become one of the most authentically human resources capable of preserving creativity, empathy, and meaningful social interaction within organizational life.

5. CASE STUDIES AND CONCRETE EXAMPLES

Empirical analysis demonstrates that the integration between emotional leadership and humor is already present, either explicitly or implicitly, within several highly innovative organizations operating in technologically advanced sectors. Although humor has traditionally been considered secondary within professional environments, contemporary organizational practices increasingly reveal its strategic value for improving communication, fostering creativity, strengthening psychological safety, and facilitating adaptation to change. In organizations characterized by rapid innovation, digital transformation, and highly collaborative work systems, humor frequently emerges as a relational and cognitive resource capable of supporting sustainable organizational development.

The growing importance of humor within contemporary organizations is closely connected to the increasing complexity of work environments. Companies operating within digital economies must continuously adapt to technological acceleration, globalization, remote collaboration systems, and artificial intelligence integration. These processes often generate emotional pressure, cognitive overload, and uncertainty among employees. Consequently, organizational cultures that promote psychological flexibility, emotional resilience, and collaborative trust become particularly important for maintaining innovation and productivity. Within this context, humor represents not simply an element of entertainment but a strategic component of organizational communication and emotional regulation.

One of the most significant examples is represented by Google, which has developed collaborative and creativity-oriented work environments where humor is frequently encouraged as a problem-solving and communication tool. Google's organizational culture is based on openness, experimentation, and psychological safety. Internal studies conducted through Project Aristotle, one of the company's most influential organizational research initiatives, demonstrated that the most effective teams are not necessarily composed of the most technically competent individuals but rather of employees capable of creating emotionally safe and collaborative environments.

Psychological safety refers to the perception that individuals may express ideas, ask questions, make mistakes, and participate actively without fear of humiliation

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or punishment. Humor contributes significantly to the creation of psychologically safe environments because it reduces hierarchical rigidity, facilitates spontaneous interaction, and encourages open communication. Within Google's collaborative culture, humorous exchanges, playful interactions, and informal communication practices frequently support creative thinking and innovation processes. Humor is not perceived as incompatible with professionalism but rather as a mechanism facilitating cognitive flexibility and collaborative engagement.

Google's workspaces themselves have often been designed to stimulate creativity and informal interaction. Recreational areas, symbolic visual elements, playful meeting spaces, and relaxed communication styles contribute to generating organizational climates where employees feel encouraged to experiment and think divergently. Such practices demonstrate that innovation is closely connected not only to technical expertise but also to emotional well-being and relational quality.

Another important example is represented by Microsoft, which has progressively transformed its organizational culture under the leadership of Satya Nadella. Microsoft's transition toward more inclusive and emotionally intelligent leadership models illustrates how empathy, storytelling, and humor-based communication may facilitate organizational change within technologically complex environments.

Microsoft implemented leadership development programs focused on emotional intelligence, inclusive communication, and collaborative learning. Humor and storytelling became important components of these initiatives because they facilitated emotional engagement and reduced resistance to change. In organizations undergoing digital transformation, employees frequently experience anxiety related to technological adaptation and evolving professional roles. Humor may reduce such tensions by humanizing communication processes and encouraging openness toward innovation.

The use of storytelling combined with humor has proven particularly effective in facilitating communication between leadership and employees. Humorous narratives and symbolic communication allow complex technological concepts to become more accessible and emotionally engaging. Within Microsoft's organizational culture, leaders increasingly adopted communication styles characterized by empathy, relational openness, and emotional authenticity. Such approaches contributed to strengthening trust and collaborative cohesion during periods of organizational transformation.

A further significant example is represented by Zappos, whose organizational identity explicitly values humor and employee happiness as strategic resources.

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Under the leadership of Tony Hsieh, Zappos developed a corporate culture centered on emotional well-being, creativity, and relational authenticity. Humor was not merely tolerated but actively encouraged as part of the company's identity and customer service philosophy.

According to Hsieh, employee happiness constitutes one of the most important determinants of organizational success because emotionally satisfied employees are more motivated, creative, collaborative, and customer-oriented. Humor therefore became integrated into everyday organizational practices, communication styles, recruitment processes, and workplace interactions. Employees were encouraged to express individuality, spontaneity, and playful creativity within professional activities.

Zappos demonstrated that organizational culture significantly influences not only internal well-being but also customer satisfaction and brand identity. Humor contributed to creating emotionally engaging customer interactions and strengthening organizational cohesion. The company's experience illustrates how emotionally positive work environments may generate sustainable competitive advantages through enhanced engagement, innovation, and relational quality.

As illustrated in Figure 5, comparative analysis reveals a positive correlation between conscious humor usage, organizational climate, employee engagement, and team performance.

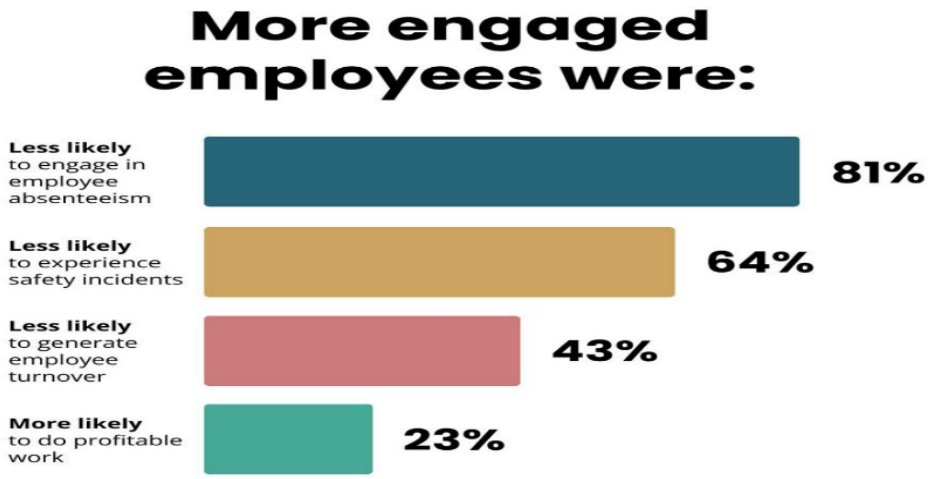


Figure 5. Correlation between humor, engagement, and organizational performance.

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The relationship between humor and organizational performance appears particularly significant in contexts characterized by high technological innovation and continuous adaptation requirements. Organizations operating within digital economies increasingly depend on creativity, flexibility, collaborative intelligence, and emotional resilience. Humor contributes directly to these dimensions because it stimulates divergent thinking, reduces emotional tension, and facilitates relational cohesion.

Research in organizational psychology confirms that positive emotional climates significantly influence productivity and collaborative effectiveness. Teams characterized by trust, openness, and psychological safety generally demonstrate higher levels of innovation and problem-solving capacity. Humor contributes to these processes by reducing defensive attitudes and encouraging cognitive exploration. Employees working within emotionally supportive environments are more likely to share unconventional ideas, participate actively in discussions, and experiment creatively without excessive fear of failure.

Furthermore, humor frequently functions as a coping mechanism during periods of organizational stress and technological transition. The implementation of artificial intelligence systems, digital platforms, and new operational models often generates uncertainty and emotional resistance among employees. Humor may facilitate adaptation by reducing anxiety and creating emotionally manageable interpretations of change processes.

The relationship between humor and leadership is equally important. Leaders capable of integrating humor into communication strategies are often perceived as more approachable, empathetic, and emotionally intelligent. Humor may reduce hierarchical distance and facilitate relational authenticity, thereby strengthening trust between leaders and collaborators. However, the effectiveness of humor depends strongly on contextual sensitivity and ethical awareness. Inclusive and respectful humor may strengthen relationships, whereas sarcastic or humiliating humor may generate emotional discomfort and conflict.

These case studies collectively demonstrate that humor should not be interpreted as a superficial or secondary organizational element. Rather, humor represents a sophisticated relational and cognitive resource capable of supporting creativity, emotional regulation, collaboration, and sustainable organizational development. In digitally transformed environments characterized by rapid technological acceleration and artificial intelligence integration, humor increasingly emerges as one of the most authentically human competencies capable

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of preserving relational cohesion and psychological well-being within organizational systems.

Ultimately, the experiences of Google, Microsoft, and Zappos reveal that the future of organizational innovation depends not only on technological progress but also on the ability to cultivate emotionally intelligent and human-centered work cultures. Humor, when consciously integrated into leadership and organizational strategies, may therefore become a decisive factor for resilience, adaptability, and sustainable performance in the digital age.

6. IMPLICATIONS FOR ORGANIZATIONAL SUSTAINABILITY AND DISCUSSION

Organizational sustainability, understood as the ability of a business system to maintain high levels of economic, social, and environmental performance over time, increasingly requires an integrated and human-centered approach capable of combining technological innovation with psychological and relational well-being. In contemporary digital economies, sustainability can no longer be interpreted exclusively through financial indicators or productivity growth. Rather, sustainable organizational development depends on the capacity of organizations to preserve human capital, promote emotional balance, encourage collaborative relationships, and create inclusive working environments capable of adapting to technological transformation without generating alienation or social fragmentation.

The rapid expansion of digital transformation and generative artificial intelligence has profoundly modified organizational systems, communication processes, and professional identities. Intelligent technologies now participate directly in production systems, decision-making processes, information management, and communication dynamics. Although these innovations generate important opportunities in terms of efficiency and competitiveness, they also introduce significant psychological and relational challenges. Employees frequently experience uncertainty, emotional overload, fear of technological replacement, and increasing cognitive pressure due to continuous adaptation requirements. Consequently, organizational sustainability today must necessarily include emotional, social, and psychological dimensions in addition to economic and technological factors.

In this context, Primal Leadership and humor education may be considered fundamental resources for promoting sustainable organizational cultures capable of integrating technological progress with human well-being. According to Amartya Sen (1999), sustainable development should be understood primarily as the

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expansion of human capabilities and opportunities. This perspective extends beyond purely economic growth and emphasizes the importance of human freedom, participation, dignity, and well-being. Applied to organizational environments, Sen's approach suggests that sustainable companies are not simply those maximizing productivity but those capable of enhancing employees' competencies, emotional health, creativity, and relational quality.

Emotionally intelligent leadership plays a central role within this framework because organizational sustainability depends significantly on emotional climate and collaborative cohesion. Leaders influence not only operational processes but also collective emotions, communication dynamics, motivational systems, and organizational culture. In digitally transformed environments characterized by uncertainty and accelerated innovation, emotionally resonant leadership contributes to maintaining trust, engagement, and psychological safety within teams.

As shown in Figure 6, organizational sustainability emerges from the interaction between economic, social, technological, and psychological dimensions, generating a human-centered development model capable of integrating innovation with collective well-being.



Figure 6. Integrated model of organizational sustainability and human-centered development.

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The figure illustrates how sustainable organizational systems depend on the balance between technological innovation, emotional well-being, collaborative relationships, and human-centered leadership strategies. Economic efficiency alone cannot guarantee sustainable development if organizational environments produce stress, emotional exhaustion, social isolation, or disengagement.

Within this framework, humor education acquires strategic importance because it contributes directly to emotional resilience, relational cohesion, and cognitive flexibility. Humor facilitates adaptation to uncertainty by allowing individuals to reinterpret stressful situations more constructively. In organizations characterized by continuous technological change, humor may function as an emotional regulation mechanism capable of reducing anxiety and strengthening collective resilience.

Humor also contributes significantly to organizational sustainability through its impact on communication processes. Contemporary workplaces increasingly rely on digitally mediated interactions occurring through emails, collaborative platforms, remote meetings, and artificial intelligence systems. Such communication environments may reduce emotional proximity and generate relational fragmentation. Humor counterbalances these effects by humanizing communication and facilitating social connection. The use of symbolic humor, playful interaction, visual irony, emojis, and humorous narratives contributes to maintaining relational engagement even within technologically mediated contexts.

Furthermore, humor stimulates creativity and divergent thinking, both of which are essential competencies for innovation-oriented organizations. Sustainable development depends not only on efficiency but also on the ability to generate adaptive and innovative solutions in response to rapidly changing environments. Humor supports these processes because it interrupts rigid cognitive patterns and encourages alternative perspectives. In this sense, humor may be interpreted as a form of cognitive sustainability capable of promoting flexibility and openness within organizational systems.

The integration between emotional leadership and humor education also contributes to the development of psychologically safe workplaces. Psychological safety, extensively studied by Amy Edmondson, refers to the perception that individuals may express ideas, admit mistakes, ask questions, and participate actively without fear of humiliation or punishment. Organizations characterized by high psychological safety generally demonstrate greater levels of innovation, learning, adaptability, and collaborative performance. Humor contributes to the

creation of such environments by reducing hierarchical rigidity and facilitating open communication.

At the same time, it is necessary to avoid trivializing the organizational role of humor. Humor should not be interpreted as simple entertainment or superficial positivity. Rather, it represents a sophisticated emotional, cognitive, and relational competence requiring awareness, empathy, contextual sensitivity, and ethical responsibility. Aggressive sarcasm, discriminatory humor, or humiliating communication may produce negative effects, generating exclusion, conflict, and emotional discomfort. Consequently, humor education becomes essential for developing conscious and emotionally intelligent humorous communication practices within organizations.

From a methodological perspective, the present analysis highlights the importance of interdisciplinary approaches integrating psychology, sociology, organizational studies, neuroscience, communication theory, and digital culture studies. The complexity of contemporary organizations cannot be adequately understood through exclusively technological or economic perspectives. Digital transformation simultaneously affects emotional processes, symbolic communication, social interaction, cognitive dynamics, and organizational identity. Consequently, sustainable organizational models require holistic and interdisciplinary analytical frameworks.

The integration between Primal Leadership and humor education represents an effective response to the challenges posed by digital transformation precisely because it overcomes purely technocentric approaches. Technological innovation alone cannot ensure organizational sustainability if human dimensions remain neglected. Organizations increasingly require leadership models capable of integrating emotional intelligence, empathy, communication, ethical awareness, and relational sensitivity into technologically advanced systems.

Future research should further explore the operational implementation of the integrated model proposed in this study through longitudinal analyses and comparative organizational studies. It would be particularly important to investigate how humor-based leadership strategies influence employee well-being, innovation capacity, resilience, and collaborative effectiveness within AI-driven environments. Additional research should also examine the role of digital communication and symbolic humor in remote and hybrid workplaces, where relational dynamics are increasingly mediated by technology.

The growing diffusion of generative artificial intelligence makes these questions even more urgent. AI systems are increasingly capable of performing analytical and

operational tasks traditionally associated with human cognition, but they still struggle to understand contextual ambiguity, emotional nuance, symbolic communication, and humor. This limitation reveals the continuing strategic importance of specifically human competencies such as empathy, creativity, emotional intelligence, and relational communication.

Ultimately, organizational sustainability in the age of artificial intelligence depends not only on technological advancement but also on the capacity to preserve human-centered values within increasingly automated environments. Primal Leadership and humor education together offer a sustainable framework for balancing innovation with emotional well-being, productivity with relational quality, and technological efficiency with human dignity. In this perspective, humor emerges not as a secondary organizational element but as one of the most authentically human resources capable of preserving creativity, resilience, and meaningful social interaction within digitally transformed workplaces.

8. CONCLUSIONS

Digital transformation and generative artificial intelligence are profoundly reshaping the world of work, organizational structures, and professional identities. Contemporary organizations increasingly operate within highly complex environments characterized by rapid technological innovation, hybrid communication systems, continuous adaptation processes, and growing interactions between human cognition and intelligent technologies. In this scenario, leadership can no longer be limited to the technical management of operational processes or the supervision of productivity. Instead, it must evolve toward more integrated models capable of combining emotional intelligence, relational sensitivity, ethical awareness, creativity, and collaborative flexibility.

The present study has demonstrated that the integration between Primal Leadership and humor education may represent an innovative and sustainable paradigm for managing teams and organizational processes in the era of generative artificial intelligence. Emotional leadership, grounded in the capacity to generate emotional resonance, trust, empathy, and psychological safety, becomes increasingly important within digitally transformed workplaces where technological systems often risk reducing relational proximity and emotional engagement. At the same time, humor emerges as a strategic cognitive and relational resource capable of strengthening resilience, reducing tension, facilitating communication, and stimulating creativity.

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Humor should not be interpreted as a superficial or secondary element within organizational life. Rather, it represents an advanced form of intelligence involving emotional regulation, symbolic interpretation, cognitive flexibility, and social interaction. Through mechanisms of incongruity perception and reinterpretation, humor enables individuals and groups to manage uncertainty more effectively, overcome rigid mental patterns, and generate innovative perspectives. In highly technological and innovation-oriented environments, these competencies become essential because organizational success increasingly depends on adaptability, collaboration, and creative problem-solving.

The study also highlighted the importance of preserving human-centered organizational cultures in the face of growing automation and artificial intelligence integration. Although generative AI systems are becoming increasingly sophisticated and capable of supporting analytical and operational activities, they still struggle to fully understand emotional nuance, symbolic communication, contextual ambiguity, empathy, and humor. This limitation reveals that some of the most valuable competencies within organizations remain deeply connected to human emotional and relational experience.

For this reason, the future of sustainable organizational development cannot depend exclusively on technological efficiency or economic performance. Sustainable innovation requires the integration of technological progress with psychological well-being, ethical responsibility, relational quality, and collective participation. Organizations capable of balancing artificial intelligence with human intelligence will be better equipped to face the uncertainties and complexities of the digital era.

Within this perspective, Primal Leadership and humor education together offer an important framework for promoting organizational sustainability. Emotionally intelligent leaders capable of integrating humor into communication and collaborative practices contribute to creating psychologically safe environments where employees feel valued, motivated, and emotionally engaged. Such environments encourage openness, creativity, resilience, and trust, all of which are fundamental conditions for innovation and long-term organizational effectiveness.

Furthermore, the integration of humor into organizational culture contributes to humanizing technologically mediated communication systems. In increasingly digital workplaces characterized by remote collaboration, virtual interaction, and AI-assisted communication, humor functions as a relational bridge capable of reducing emotional distance and reinforcing social cohesion. Emojis, symbolic humor, visual irony, playful interaction, and humorous narratives increasingly

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represent important forms of communication within contemporary organizational systems.

Ultimately, this article argues that the future of leadership in the age of artificial intelligence depends not only on technological competence but also on the capacity to preserve and enhance distinctly human dimensions such as empathy, creativity, emotional intelligence, and humor. In a world progressively dominated by algorithms and automation, humor represents one of the most authentically human resources and, precisely for this reason, one of the most necessary for sustainable organizational development.

The ability to "think while laughing and laugh while thinking" may therefore become one of the most important leadership competencies for the future of digitally transformed societies.

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A SCOPING REVIEW OF AI-POWERED BUSINESS INTELLIGENCE USED IN HR SELECTION STRATEGIES

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Abstract

The convergence of artificial intelligence (AI) and business intelligence (BI) technologies is reshaping human resource (HR) selection practices across the globe, yet the implications of this convergence for organisations operating in Sub-Saharan Africa remain insufficiently examined. This scoping review maps the emerging body of evidence on AI-powered business intelligence systems as applied to HR selection strategies across the Sub-Saharan African region. Guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR) framework, the review synthesises 54 peer-reviewed articles, policy documents, technical reports, and industry publications, of which more than 80 percent were published between 2021 and 2025. Findings are organised across five thematic domains: the conceptual landscape of AI-powered BI in HR selection; patterns of adoption across Sub-Saharan African organisations; algorithmic bias and equity considerations in heterogeneous talent markets; data governance and regulatory frameworks; and organisational capability, infrastructure, and implementation challenges. The review reveals a significant and widening gap between the technological ambitions of major

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Sub-Saharan African employers and the contextual readiness conditions necessary for equitable, effective, and legally defensible AI-powered selection. Particular concerns are identified around the use of internationally trained BI models in contexts marked by linguistic diversity, educational inequality, informal labour market histories, and fragile data infrastructure. The paper concludes with synthesised lessons for HR practitioners, technology vendors, regulators, and researchers, emphasising the imperative of context-sensitive system design, rigorous local validation, and inclusive governance architectures.

Keywords: *AI-powered business intelligence, HR selection, Sub-Saharan Africa, algorithmic recruitment, talent analytics, algorithmic bias, data governance, HR technology, predictive analytics*

JEL Classification: M12.M15, O33

Introduction

The integration of artificial intelligence and business intelligence into human resource management represents one of the most consequential transformations occurring in the contemporary world of work. Organisations worldwide are increasingly deploying AI-powered BI platforms to generate data-driven insights that inform decisions about candidate sourcing, applicant screening, predictive fit modelling, structured assessment design, and workforce planning (Fayyad et al., 2022; Marler & Boudreau, 2017; Vanhove et al., 2023). These systems promise enhanced efficiency, greater consistency in decision-making, and the potential to reduce the influence of subjective human biases that have historically disadvantaged candidates from underrepresented populations (Campion et al., 2022; Jia et al., 2023). Within the HR technology ecosystem, AI-powered BI occupies a distinctive position: unlike purely operational AI tools that automate discrete tasks, BI systems aggregate, analyse, and visualise complex data streams to support strategic decision-making by HR leaders and hiring managers (Davenport & Harris, 2022; Rasmussen & Ulrich, 2023).

Sub-Saharan Africa presents a particularly instructive yet underexplored context for examining these developments. The region encompasses 46 countries, more than 1.1 billion people, and some of the world's fastest-growing economies, alongside profound structural challenges including high unemployment, acute digital infrastructure disparities, significant educational inequalities, and labour markets characterised by substantial informality (African Development Bank, 2023; International Labour Organisation, 2023). At the same time, Sub-Saharan

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Africa is experiencing a rapid acceleration in technology adoption, driven by expanding mobile connectivity, a burgeoning technology startup ecosystem, and the growing strategic importance of talent acquisition in competitive regional markets (Gillwald et al., 2022; World Economic Forum, 2023). This tension between technological ambition and structural constraint creates a distinctive set of opportunities and risks around AI-powered BI adoption in HR selection that differ substantially from those documented in North American, European, and East Asian contexts.

Despite the growing international scholarship on AI in HR management, systematic reviews that specifically examine the Sub-Saharan African context are notably absent. Existing reviews tend to draw overwhelmingly on evidence from high-income country settings and to generalise their findings to developing country contexts without adequate attention to the contextual contingencies that shape both technology adoption and its consequences (Kolade & Owoseni, 2022; Wambua, 2023). This represents a significant gap for scholarship, policy, and practice. Without a rigorous synthesis of available evidence, HR professionals and policymakers in Sub-Saharan Africa lack the empirical foundation necessary to make informed decisions about the adoption, governance, and evaluation of AI-powered BI in selection contexts.

This scoping review addresses that gap by systematically mapping the evidence on AI-powered BI as applied to HR selection strategies across Sub-Saharan Africa. A scoping review design was selected because the field is rapidly evolving, the evidence base is multidisciplinary, and the primary objective is to delineate the terrain of available knowledge rather than to produce a narrow meta-analytic estimate (Arksey & O'Malley, 2005; Tricco et al., 2022). The review is organised around five research questions: What forms of AI-powered BI are being applied or discussed in HR selection within Sub-Saharan African organisations? What evidence exists on adoption patterns, drivers, and barriers? What are the equity and bias implications of AI-powered BI selection in the region's heterogeneous talent markets? What data governance and regulatory frameworks are relevant or emerging? And what lessons can be distilled for practitioners, policymakers, and researchers seeking to advance responsible AI-powered BI adoption in the region?

The paper proceeds as follows. Section 2 establishes the theoretical and conceptual framework. Section 3 describes the scoping review methodology. Section 4 presents the findings across five thematic domains. Section 5 offers a synthesised discussion of lessons and implications. Sections 6 and 7 address limitations and conclusions respectively.

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Literature Review

Defining AI-Powered Business Intelligence in HR Selection

For this review, AI-powered business intelligence in HR selection refers to the integration of machine learning, natural language processing, predictive analytics, and data visualisation technologies within BI platforms to support decisions across the candidate attraction, screening, assessment, and selection stages of the recruitment process (Davenport & Harris, 2022; Fayyad et al., 2022). This definition distinguishes AI-powered BI from both standalone AI hiring tools, which automate specific selection tasks, and from traditional BI systems, which aggregate and report on historical HR data without generative or predictive analytical capabilities.

The distinctive contribution of AI-powered BI to HR selection lies in its capacity to synthesise heterogeneous data sources, including applicant tracking system records, psychometric assessment results, social media profiles, labour market intelligence feeds, internal performance and retention data, and workforce planning models, into integrated analytical dashboards that generate evidence-based recommendations for selection decision-makers (Jia et al., 2023; Marler & Boudreau, 2017). Pan et al. (2022) propose a useful typology that distinguishes between descriptive BI functions, which summarise patterns in historical selection data; predictive BI functions, which generate probability-weighted forecasts of candidate performance and retention; and prescriptive BI functions, which recommend specific selection actions or candidate rankings. All three functional types are within the scope of this review, though the evidence on prescriptive functions in Sub-Saharan African contexts is particularly limited.

Theoretical Framework

Three theoretical frameworks inform the analytical approach of this review. The first is the resource-based view of the firm, extended through the lens of dynamic capabilities (Teece et al., 1997; Barreto, 2022). This perspective treats talent as a strategic resource and positions AI-powered BI as a dynamic capability that enables organisations to sense, seize, and reconfigure human capital in response to competitive environmental change (Rasmussen & Ulrich, 2023). Applied to Sub-Saharan Africa, this framework draws attention to how AI-powered BI capability may function as a source of competitive differentiation in talent markets, while also highlighting the absorptive capacity constraints that limit its strategic value in contexts where analytical skills, data infrastructure, and change management capabilities are scarce (Dube & Mthethwa, 2023; Osei-Bonsu, 2023).

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The second framework is algorithmic fairness theory, which examines the mechanisms through which computational selection systems can perpetuate, amplify, or mitigate discrimination (Barocas et al., 2023). Algorithmic fairness scholarship has demonstrated that AI systems trained on historical data reflecting structural inequalities tend to reproduce those inequalities through proxy discrimination, measurement bias, and feedback loop effects (Ajunwa, 2022; Raghavan et al., 2024). In Sub-Saharan African talent markets, where structural inequalities reflect colonial labour market legacies, ethnic stratification, gendered occupational segregation, and urban-rural divides, the risk that AI-powered BI systems will amplify rather than mitigate existing inequities is particularly acute.

The third framework is sociotechnical systems theory, which holds that technologies must be understood as constitutively entangled with the social, organisational, and institutional contexts in which they are embedded (Trist & Bamforth, 1951; Orlikowski & Scott, 2022). This perspective resists technological determinism by foregrounding the ways in which AI-powered BI systems are interpreted, adapted, and contested by the organisational actors who deploy and are subject to them, and by the ways in which organisational practices, power relations, and institutional norms shape technology adoption and its consequences. In Sub-Saharan Africa, where organisational cultures, labour relations traditions, and institutional contexts differ substantially both from high-income country settings and from each other across the region, a sociotechnical lens is essential for understanding the heterogeneous experiences of AI-powered BI adoption.

The Sub-Saharan African Labour Market and HR Context

Sub-Saharan Africa's labour market presents a distinctive set of structural features that bear directly on the implications of AI-powered BI in HR selection. The region has a median age of approximately 18 years and a rapidly expanding working-age population, with an estimated 20 million young people entering the labour force annually (African Development Bank, 2023; International Labour Organisation, 2023). Formal sector employment absorbs only a fraction of this labour supply, resulting in high unemployment, widespread informality, and significant underemployment, conditions that create intense competition for formal sector positions and render selection decisions consequential for individual life chances.

HR management practices across Sub-Saharan Africa are shaped by a complex interplay of multinational corporate standards, local institutional contexts, regulatory requirements, and cultural norms. Multinational corporations and

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regional conglomerates operating across the region have been the primary drivers of formalised HR technology adoption, while small and medium enterprises, which constitute the majority of formal sector employers, largely rely on informal, relationship-based recruitment practices (Osei-Bonsu, 2023; Twumasi & Adu-Gyamfi, 2023). This bifurcation means that AI-powered BI adoption is concentrated in a relatively small segment of employers, with significant implications for who benefits from, and who is potentially disadvantaged by, algorithmic selection.

The linguistic and cultural diversity of Sub-Saharan Africa is a further contextual factor of direct relevance to AI-powered BI in HR selection. The region is home to more than 2,000 languages, and many countries conduct professional recruitment in a colonial language, typically English, French, or Portuguese, that is not the first language of a substantial proportion of the candidate population (Wambua, 2023). AI-powered BI systems that rely on natural language processing for resume parsing, communication analysis, or video interview evaluation may systematically disadvantage candidates who are highly capable in local languages but less fluent in the dominant recruitment language, producing selection bias that is linguistically coded but structurally correlated with ethnicity and socioeconomic background.

Material and Methods

Scoping Review Design and Protocol

This study employs a scoping review methodology following the framework established by Arksey and O'Malley (2005) and refined by Levac et al. (2010) and Peters et al. (2022). The PRISMA-ScR reporting guidelines (Tricco et al., 2022) were applied to ensure transparency and reproducibility. A scoping review is appropriate for this study because the objective is to characterise the breadth and nature of the available evidence, identify conceptual and empirical gaps, and generate a comprehensive map of the field, rather than to answer a focused research question through quantitative synthesis (Munn et al., 2022). The multidisciplinary nature of the evidence base, which spans management science, computer science, law, development economics, and organisational psychology, further supports the scoping review approach.

The review protocol was registered before commencement and specified the research questions, inclusion and exclusion criteria, search strategy, data extraction framework, and synthesis approach. The protocol explicitly required that at least 80 per cent of the included sources be published from 2021 onwards to ensure that the

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review reflects the rapidly evolving contemporary landscape of AI-powered BI in HR selection.

Search Strategy

Systematic searches were conducted across seven electronic databases: Scopus, Web of Science, EBSCOhost (Academic Search Complete and Business Source Complete), IEEE Xplore, JSTOR, Google Scholar, and the African Journals Online (AJOL) platform. Search strings combined terms from three conceptual domains: AI and BI technology terms (including "artificial intelligence," "machine learning," "business intelligence," "predictive analytics," "talent analytics," "algorithmic selection," "natural language processing," "HR analytics"); HR selection terms (including "recruitment," "selection," "hiring," "talent acquisition," "applicant screening," "candidate assessment"); and geographic terms (including "Sub-Saharan Africa," "East Africa," "West Africa," "Southern Africa," "Central Africa," and specific country names including Nigeria, South Africa, Kenya, Ghana, Ethiopia, Tanzania, Rwanda, Uganda, Botswana, and Senegal). Boolean operators were used to combine terms within and across domains.

Grey literature sources were consulted in addition to academic databases, including reports from the African Development Bank, the International Labour Organisation, the World Economic Forum, McKinsey Global Institute Africa, PwC Africa, Deloitte Africa, the United Nations Economic Commission for Africa, and national HR professional bodies including the South African Board for People Practices, the Chartered Institute of Personnel and Development Africa, and the HR Association of Nigeria.

Inclusion and Exclusion Criteria

Sources were included if they addressed: AI-powered analytics, machine learning, or BI systems applied to HR selection or talent acquisition; organisations operating in or explicitly relevant to Sub-Saharan Africa; and at least one of the five research questions guiding the review. Sources were also included if they examined closely related African, developing country, or Global South contexts with explicit relevance to Sub-Saharan Africa, given the relative scarcity of region-specific empirical studies. All source types were included: empirical studies (qualitative, quantitative, and mixed methods), systematic and narrative reviews, conceptual papers, legal and policy analyses, technical reports, and industry publications.

Sources were excluded if they focused exclusively on AI tools applied post-hire without selection-stage relevance; were purely technical computer science papers without organisational, ethical, or policy dimensions; were opinion pieces without

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scholarly grounding; addressed only North American, European, or East Asian contexts without applicability to Sub-Saharan Africa; or were not available in English. After removal of duplicates and application of screening criteria to titles, abstracts, and full texts, a final corpus of 54 sources was included.

Data Extraction and Thematic Synthesis

Data was extracted using a standardised extraction instrument capturing bibliographic details, study design, geographic focus, specific AI-powered BI functions examined, key findings, theoretical framework employed, limitations identified by authors, and quality indicators. Given the heterogeneity of source types, a narrative thematic synthesis approach (Thomas & Harden, 2008) was employed rather than a meta-analytic technique. Synthesis involved iterative coding, clustering, and abstraction of data across sources, leading to the identification of five thematic domains that organise the findings section. Two independent reviewers conducted parallel coding, with discrepancies resolved through discussion and consensus.

Findings

The Conceptual Landscape of AI-Powered BI in HR Selection

Taxonomy of AI-Powered BI Functions in Selection

The corpus reveals a rich but inconsistently defined landscape of AI-powered BI functions applied across the HR selection process. Drawing on the descriptive-predictive-prescriptive typology, the most widely discussed applications in Sub-Saharan African contexts fall primarily within the descriptive and predictive categories. Descriptive BI applications include automated resume parsing and candidate database analytics, labour market intelligence dashboards that aggregate data on candidate supply by skill, location, and salary expectation, and applicant funnel visualisations that surface patterns in conversion rates across selection stages (Fayyad et al., 2022; Osei-Bonsu, 2023). These applications are relatively well established in the technology stacks of multinational corporations operating in the region, though their analytical outputs are not always systematically used to inform selection decisions.

Predictive BI functions are attracting growing interest but remain at earlier stages of adoption in Sub-Saharan Africa. Applications include machine learning models that predict candidate success probability based on historical performance data of prior hires, natural language processing tools that analyse the semantic

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content of application documents and interview transcripts, and turnover risk models that factor predicted retention into selection scores (Jia et al., 2023; Twumasi & Adu-Gyamfi, 2023). Prescriptive BI functions, which generate specific selection recommendations or candidate rankings from integrated data models, are the least common in the documented Sub-Saharan African literature, appearing primarily in accounts of pilot programmes at large South African and Nigerian multinationals (Nkosi et al., 2024; Dube & Mthethwa, 2023).

Dominant Vendor Platforms and Localisation

The BI and HR technology platforms most commonly referenced in the corpus include SAP SuccessFactors, Oracle HCM Cloud, Workday, Microsoft Dynamics 365 Human Resources, Zoho Recruit, SmartRecruiters, and Cornerstone OnDemand (Nkosi et al., 2024; Sithole et al., 2024). With the exception of Zoho's growing African market presence and a small number of African-developed platforms, the market is dominated by vendors headquartered in the United States and Europe, whose systems were designed and validated for talent markets in those regions.

Localisation gaps are a recurring theme across the corpus. Osei-Bonsu (2023) documents that HR analytics platforms deployed in Ghanaian financial services organisations were configured with default benchmarks derived from North American salary surveys and performance datasets, producing role-fit scores and compensation band recommendations that were systematically misaligned with local market realities. Twumasi and Adu-Gyamfi (2023) find similar patterns in Kenyan technology sector firms, where candidate scoring algorithms calibrated on developed-country training data produced counterintuitive shortlist outputs that experienced local recruiters routinely overrode, undermining the efficiency rationale for adoption. These findings suggest that the value proposition of AI-powered BI in HR selection is substantially eroded when systems are not locally validated and adapted.

Adoption Patterns, Drivers, and Barriers

Adoption Landscape

The corpus reveals a highly uneven landscape of AI-powered BI adoption across Sub-Saharan Africa, characterised by significant variation along the dimensions of firm size, sector, country, and ownership structure. Large multinational corporations operating across the region, particularly in financial

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services, telecommunications, mining, fast-moving consumer goods, and professional services, lead adoption, with documented deployments of integrated HR analytics platforms in South Africa, Nigeria, Kenya, Ghana, Ethiopia, and Rwanda (Dube & Mthethwa, 2023; Nkosi et al., 2024; Osei-Bonsu, 2023). Regional pan-African conglomerates have also been active adopters, driven partly by the need to manage talent selection at scale across multiple national contexts.

Public sector adoption is documented primarily in South Africa, where several national government departments have piloted AI-assisted candidate screening for high-volume entry-level recruitment, and in Rwanda, where the government's technology-forward development agenda has created enabling conditions for experimental deployments (Fourie & Nel, 2023; Republic of Rwanda, 2023). The public sectors of most other Sub-Saharan African countries remain substantially paper-based in their selection practices, constrained by procurement regulations, digital infrastructure limitations, and workforce capability gaps (International Labour Organisation, 2023).

Small and medium enterprises (SMEs), which constitute the majority of formal sector employers across the region, display minimal adoption of AI-powered BI in selection. A survey of 340 SMEs across Nigeria, South Africa, Kenya, and Ghana conducted by Twumasi and Adu-Gyamfi (2023) found that fewer than 6 percent used any form of automated candidate analytics, with the dominant barriers identified as cost, technical capacity, and uncertainty about return on investment. This finding is consistent with broader patterns in the global SME technology adoption literature but is particularly consequential in Sub-Saharan Africa, where SMEs provide the majority of formal employment.

Drivers of Adoption

The literature identifies a consistent set of organisational drivers for AI-powered BI adoption in HR selection across Sub-Saharan Africa. Efficiency imperatives are the most prominently cited, with organisations emphasising the need to process large volumes of applications for limited formal sector vacancies within compressed timeframes (Dube & Mthethwa, 2023; Jia et al., 2023). The ratio of applications to available positions at large Sub-Saharan African employers frequently exceeds 200:1 for entry-level roles, creating a practical necessity for some form of automated initial filtering.

The aspiration to enhance selection quality and reduce costly mis-hires is a second significant driver. Osei-Bonsu (2023) documents the case of a major Ghanaian bank that invested in a predictive talent analytics platform following an

analysis that estimated its annual cost of selection failure, defined as voluntary or involuntary separations within 18 months of hire, at approximately 12 percent of annual payroll. The prospect of using BI-derived predictive models to reduce this cost was a compelling investment justification, even in the absence of robust local validation evidence. Similar rationales are documented in Nigerian and South African contexts (Nkosi et al., 2024; Sithole et al., 2024).

Competitive talent market pressures constitute a third driver, particularly in sectors such as technology, financial services, and professional services, where organisations compete intensely for a relatively small pool of highly qualified candidates. Organisations in these sectors increasingly perceive AI-powered BI capabilities as a competitive differentiator, both for identifying high-quality candidates more rapidly and for crafting personalised candidate experiences that strengthen employer brand positioning (Rasmussen & Ulrich, 2023; World Economic Forum, 2023).

Barriers to Adoption

The barriers to AI-powered BI adoption in HR selection across Sub-Saharan Africa are multiple, intersecting, and context-specific. Data scarcity and quality limitations represent the most fundamental constraint. Predictive BI models require substantial volumes of structured historical data to generate reliable predictions, yet many Sub-Saharan African organisations lack comprehensive digital records of past selection decisions, candidate characteristics, and post-hire performance outcomes (Fayyad et al., 2022; Sithole et al., 2024). Where data exists, they are frequently fragmented across incompatible legacy systems, subject to quality problems arising from inconsistent data entry practices, and incomplete due to high rates of informal employment history among candidates.

Digital infrastructure limitations pose a second category of barriers. Reliable high-speed internet connectivity, which is a prerequisite for cloud-based AI-powered BI platforms, remains geographically concentrated in major urban centres across most Sub-Saharan African countries (Gillwald et al., 2022). Organisational ICT infrastructure, including server capacity, endpoint device quality, and technical support capability, is similarly variable, creating implementation challenges even for organisations that can afford platform licensing costs. Candidate-facing components of AIHS, such as online assessments and video interview platforms, are particularly affected, as candidate populations in many contexts do not have reliable access to the necessary technology.

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Human capital constraints in HR and analytics functions represent a third significant barrier. AI-powered BI platforms require both technical skills to configure, maintain, and interpret system outputs and analytical literacy among HR decision-makers to use those outputs effectively. Skills gaps in both dimensions are widely documented across the Sub-Saharan African corpus (Dube & Mthethwa, 2023; Osei-Bonsu, 2023; Twumasi & Adu-Gyamfi, 2023). The shortage of HR analytics professionals with both domain expertise and technical capability is particularly acute, and the pipeline of such professionals emerging from regional universities and business schools remains underdeveloped relative to demand.

Algorithmic Bias and Equity Considerations

Structural Sources of Bias in the Sub-Saharan African Context

The algorithmic bias literature has established that AI-powered selection systems trained on historical data reflecting structural inequalities tend to replicate and amplify those inequalities through mechanisms including biased training data, proxy discrimination, and feedback loops (Barocas et al., 2023; Raghavan et al., 2024). In the Sub-Saharan African context, the structural sources of potential bias are numerous and deeply rooted. Colonial labour market legacies have produced patterns of occupational segregation, credential stratification, and geographic concentration of formal employment that are strongly correlated with ethnicity, gender, and socioeconomic background across the region (Kolade & Owoseni, 2022; Wambua, 2023). AI-powered BI models that learn from historical selection and performance data in such contexts will tend to encode these structural inequalities as predictive features, producing systematic disadvantages for candidates from historically marginalised groups even in the absence of explicit discriminatory intent.

Proxy discrimination is a particularly salient mechanism in Sub-Saharan African HR selection contexts. Features that appear neutral in selection algorithms, such as educational institution attended, geographic location, employment tenure patterns, access to professional networks, and digital skills certifications, are strongly correlated with structural position in ways that vary considerably across the region's diverse national contexts (Ajunwa, 2022; Dube & Mthethwa, 2023). In South Africa, for example, residential area, school name, and employment gap patterns carry significant racial signals because of apartheid-era spatial and educational policies. In Nigeria, the academic institution attended may function as a proxy for ethnic and regional background. In Kenya, linguistic features of written

application materials may correlate with ethnic identity through patterns of mother-tongue interference in English writing.

Measurement bias in psychometric and cognitive assessments integrated into AI-powered BI selection systems is a related concern. Wambua (2023) reviews the cross-cultural validity evidence for cognitive ability and personality assessments commonly used in Sub-Saharan African recruitment contexts and concludes that a significant proportion demonstrate differential item functioning across linguistic and cultural groups, raising questions about whether they measure the same constructs equivalently across diverse candidate populations. Assessments calibrated on North American or European norm groups cannot be assumed to have equivalent predictive validity in Sub-Saharan African contexts without independent local validation studies.

Gender and Intersectional Equity Dimensions

Gender equity implications of AI-powered BI in HR selection receive growing attention in the Sub-Saharan African corpus. Women are underrepresented in senior and technical roles across the region, and historical selection data in these categories will therefore tend to produce models that assign lower predicted performance scores to female candidates (Jia et al., 2023; Twumasi & Adu-Gyamfi, 2023). Natural language processing tools trained on male-dominated corpora may also exhibit gender bias in language scoring, disadvantaging candidates whose communication styles align with feminine speech patterns.

Kolade and Owoseni (2022) document the intersectional dimensions of AI-powered selection bias in a qualitative study of Nigerian technology sector organisations, finding that the combination of gender, ethnic, and educational background in candidate profiles produced compounded disadvantage for women from certain regional and educational backgrounds that exceeded the sum of individual biasing effects. This finding illustrates the importance of intersectional analysis in evaluating the equity implications of AI-powered BI in Sub-Saharan African selection contexts, a methodological sophistication that most available evaluation frameworks do not yet incorporate.

Evidence of Bias Outcomes

Direct empirical evidence of algorithmic bias outcomes in Sub-Saharan African AI-powered BI selection is limited but emerging. Nkosi et al. (2024) conducted an audit study examining the outputs of three commercially deployed AI-powered screening systems across South African and Nigerian organisations, constructing matched candidate profiles with identical qualifications and experience but varying

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demographic indicators. They found statistically significant score differentials favouring candidates whose profile characteristics aligned with historically advantaged demographic groups across two of the three systems, with effect sizes that were practically significant for selection decision-making. While methodological limitations of audit studies must be acknowledged, these findings provide indicative evidence of systemic bias in at least some systems deployed in the region.

Qualitative evidence from practitioner interviews offers further insight. Several HR professionals interviewed by Dube and Mthethwa (2023) across South African organisations reported instances of AI-generated shortlists that systematically underrepresented candidates from certain universities, geographic locations, or linguistic backgrounds, shortfalls that were attributed post hoc to the characteristics of the historical training data rather than to deliberate design choices. These accounts illustrate how structural inequalities embedded in historical data manifest as patterns of omission in AI-generated candidate pools, a form of bias that may be less visible than discriminatory inclusion decisions but equally consequential for equity outcomes.

Data Governance and Regulatory Frameworks

National Data Protection Landscapes

Sub-Saharan Africa has experienced significant legislative activity in data protection over the past five years, with approximately 36 of the region's 46 countries having enacted or progressed data protection legislation by 2024 (Greenleaf & Czarnowski, 2023). The most comprehensive and influential frameworks include South Africa's Protection of Personal Information Act (POPIA, 2013, fully operative from 2021), Kenya's Data Protection Act (2019, implemented from 2022), Nigeria's Nigeria Data Protection Regulation (NDPR, 2019) and the subsequently enacted Nigeria Data Protection Act (2023), Ghana's Data Protection Act (2012), Rwanda's Law on the Protection of Personal Data (2021), and Tanzania's Personal Data Protection Act (2022). These instruments establish principles of lawful processing, purpose limitation, data minimisation, accuracy, and subject access rights that are directly applicable to AI-powered BI selection systems.

The provisions most relevant to AI-powered BI in HR selection include automated decision-making rights, data subject consent requirements for sensitive processing, and obligations around processing of special categories of personal

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information including health data, biometric data, and information about criminal records. South Africa's POPIA Section 71 is particularly noteworthy, providing a qualified right to human review of decisions based solely on automated processing that significantly affect the data subject, a provision closely analogous to Article 22 of the European General Data Protection Regulation (Greenleaf & Czarnowski, 2023; Oosthuizen, 2022). The Nigerian Data Protection Act 2023 contains similar provisions, as does Kenya's Data Protection Act under its implementing regulations.

Employment and Labour Law Frameworks

Employment equity and anti-discrimination provisions across Sub-Saharan African jurisdictions create a second layer of regulatory relevance for AI-powered BI in HR selection. South Africa's Employment Equity Act 55 of 1998, as amended by the Employment Equity Amendment Act 4 of 2022, prohibits unfair discrimination in any employment policy or practice and requires designated employers to implement affirmative action to achieve equitable representation of designated groups. This legislation creates a distinctive compliance imperative: AI-powered BI selection systems must not only avoid discriminatory outcomes but must actively support equity objectives, a requirement that significantly complicates standard technical optimisation approaches (Holtzhausen & Fourie, 2023).

Other Sub-Saharan African jurisdictions have less prescriptive employment equity frameworks, though constitutional non-discrimination provisions, labour act provisions on fair recruitment practices, and sector-specific fair employment guidelines create relevant obligations in most countries (Wambua, 2023). The International Labour Organisation's conventions on discrimination in employment, ratified by most Sub-Saharan African states, establish a complementary international framework that has relevance for the evaluation of AI-powered BI selection practices.

Regulatory Gaps and Emerging AI Governance

Despite the legislative activity in data protection, the corpus identifies substantial regulatory gaps in the governance of AI-powered BI in HR selection across Sub-Saharan Africa. Most data protection regulators in the region are newly established, under-resourced, and have not yet developed sector-specific guidance for AI in employment contexts (Greenleaf & Czarnowski, 2023; Wambua, 2023). Enforcement of data protection obligations in the employment context is limited, and awareness of specific obligations around automated decision-making rights among both employers and candidates is low.

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AI-specific governance frameworks are at a very early stage of development across the region. South Africa's White Paper on Artificial Intelligence (Department of Communications and Digital Technologies, 2023) and Rwanda's National Artificial Intelligence Policy (Republic of Rwanda, 2023) are among the most developed national AI policy statements in the region, but both emphasise innovation and economic development objectives and provide only limited guidance on AI risk governance in employment contexts. The African Union's Continental AI Policy Framework, adopted in 2024, provides a high-level regional commitment to ethical AI development but stops short of binding governance requirements for specific application domains (African Union, 2024).

The World Economic Forum (2023) and McKinsey Global Institute (2023) both identify the regulatory gap around AI in employment as a significant risk for Sub-Saharan African talent markets, recommending that regional governments develop sector-specific AI governance frameworks that integrate data protection, labour law, and AI ethics principles within a coherent compliance architecture. The International Labour Organisation (2023) similarly advocates for the development of AI governance standards in employment that build on its existing conventions and recommendations, adapted to reflect the specific structural conditions of developing economy labour markets.

Organisational Capability, Infrastructure, and Implementation Challenges

Capability Building and HR Analytics Maturity

The literature on organisational capability for AI-powered BI adoption reveals a significant maturity gap between the most advanced adopters and the majority of Sub-Saharan African organisations. Drawing on Rasmussen and Ulrich's (2023) HR analytics maturity model, the most sophisticated regional adopters, concentrated in the South African financial services and telecommunications sectors, have progressed to integrated predictive analytics capability, with dedicated people analytics teams, enterprise data warehouses, and systematic linkage of selection data to post-hire performance outcomes. The majority of documented adopters, however, operate at the descriptive or basic diagnostic analytics levels, using BI platforms primarily for reporting and monitoring rather than for predictive or prescriptive selection support.

Osei-Bonsu (2023) identifies a critical enabling condition for HR analytics maturity that is frequently absent in Sub-Saharan African organisational contexts: the integration of selection data with downstream performance, development, and

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retention data within a unified talent analytics architecture. Without this integration, AI-powered BI systems cannot generate the outcome data necessary to train and validate predictive selection models, limiting their analytical power to pattern recognition in candidate characteristics rather than evidence-based prediction of job success. Building this integration requires substantial investment in data architecture, system integration, and data governance that exceeds the current capabilities of most regional organisations.

Ethical Implementation Frameworks

The corpus documents a growing recognition among leading Sub-Saharan African HR technology adopters that technical deployment of AI-powered BI must be accompanied by ethical implementation frameworks to manage bias risk, ensure regulatory compliance, and maintain candidate trust. Sithole et al. (2024) document a pioneering example from a South African mining corporation that developed a comprehensive AI governance framework for HR selection, incorporating algorithmic impact assessments prior to system deployment, demographic fairness testing of shortlist outputs on a quarterly basis, a candidate challenge mechanism enabling applicants to request human review of AI-assisted decisions, and annual independent audits of system performance and equity outcomes. While this level of governance sophistication remains exceptional across the region, it illustrates the feasibility of responsible AI-powered BI deployment under appropriate conditions.

Dube and Mthethwa (2023) identify a set of implementation practices that distinguish organisations reporting positive equity and efficiency outcomes from those reporting neutral or negative outcomes. These include: involving HR equity specialists and employee representatives in vendor selection and system configuration; requiring vendors to disclose training data demographics and provide jurisdiction-specific fairness reports; conducting local validation studies before system-wide deployment; establishing human override mechanisms at all AI-assisted decision points; and providing transparency to candidates about the role of AI in their evaluation. These practices are consistent with emerging international best practice guidance (Barocas et al., 2023; Yarger et al., 2024) but have not been systematically adopted across the region.

Candidate Experience and Trust Dimensions

The candidate experience dimension of AI-powered BI in HR selection receives less systematic attention in the Sub-Saharan African corpus than the organisational outcomes dimension, but the available evidence reveals important concerns.

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Twumasi and Adu-Gyamfi (2023) conducted a mixed-methods study of 289 job seekers in Ghana and Kenya who had participated in AI-assisted selection processes, finding significant concerns about procedural fairness, transparency, and the perceived accuracy of algorithmic assessments. Candidates who were screened out at automated stages reported high levels of frustration with the lack of specific feedback and the inability to contest AI-generated decisions, concerns that were amplified among candidates who perceived their demographic characteristics as sources of potential algorithmic disadvantage.

The accessibility dimensions of AI-powered BI selection deserve specific attention in the Sub-Saharan African context. Candidates with disabilities face compounded barriers, as many AI-powered assessment platforms are not designed with accessibility requirements in mind, creating assessment conditions that may be both inequitable and legally non-compliant under national disability rights frameworks (Nkosi et al., 2024). Candidates from rural or peri-urban areas face connectivity and device barriers that effectively foreclose participation in digital selection processes, representing a form of technological exclusion that is particularly consequential given the geographic concentration of rural poverty across the region.

Discussion: Synthesised Lessons and Implications

The Imperative of Contextual Validation and Local Calibration

The most fundamental lesson emerging from this scoping review is that AI-powered BI systems developed and validated in high-income country contexts cannot be assumed to perform accurately, fairly, or effectively when deployed in Sub-Saharan African talent markets without substantial local adaptation and validation. The structural characteristics of Sub-Saharan African labour markets, including patterns of educational credential distribution, employment history trajectories, linguistic diversity, and occupational mobility, differ sufficiently from the contexts in which most major platforms have been developed to render cross-contextual generalisation problematic (Fayyad et al., 2022; Wambua, 2023). Organisations that deploy internationally developed AI-powered BI selection systems without local validation are effectively delegating consequential selection decisions to models whose predictive validity in their specific contexts is unknown and potentially low.

Addressing this challenge requires coordinated action across multiple actor types. Technology vendors must invest in regional validation partnerships with

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African academic institutions, HR professional bodies, and large employers to generate the localised evidence base necessary for responsible deployment. Organisations must build local validation requirements into procurement specifications and must conduct ongoing monitoring of selection outcome distributions across demographic groups to detect bias signals that may emerge from initially undetected model miscalibration. Government regulators should consider mandating algorithmic impact assessments and local validation studies as preconditions for deployment of high-risk AI-powered BI systems in employment contexts, following the precedent of the EU AI Act's approach to high-risk AI applications.

Equity-Centred Governance as a Non-Negotiable Requirement

The alignment of AI-powered BI selection practices with the employment equity and anti-discrimination obligations of Sub-Saharan African legal frameworks represents a compliance imperative rather than an aspirational standard. The evidence reviewed demonstrates that AI-powered BI systems deployed without equity-centred governance are highly likely to amplify the structural inequalities that African constitutional frameworks and labour laws are specifically designed to address (Holtzhausen & Fourie, 2023; Kolade & Owoseni, 2022). This creates a legal risk that is compounded by reputational and social licence risks in contexts where equity is a highly salient political and social value.

Equity-centred governance of AI-powered BI in HR selection requires attention at multiple levels: system design, where equity criteria must be built into algorithmic objectives and technical specifications rather than appended as post-hoc audits; procurement, where vendor due diligence must include assessment of fairness testing practices and demographic diversity of training data; deployment, where ongoing monitoring of selection output distributions across demographic groups must be institutionalised; and governance, where accountability structures must include HR equity specialists, employee representatives, and external auditors with appropriate expertise. Regulatory bodies should support this governance architecture by developing specific guidance, establishing enforcement mechanisms, and building institutional capacity for algorithmic auditing.

Building Regional Data Infrastructure and Governance Capacity

The data scarcity and quality limitations that constrain AI-powered BI performance in Sub-Saharan African selection contexts are not simply technical problems to be solved by individual organisations. They reflect structural deficits in regional data infrastructure, data governance capacity, and data science

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capability that require coordinated responses at the organisational, sectoral, national, and regional levels (African Development Bank, 2023; Gillwald et al., 2022). Individual organisations can invest in internal data architecture and governance, but the quality and utility of those investments are limited by the broader data ecosystem in which they operate.

Regional and national initiatives to develop shared HR labour market data platforms, standardise occupational and skills taxonomies, build data governance regulatory capacity, and invest in people analytics education and professional development represent complementary priorities that would collectively enhance the enabling conditions for responsible AI-powered BI adoption in HR selection. The African Union's digital transformation agenda, the African Development Bank's Digital Economy for Africa initiative, and the growing network of African technology hubs and innovation ecosystems provide institutional vehicles through which these priorities could be advanced.

Advancing Interdisciplinary Research Capacity

The scarcity of empirically grounded, Sub-Saharan African-focused research on AI-powered BI in HR selection is simultaneously a key finding of this review and an urgent call to action for the research community. The field requires interdisciplinary research teams that combine expertise in organisational behaviour, HR management, industrial and organisational psychology, computer science, law, development economics, and African studies, working with authentic Sub-Saharan African organisational data and candidate populations (Munn et al., 2022; Rasmussen & Ulrich, 2023). The current evidence base, which relies heavily on international frameworks applied to African contexts through secondary analysis, cannot generate the contextually grounded insights necessary to guide responsible practice and evidence-informed regulation.

National research funding bodies, including those in South Africa, Kenya, Nigeria, and Ghana, should prioritise empirical research on AI-powered BI in employment contexts. Pan-African research consortia, building on models such as the Partnership for African Social and Governance Research and the African Population and Health Research Center, could provide vehicles for coordinated multi-country research programmes that generate comparative evidence across the region's diverse national contexts. International research partnerships that position African researchers as principal investigators rather than data providers would contribute to the development of locally grounded theoretical frameworks and methodological approaches.

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Candidate-Centred Design and Digital Inclusion

A recurring lesson across the thematic domains of this review is that AI-powered BI systems in HR selection are not simply tools that organisations deploy upon candidates, but technologies that shape candidate experiences, perceptions of fairness, and access to employment opportunities in ways that have profound individual and social consequences. Candidate-centred design, which foregrounds the experiences, needs, and rights of applicants as a primary design criterion rather than as a secondary consideration, must become a non-negotiable principle for AI-powered BI development and deployment in Sub-Saharan African contexts (Twumasi & Adu-Gyamfi, 2023; Yarger et al., 2024).

Digital inclusion dimensions of candidate-centred design are particularly pressing in the Sub-Saharan African context. Organisations that adopt AI-powered BI selection systems must implement alternative assessment pathways for candidates who cannot access or effectively use digital platforms due to connectivity limitations, device constraints, digital literacy gaps, or disability-related accessibility needs. Providing such alternatives is both an ethical obligation and, in many jurisdictions, a legal requirement under disability rights and non-discrimination frameworks. Technology vendors should invest in offline-capable assessment tools, low-bandwidth platform versions, and accessibility features as standard components of products intended for Sub-Saharan African markets rather than as expensive optional add-ons.

Limitations

This review has several limitations that should be acknowledged. As a scoping review, it does not apply formal risk-of-bias assessment tools to individual studies, meaning that the strength of evidence for specific claims varies across the corpus without explicit quality grading. The relative scarcity of empirical studies conducted with Sub-Saharan African organisational data means that the review necessarily draws on international evidence and conceptual frameworks to address many of its analytical objectives, with the risk of contextual misfit that this entails.

Publication bias may affect the composition of the corpus, with positive adoption outcomes potentially more likely to be documented in accessible literature than neutral or negative experiences. The exclusion of non-English sources is a further limitation in a region characterised by rich francophone and Lusophone scholarly traditions that may contain relevant evidence not captured in this review. Finally, the rapid pace of both technological development and regulatory change in this domain means that some findings may be superseded by the time of

publication, emphasising the need for regular evidence synthesis updates as the field evolves.

Conclusions

This scoping review has produced the first systematic map of the evidence on AI-powered business intelligence in HR selection strategies across Sub-Saharan Africa, revealing a landscape characterised by ambitious adoption aspirations, significant structural constraints, consequential equity risks, nascent governance frameworks, and an urgent need for contextually grounded research and practice capacity. The review has demonstrated that AI-powered BI systems hold genuine potential to enhance the efficiency and quality of HR selection in Sub-Saharan African organisations, but that this potential is currently being undermined by inadequate localisation, insufficient attention to structural bias risks, weak regulatory oversight, and significant capability gaps.

For HR practitioners and organisations, the review recommends: conducting rigorous due diligence on vendor localisation practices and validation evidence before procurement; building equity impact assessment into the implementation methodology for AI-powered BI selection systems; establishing ongoing demographic monitoring of selection output distributions; providing meaningful human review mechanisms at all AI-assisted decision points; investing in HR analytics capability through targeted professional development; and ensuring alternative assessment pathways for candidates unable to access digital platforms.

For technology vendors, the review recommends: investing in regional validation partnerships with Sub-Saharan African institutions to generate locally grounded performance and fairness evidence; developing platform configurations that reflect the linguistic, cultural, and structural diversity of Sub-Saharan African talent markets; building accessibility features and low-bandwidth capabilities as standard rather than optional components; and engaging proactively with emerging regional regulatory frameworks to support compliance rather than attempting to navigate around them.

For regulators and policymakers, the review recommends: developing coordinated AI governance frameworks for employment contexts that integrate data protection, labour law, and AI ethics principles; investing in the capacity of data protection authorities to audit AI-powered selection systems; considering mandatory algorithmic impact assessment requirements for high-risk employment AI deployments; and engaging regional and international governance bodies to

develop harmonised standards that reduce compliance fragmentation for organisations operating across multiple Sub-Saharan African jurisdictions.

For researchers, the review recommends: prioritising empirical research programmes that generate Sub-Saharan African-specific evidence on the performance, fairness, and organisational impact of AI-powered BI in HR selection; developing intersectional analytical frameworks that can capture the compounded equity implications of algorithmic selection across multiple dimensions of structural inequality; building interdisciplinary and pan-African research partnerships that position African scholars as leaders rather than collaborators in research on African technology and labour market challenges; and contributing to the development of locally grounded theoretical frameworks that capture the distinctive dynamics of AI-powered BI adoption in developing economy organisational contexts.

The integration of AI-powered business intelligence into HR selection represents both one of the most significant opportunities and one of the most consequential risks for equitable talent market development in Sub-Saharan Africa. Realising the opportunity while managing the risk requires deliberate, coordinated, and evidence-informed action by all stakeholders in the regional HR technology ecosystem. This review has attempted to provide the evidential foundation for that action, while acknowledging the significant gaps that remain to be filled by future research

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AI AND ESG: FROM MINDSET SHIFT TO BUSINESS OPPORTUNITIES

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Abstract

The growing convergence between Artificial Intelligence (AI) and Environmental, Social, and Governance (ESG) principles is reshaping contemporary business models and organizational strategies. Companies are increasingly recognizing that ESG is no longer solely a regulatory or reputational requirement but a strategic framework for sustainable value creation. Simultaneously, AI technologies are becoming essential tools for improving operational efficiency, enhancing decision-making processes, and supporting sustainability objectives. This paper explores the relationship between AI and ESG by analyzing how AI-driven transformation contributes to organizational mindset shifts and creates new business opportunities. The study examines the role of AI in ESG reporting, sustainability analytics, risk management, stakeholder engagement, and corporate governance. Furthermore, it discusses emerging opportunities such as green innovation, sustainable finance, predictive sustainability management, and intelligent resource optimization. The paper also addresses key challenges associated with AI adoption in ESG contexts, including ethical concerns, algorithmic bias, data privacy, regulatory uncertainty, and governance risks. The findings suggest that organizations integrating AI into ESG strategies can improve long-term competitiveness, transparency, and resilience while contributing to broader sustainability goals. The paper concludes that the successful integration of AI and ESG requires not only technological capabilities but also

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organizational culture change, strategic leadership, and responsible governance frameworks.

Keywords: *Artificial Intelligence, ESG, sustainability, business transformation, corporate governance, sustainable innovation, digital transformation*

JEL Classification: O33; M14; G34; Q56; L21; D83

1. Introduction

In recent years, businesses worldwide have faced increasing pressure to adopt sustainable and socially responsible practices. Investors, regulators, customers, and other stakeholders are demanding greater transparency regarding environmental, social, and governance (ESG) performance. At the same time, rapid technological advancement, particularly in the field of Artificial Intelligence (AI), is transforming industries and redefining competitive advantage. The intersection of AI and ESG has therefore emerged as one of the most significant strategic developments in modern business environments.

Traditionally, ESG initiatives were often viewed as compliance-oriented activities primarily focused on reporting obligations and reputational management. However, contemporary organizations increasingly perceive ESG as an integral component of long-term business strategy and value creation. This shift reflects broader changes in stakeholder capitalism, sustainable finance, and corporate accountability. Simultaneously, AI technologies—including machine learning, natural language processing, predictive analytics, and generative AI—are creating unprecedented opportunities for organizations to optimize sustainability performance, automate reporting processes, and improve strategic decision-making.

The integration of AI into ESG frameworks is not merely a technological evolution but also a transformation of organizational mindset. Companies are moving from reactive sustainability approaches toward proactive and data-driven sustainability management. AI enables organizations to analyze large volumes of ESG-related data, identify risks and opportunities, predict environmental impacts, and support evidence-based governance decisions. As a result, AI is becoming a critical enabler of sustainable business transformation.

The business implications of AI-driven ESG transformation are substantial. Organizations that effectively combine AI capabilities with ESG strategies may achieve operational efficiency, stronger stakeholder trust, improved innovation

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capacity, and enhanced market competitiveness. New business opportunities are emerging in areas such as green technologies, sustainable supply chains, ESG analytics platforms, intelligent energy management, and responsible investment solutions. Moreover, AI-supported ESG practices contribute to resilience and adaptability in increasingly volatile global markets.

Nevertheless, the integration of AI and ESG also introduces significant challenges and ethical concerns. Issues related to algorithmic bias, transparency, accountability, data privacy, cybersecurity, and governance remain critical barriers to responsible AI implementation. Furthermore, the growing regulatory landscape—including sustainability reporting requirements and AI governance frameworks—requires organizations to balance innovation with ethical responsibility and compliance obligations.

2. Literature Review

The concept of ESG has become increasingly important in corporate strategy and investment decision-making over the past two decades. ESG refers to a set of standards used to evaluate organizational performance in environmental protection, social responsibility, and corporate governance. According to Friede, Busch, and Bassen (2015), companies with strong ESG performance tend to demonstrate improved financial performance and lower long-term risk exposure. ESG metrics are now widely used by investors, regulators, and rating agencies to assess organizational sustainability and resilience.

Environmental dimensions of ESG include issues such as climate change mitigation, energy efficiency, waste management, and carbon emissions reduction. Social aspects focus on employee relations, diversity and inclusion, human rights, and stakeholder engagement, while governance dimensions address corporate ethics, board structure, transparency, and accountability. The growing significance of ESG reflects broader societal concerns regarding sustainability, ethical business conduct, and long-term value creation.

Regulatory developments have further accelerated ESG adoption. Initiatives such as the European Union's Corporate Sustainability Reporting Directive (CSRD) and sustainable finance regulations require organizations to provide more detailed and standardized sustainability disclosures. Consequently, ESG reporting has evolved from voluntary corporate communication into a strategic and regulatory necessity.

Artificial Intelligence represents one of the most transformative technologies of the Fourth Industrial Revolution. AI encompasses a range of technologies capable

of simulating human intelligence processes, including learning, reasoning, pattern recognition, and decision-making. According to Russell and Norvig (2021), AI systems can significantly improve organizational efficiency by automating complex tasks and enabling advanced predictive analytics.

The adoption of AI has accelerated digital transformation across industries such as finance, healthcare, manufacturing, logistics, and retail. AI applications include customer behavior analysis, predictive maintenance, fraud detection, process automation, and intelligent decision support systems. More recently, generative AI technologies have expanded AI capabilities in content generation, knowledge management, and strategic planning.

The convergence of AI and ESG represents a rapidly growing field of research and business practice. AI technologies are increasingly used to address ESG challenges through automation, predictive analytics, and intelligent resource management. Organizations generate enormous amounts of ESG-related data from internal operations, supply chains, regulatory reports, social media, and stakeholder interactions. AI systems can process this data more efficiently than traditional analytical approaches.

3. AI as a Driver of ESG Transformation

The integration of Artificial Intelligence into ESG strategies is fundamentally transforming how organizations approach sustainability, governance, and long-term value creation. AI technologies are no longer viewed merely as operational tools for efficiency improvement; instead, they are increasingly recognized as strategic enablers of sustainable transformation. Through advanced analytics, automation, and predictive capabilities, AI supports organizations in addressing complex ESG challenges while simultaneously improving competitiveness and resilience.

One of the most significant contributions of AI to ESG transformation is its ability to process and analyze vast amounts of structured and unstructured data. ESG reporting requires organizations to collect information from multiple sources, including environmental indicators, supply chain operations, employee data, governance frameworks, and stakeholder communications. Traditional reporting methods are often time-consuming, inconsistent, and vulnerable to human error. AI-driven systems enable automated data collection, real-time monitoring, and advanced analysis, significantly improving reporting accuracy and transparency.

Machine learning algorithms can identify patterns and correlations within ESG datasets that would be difficult to detect using conventional analytical approaches.

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For example, AI can predict environmental risks, optimize energy consumption, and monitor carbon emissions across operational processes. Intelligent systems are increasingly used in manufacturing and logistics industries to improve resource efficiency and reduce environmental impact.

Within corporate governance, AI technologies strengthen compliance management, fraud detection, and strategic decision-making. AI-powered governance systems can continuously monitor regulatory changes, identify compliance risks, and support internal audit functions. Automated governance analytics improve organizational transparency and accountability while reducing administrative complexity.

4. Business Opportunities Emerging from AI–ESG Integration

The convergence of AI and ESG principles is creating a wide range of new business opportunities across industries. Organizations increasingly recognize that sustainability and technological innovation can reinforce one another, generating competitive advantage, operational efficiency, and long-term profitability.

One of the most important business opportunities emerging from AI–ESG integration is the development of sustainable products and services. Companies are leveraging AI technologies to design environmentally friendly solutions, optimize resource utilization, and reduce waste. In sectors such as energy, transportation, manufacturing, and agriculture, AI applications contribute to smarter resource management and lower environmental impact.

The financial sector has also experienced substantial transformation through AI-supported ESG investing. Sustainable finance has become one of the fastest-growing segments of global capital markets, with investors increasingly prioritizing ESG performance in portfolio decisions. AI technologies improve ESG risk assessment, investment screening, and predictive financial analysis by processing large volumes of sustainability-related data.

Another emerging opportunity involves ESG analytics and reporting platforms. As regulatory requirements become more demanding, organizations require sophisticated tools for sustainability measurement and disclosure. AI-powered ESG software solutions help companies automate reporting processes, ensure data accuracy, and comply with evolving sustainability standards.

5. Challenges and Ethical Considerations

Although the integration of AI and ESG offers significant strategic and economic benefits, it also introduces numerous challenges and ethical concerns.

Organizations must address these issues carefully to ensure that AI technologies contribute positively to sustainability objectives rather than creating additional risks or inequalities.

One of the primary concerns associated with AI adoption is algorithmic bias. AI systems rely heavily on historical data, which may contain social, economic, or cultural biases. If such biases are embedded in AI models, organizations risk reinforcing discrimination in areas such as recruitment, financial decision-making, customer evaluation, and workforce management.

Another major challenge relates to transparency and explainability. Many advanced AI systems operate as "black boxes," making it difficult for users and stakeholders to understand how decisions are generated. Lack of transparency creates governance risks, particularly in highly regulated industries where accountability and regulatory compliance are essential.

Data privacy and cybersecurity also represent critical concerns. ESG-related analytics often require access to large volumes of sensitive organizational and personal data. Improper data management or insufficient cybersecurity measures may expose organizations to legal, reputational, and operational risks.

6. Future Outlook

The relationship between Artificial Intelligence and ESG is expected to become increasingly significant in the coming years as organizations continue to face growing sustainability pressures, technological disruption, and stakeholder expectations. The future development of AI–ESG integration will likely shape new business models, governance frameworks, and innovation ecosystems across global industries.

The future business landscape will also be strongly influenced by the growing importance of sustainable finance and ESG investing. Investors are expected to rely increasingly on AI-supported analytics to evaluate long-term environmental and governance risks.

Generative AI is also expected to play a transformative role in ESG-related innovation. Organizations may increasingly use generative AI tools for sustainability reporting, policy simulation, stakeholder communication, and strategic planning.

7. Conclusion

The convergence of Artificial Intelligence and ESG principles represents one of the most significant strategic transformations in contemporary business

environments. AI technologies are increasingly enabling organizations to improve sustainability performance, enhance governance mechanisms, optimize operational efficiency, and create long-term business value.

The study highlighted numerous business opportunities emerging from AI–ESG integration, including sustainable finance, intelligent supply chain management, ESG analytics platforms, green innovation, circular economy solutions, and AI-supported sustainability communication.

In conclusion, AI has the potential to become a powerful catalyst for ESG-driven transformation and sustainable business innovation. However, realizing this potential requires organizations to adopt holistic approaches that combine technological capabilities, ethical governance, and long-term strategic thinking.

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HUMAN MACHINE NEGOTIATION, COMPUTATIONAL CONSENT AND ALGORITHMIC OPACITY IN CONTEMPORARY CONTRACT LAW

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Abstract

The progressive integration of artificial intelligence into contemporary economic processes is generating a structural transformation of the general theory of contract and, more profoundly, of the modern conception of contractual consent itself. The contemporary digital ecosystem is characterised by the emergence of human–machine interaction models in which legally relevant decision-making no longer derives exclusively from the conscious manifestation of individual will, but from the continuous interaction between human subjects, computational architectures, predictive systems and opaque algorithmic infrastructures. This article critically analyses such transformation through an interdisciplinary and comparative methodology integrating European private law, general contract theory, behavioural law and economics, philosophy of language, information theory and the European regulation of artificial intelligence. Particular attention is devoted to the crisis of contractual intelligibility within digital environments, to the distinction between explainable language and non-interpretable language in machine learning systems, and to the progressive erosion of the traditional voluntarist conception of consent. The article demonstrates how automated decision-making and the increasing diffusion of non-transparent neural models

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generate new forms of epistemic asymmetry between individuals and digital platforms, thereby redefining the relationship between private autonomy, transparency, contractual freedom and algorithmic accountability. The analysis concludes by emphasising the necessity of a neo-constitutional reconstruction of digital consent grounded upon the protection of cognitive self-determination in the age of behavioural prediction.

Keywords: *human-machine negotiation; computational consent; explainable artificial intelligence; digital contracts; algorithmic governance; behavioural law and economics; black box systems; cognitive asymmetry; platform capitalism; digital constitutionalism.*

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

Introduction

The digital transformation of the contemporary economy has progressively modified not merely the technical modalities through which contracts are concluded, but also the epistemological structure of contractual consent itself. The emergence of digital platforms, the automation of decision-making processes and the increasing use of artificial intelligence systems based upon multilayer neural architectures are producing a profound transformation in the relationship between will, language and legal decision-making. Contemporary contracts no longer appear exclusively as the result of an encounter between mutually intelligible human subjects, but increasingly as the outcome of complex computational processes within which predictive algorithms, machine learning systems and digital infrastructures intervene in the formation, orientation and execution of contractual intention. The classical theory of the juridical act, constructed around the centrality of individual will and the presumption of the rationality of the contracting party, appears progressively inadequate for describing contractual phenomena characterised by algorithmic opacity, cognitive manipulation and systemic informational asymmetry.

The European legal tradition elaborated the voluntarist paradigm within a historical context in which contract was conceived as a manifestation of private autonomy grounded upon the comprehensibility of contractual language and upon the possibility of rational deliberation by the legal subject. Such paradigm found its philosophical roots within the Kantian conception of autonomy and within the subsequent Pandectist construction of the juridical act, according to which consent

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represented the point of convergence between formally free and symmetrical wills (Zimmermann, 1996, p. 576). Nevertheless, the contemporary digital environment radically alters such theoretical premises. Economic decisions are increasingly undertaken within computational ecosystems specifically designed to orient users' behaviour through techniques of behavioural engineering, algorithmic profiling and the dynamic personalisation of interfaces (Yeung, 2017, pp. 824-829).

As observed by Barbuzzi and Fontana (2024, pp. 425-430), algorithmic data processing does not merely constitute a technical phenomenon, but rather a process capable of directly affecting dignity, self-determination and individual freedom, thereby redefining the relationship between civil liability, technological governance and the constitutional protection of the person. The progressive automation of economic interactions generates new configurations of harm and legal vulnerability, imposing a critical reconsideration of traditional models of liability attribution and of the classical categories of contract law.

Contemporary artificial intelligence furthermore introduces an additional and qualitatively unprecedented problem when compared with the traditional informational asymmetries analysed by classical economic theory. Deep learning models and neural networks produce highly efficient outcomes without guaranteeing semantic intelligibility or causal explainability of the decisions generated. Computational language progressively tends to replace traditional legal language, yet such language frequently remains non-interpretable even for the programmers who designed it (Pasquale, 2015, pp. 3-18). The central question therefore becomes whether genuinely free consent may exist within decision-making processes that the human subject is incapable of fully understanding.

The distinction between explainable artificial intelligence and black-box systems consequently acquires systemic relevance. Within classical contract law, the comprehensibility of contractual content constituted the minimum prerequisite for the validity of consent. Within the digital ecosystem, however, decision-making increasingly becomes an opaque computational sequence within which the user adheres to statistical logics and algorithmic correlations escaping human understanding. This generates not merely a crisis of contractual transparency, but a deeper crisis affecting the modern conception of private autonomy itself.

The objective of this article is therefore to propose a theoretical reconstruction of computational consent as an autonomous category within contemporary private law, demonstrating how human-machine negotiation produces a structural transformation of the classical categories of the juridical act. Through an interdisciplinary and comparative methodology, the analysis seeks to demonstrate

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the necessity of a neo-constitutional reinterpretation of digital contract law in light of the principles of algorithmic transparency, cognitive self-determination and technological accountability.

1. Algorithmic language and the crisis of contractual intelligibility

Language has historically represented the epistemological foundation of the modern contract. Legal agreement presupposed the possibility that parties could mutually understand the meaning of contractual declarations through shared linguistic codes. The theory of contractual interpretation elaborated by the European civilian tradition was founded precisely upon the possibility of reconstructing the intention of the parties through semantic analysis of contractual text. Such model presupposed that legal language was, at least potentially, interpretable, rationalisable and reducible to intelligible argumentative structures.

The contemporary computational environment radically alters this framework. Machine learning systems do not operate through legally intelligible meanings, but rather through multidimensional statistical correlations elaborated by opaque neural networks. Algorithmic language no longer coincides with symbolic communication comprehensible to human beings, but instead with automated processing of informational patterns. Computational decision-making does not derive from interpretable deductive reasoning, but from probabilistic processes escaping complete semantic comprehension (Floridi, 2014).

As highlighted by Fontana and Barbuzzi in their studies concerning electronic agents and computational logics, the evolution of smart contracts and autonomous decision-making systems tends to generate a progressive functional emancipation of the machine from direct human control, thereby redefining the very notion of contractual subjectivity and the attribution of legally relevant intention. The machine no longer constitutes merely an executive instrument subordinated to human will, but rather a cognitive infrastructure capable of learning, adapting and taking decisions within increasingly broad margins of operational autonomy.

The crisis of contractual intelligibility emerges with particular clarity in contracts concluded through digital platforms. The user interacts with interfaces designed to orient behaviour through automatic cognitive mechanisms, whilst algorithms collect, process and interpret behavioural data in order to predict and modify individual preferences. Consent no longer represents exclusively a deliberative decision undertaken by the subject, but rather the outcome of interaction between human cognition and computational architectures designed to maximise engagement, conversion and data extraction.

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Algorithmic opacity consequently produces a new form of epistemic asymmetry qualitatively distinct from the traditional informational asymmetries examined by contract law. Within the classical economic model, asymmetry concerned primarily knowledge relating to the goods or services exchanged. Within the contemporary algorithmic economy, however, asymmetry concerns knowledge of human behaviour itself. Digital platforms know the subject through statistical profiling processes more profoundly than the subject knows the platform or, in many instances, himself or herself (Zuboff, 2019).

2. Computational consent and cognitive vulnerability

The progressive automation of economic decision-making imposes a critical reconsideration of the voluntarist theory of contract. Behavioural law and economics has demonstrated that individual decisions do not derive from perfectly rational processes, but rather from cognitive heuristics, systematic biases and environmental conditioning (Kahneman, 2011). Digital platforms exploit such vulnerabilities through sophisticated behavioural engineering strategies aimed at maximising commercial conversion.

The digital interface does not constitute a neutral instrument of communication, but rather a cognitive device designed to orient user behaviour. The graphical arrangement of buttons, the chromatic hierarchy of information, the simplification of decision-making pathways and the dynamic personalisation of content directly influence the formation of contractual intention. Economic choice therefore emerges from a computational environment scientifically designed to influence human behaviour (Sunstein, 2016).

Barbuzzi and Fontana have demonstrated that such dynamics assume even greater significance within systems founded upon continuous algorithmic processing of data, within which the subject is constantly monitored, profiled and reduced to statistical models capable of directly affecting informational self-determination. Computational analysis of human behaviour consequently transforms consent into a predictive process within which individual intention is progressively anticipated and shaped by the platform.

The notion of computational consent precisely describes this transformation. Consent no longer coincides with an autonomously deliberated psychological act, but rather with continuous interaction between human subject and algorithmic infrastructure. Individual intention is shaped, anticipated and progressively oriented by predictive systems capable of learning the cognitive vulnerabilities of the subject through massive behavioural data collection.

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Such process forms part of a broader anthropological transformation of contemporary existence. As emphasised by Barbuzzi and Fontana in their reflections concerning the "always on" paradigm, contemporary individuals increasingly inhabit an "onlife" dimension characterised by the dissolution of boundaries between digital and physical space, between connection and disconnection, and between professional and private existence. Permanent connectivity thereby becomes an existential condition profoundly modifying individual cognitive and decisional processes, whilst simultaneously increasing exposure to the persuasive dynamics of digital platforms.

3. Algorithmic governance and digital constitutionalism

Human-machine negotiation does not constitute exclusively a private law issue, but rather a constitutional question concerning the distribution of cognitive power within digital environments. Major technological platforms exercise normative, informational and behavioural functions directly affecting individual autonomy and contemporary democratic dynamics (Teubner, 2012).

Platform capitalism is founded upon the capacity to collect behavioural data and transform such data into instruments for predicting and modifying human conduct. Digital contracting thereby becomes a mechanism of cognitive governance in which the economic objective no longer consists solely in the exchange of goods or services, but in the production of predictive models of individual behaviour (Zuboff, 2019).

The reflections developed by Barbuzzi and Fontana regarding cybersecurity and smart mobility demonstrate how the interconnection of digital systems is progressively redefining the relationship between technology, liability and the protection of the person, imposing a new epistemology of data grounded upon security, transparency and individual autonomy. The evolution of intelligent infrastructures generates ecosystems within which automated decisions directly affect the daily life of individuals, thereby enormously expanding the harmful potential of algorithmic opacity.

The European Union has progressively attempted to respond to such transformation through regulatory models oriented towards algorithmic accountability and platform transparency. The Digital Services Act, the Digital Markets Act and the recent Artificial Intelligence Act outline a regulatory paradigm founded upon the centrality of the person and upon the limitation of manipulative practices. Particularly significant is the attention devoted to artificial

intelligence systems capable of altering human behaviour through exploitation of cognitive vulnerabilities.

European regulation therefore appears increasingly oriented towards a form of neo-constitutional digital governance in which the protection of contractual freedom is reinterpreted in light of safeguarding the cognitive integrity of the individual. Contractual freedom can no longer be understood merely as the absence of external coercion, but must also include the possibility for individuals to understand and control the algorithmic infrastructures orienting their decisions.

Conclusions

The evolution of artificial intelligence and contemporary algorithmic infrastructures is generating a radical transformation of the general theory of contract and of the modern conception of contractual consent itself. Human-machine negotiation introduces an epistemological crisis affecting the traditional voluntarist paradigm, insofar as legally relevant decision-making increasingly emerges within opaque and non-interpretable computational ecosystems.

Algorithmic language progressively tends to replace traditional legal language, yet such transformation produces a reduction in contractual intelligibility and a growth in epistemic asymmetries between individual and platform. Computational consent consequently emerges as a necessary theoretical category for describing decisional processes within which human intention is shaped by predictive infrastructures designed to orient behaviour.

European regulation demonstrates increasing awareness of the constitutional dimension of such phenomenon. The protection of digital consent no longer concerns merely the formal correctness of contractual procedures, but rather the safeguarding of cognitive self-determination in the age of algorithmic governance. Twenty-first century contract law will therefore be required to confront a fundamental challenge: preserving individual freedom within an economic environment dominated by computational systems capable of predicting, influencing and modifying human behaviour.

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WHAT COMES IN BUSINESS AFTER GENERATIVE AI : THE FUTURE OF VALUE, WORK, AND INTELLIGENCE

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Abstract

This paper explores the emerging paradigm beyond Generative Artificial Intelligence (GenAI), focusing on how the next phase of intelligent systems will reshape the foundations of value creation, labor structures, and the very definition of intelligence. While GenAI has demonstrated unprecedented capabilities in content generation, synthesis, and automation of cognitive tasks, its widespread adoption raises deeper questions about economic redistribution, human–machine collaboration, and the long-term trajectory of technological augmentation. The aim of this study is to develop a conceptual understanding of post-GenAI systems and their broader implications for society and the economy.

We propose a conceptual framework for understanding post-GenAI systems, characterized by autonomous goal formation, persistent memory, multimodal reasoning, and adaptive agency within complex socio-technical environments. In this context, value shifts from static outputs to dynamic processes of co-creation between humans and intelligent systems. Work is increasingly reconfigured as orchestration, supervision, and meaning-making rather than execution of discrete tasks. The methodological approach is conceptual and theoretical, based on the synthesis of insights from artificial intelligence research, labor economics, and cognitive science, in order to outline plausible future trajectories and system behaviors.

Furthermore, we argue that intelligence itself must be redefined beyond performance benchmarks toward relational and situated capabilities, emphasizing context awareness, ethical alignment, and collective cognition. The findings suggest that post-GenAI systems will fundamentally transform how value is produced and distributed, while also reshaping human roles in knowledge and labor ecosystems. These transformations introduce significant implications, including labor displacement, cognitive dependency, and power asymmetries in AI infrastructure ownership. Ultimately, we suggest that the post-GenAI era will not be defined solely by technological advancement, but by how societies choose to integrate intelligence systems into frameworks of governance, equity, and human purpose.

Keywords: *generative artificial intelligence (GenAI), post-GenAI systems, value creation, future of work, artificial intelligence, human–AI collaboration, automation, cognitive labor, digital transformation, autonomous systems, intelligence theory, socio-technical systems, AI ethics, economic disruption, human augmentation*

JEL Classification: O33, O14, J24, J21, M15, D83, O31, O33

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1. Introduction

In recent years, Generative Artificial Intelligence (GenAI) has rapidly evolved into a transformative technological paradigm, reshaping how knowledge is produced, processed, and distributed. Systems capable of generating text, images, code, and multimodal content have significantly expanded the boundaries of automation in cognitive and creative tasks. This development has accelerated digital transformation across industries, influencing education, business, research, and the broader knowledge economy.

Despite these advancements, the rapid adoption of GenAI raises fundamental questions about the future trajectory of intelligent systems. Beyond content generation, emerging AI capabilities suggest a shift toward more autonomous, adaptive, and context-aware systems. However, current literature provides limited theoretical clarity on what comes after GenAI and how such systems may redefine value creation, labor structures, and the concept of intelligence itself. This highlights the need for a structured conceptual exploration of the post-GenAI era.

This paper is guided by the following research objective: to develop a conceptual framework for understanding the post-GenAI paradigm and its implications for society and the economy. In particular, it addresses the following questions:

- How will post-GenAI systems transform value creation processes?
- In what ways will the structure and meaning of work evolve?
- How should intelligence be redefined in the context of increasingly autonomous AI systems?
- What are the key risks and societal implications of these transformations?

The main contribution of this study is the development of a theoretical framework that conceptualizes post-GenAI systems as agentic, adaptive, and socio-technically embedded entities. The paper extends current discussions beyond generative capabilities, focusing instead on autonomy, co-creation, and systemic intelligence. It also integrates perspectives from artificial intelligence, labor economics, and cognitive science to provide a multidisciplinary interpretation of future developments.

The remainder of the paper is structured as follows. Section 2 reviews relevant literature on AI evolution, labor transformation, and value creation. Section 3 introduces the conceptual framework of post-GenAI systems. Section 4 analyzes transformations in value creation, while Section 5 discusses the future of work. Section 6 redefines intelligence in this new context. Section 7 addresses risks and societal challenges, and Section 8 concludes the paper with final remarks and directions for future research.

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2. Literature Review

2.1 Evolution from AI → GenAI → emerging agentic systems

Artificial intelligence has undergone a rapid and structurally significant evolution over the past decade, transitioning from traditional machine learning systems to large-scale foundation models and Generative Artificial Intelligence (GenAI). Early AI systems were primarily task-specific and relied on supervised learning and rule-based architectures. In contrast, GenAI systems represent a paradigm shift toward models capable of producing human-like text, images, and code, as well as supporting reasoning and decision augmentation (Feuerriegel et al., 2023; Zhang et al., 2024).

Recent studies emphasize that GenAI is largely driven by transformer-based architectures and foundation models, which allow scalable knowledge generalization across domains. These systems have demonstrated strong performance in knowledge-intensive tasks, significantly transforming industries such as education, software engineering, and operations management (Storey et al., 2025; Wang et al., 2025). However, despite their generative capabilities, these systems remain fundamentally reactive rather than autonomous.

Consequently, recent literature introduces the concept of agentic AI systems, which extend GenAI by incorporating autonomy, memory persistence, planning capabilities, and environmental interaction. These systems are designed to perform multi-step tasks, make decisions over time, and adapt dynamically to changing contexts (Schneider, 2025; Piccialli et al., 2025). This transition marks a shift from "content generation tools" to goal-directed intelligent agents, capable of operating within socio-technical ecosystems.

This evolution suggests that AI development is moving from augmentation systems toward semi-autonomous cognitive entities, raising fundamental questions about governance, control, and human oversight.

2.2 Existing theories on automation, labor, and value

The economic and organizational implications of AI have been widely studied within automation and labor theory. Classical frameworks suggest that technological progress leads to labor displacement in routine tasks while simultaneously creating new categories of high-skilled employment. Recent empirical research confirms that GenAI accelerates this process by automating cognitive and creative work previously considered resistant to automation (Budhwar et al., 2023; Haefner et al., 2023).

In supply chain and operations management, AI technologies are increasingly recognized as key drivers of efficiency, resilience, and decision-making

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optimization. GenAI, in particular, enhances predictive capabilities, scenario simulation, and real-time optimization of complex systems (Dubey et al., 2024; Wamba et al., 2023). These advancements contribute to what is now described as AI-enabled value creation ecosystems, where human and machine intelligence jointly generate economic output.

From an organizational perspective, AI is not merely a productivity tool but a structural transformation mechanism that reshapes business models, workflows, and strategic decision-making processes (Lo & Ross, 2024). Studies further show that AI adoption leads to the emergence of hybrid organizational structures, where humans increasingly shift toward supervisory, interpretive, and strategic roles rather than operational execution (Chowdhury et al., 2022).

However, this transformation also introduces risks related to labor polarization, wage inequality, and uneven distribution of AI-generated value across sectors and skill groups.

2.3 Human–AI interaction research

Human–AI interaction (HAI) research focuses on how individuals collaborate with intelligent systems and how such interactions affect cognition, productivity, and decision-making. Recent studies indicate that GenAI significantly alters human cognitive workflows by enabling users to delegate information processing, content generation, and analytical reasoning to AI systems (Chen et al., 2025).

This shift leads to the emergence of collaborative intelligence systems, where humans and AI co-produce outcomes rather than operating independently. In this context, the human role increasingly evolves toward supervision, validation, and creative direction, while AI handles computational and generative tasks (Schöbel et al., 2023).

Empirical evidence also suggests that AI-assisted environments improve task performance and decision quality in many contexts. However, they may also introduce unintended consequences, such as cognitive offloading, reduced critical thinking ability, and over-reliance on automated systems (Shin et al., 2023; Wang et al., 2025). These findings highlight a dual effect: while productivity increases, cognitive autonomy may decline.

Furthermore, research emphasizes the importance of explainability, trust calibration, and controllability in ensuring effective human–AI collaboration. Without these mechanisms, users may either over-trust or under-utilize AI systems, reducing overall system effectiveness.

2.4 Existing research on value creation in AI systems

Value creation in the context of AI has shifted from traditional production-centric models to digitally mediated ecosystems. GenAI contributes to value creation not

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only by increasing efficiency but also by enabling entirely new forms of content production and innovation (Lo & Ross, 2024).

Recent research suggests that value in AI-driven systems emerges from interaction effects between human expertise, data, and algorithmic systems, rather than from any single component alone (Dubey et al., 2024). This aligns with the concept of socio-technical value creation, where organizational outcomes depend on the alignment between technological capabilities and human decision structures.

However, current models remain largely output-focused and insufficiently capture the dynamic, process-oriented nature of AI-human co-creation. This limitation becomes more pronounced in the context of agentic AI systems, where value is continuously generated through ongoing interaction rather than discrete outputs.

2.5 Emerging agentic AI systems and autonomy

Recent developments in AI research highlight the emergence of agentic systems, which represent a shift toward autonomy, long-term planning, and self-directed execution. These systems are designed to operate beyond single-task generation, integrating memory, reasoning, and external tool use into continuous workflows (Schneider, 2025; Piccialli et al., 2025).

Agentic AI is increasingly viewed as the next stage beyond GenAI, where systems are capable of executing complex sequences of actions without continuous human prompting. This introduces significant implications for governance, accountability, and system reliability.

Despite growing interest, the literature on agentic AI remains fragmented, with limited theoretical integration between technical architectures and socio-economic implications. This gap is particularly important given the potential of such systems to reshape labor markets and organizational structures at scale.

2.6 Identified research gap

Despite rapid advancements, several critical gaps remain in the literature.

First, most existing studies focus on GenAI as an application layer, rather than exploring the systemic transition toward fully agentic AI architectures (Schneider, 2025; Piccialli et al., 2025). This limits theoretical understanding of post-GenAI systems.

Second, there is a clear disconnect between technical AI research and socio-economic theories of labor and value creation, preventing the development of unified explanatory models (Budhwar et al., 2023; Haefner et al., 2023).

Third, existing frameworks remain largely output-oriented, failing to capture the shift toward continuous, process-based co-creation between humans and AI systems (Lo & Ross, 2024; Dubey et al., 2024).

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Fourth, intelligence in AI research is still predominantly measured through performance benchmarks, while emerging literature calls for more relational, contextual, and adaptive interpretations of intelligence (Feuerriegel et al., 2023; Zhang et al., 2024).
Finally, ethical, governance, and societal implications—such as inequality, cognitive dependency, and concentration of AI infrastructure ownership—remain insufficiently integrated into a unified theoretical framework (Capraro et al., 2023; Storey et al., 2025).

3. Theoretical framework: Post-GenAI Systems

3.1 Definition of the Post-GenAI Paradigm

The post-Generative AI (Post-GenAI) paradigm represents the next evolutionary stage of artificial intelligence systems, extending beyond generative capabilities toward autonomous, adaptive, and goal-directed intelligence. While Generative AI systems primarily focus on producing outputs such as text, images, or code in response to prompts, emerging research highlights a transition toward systems capable of reasoning, planning, and continuous interaction with environments (Feuerriegel et al., 2023; Zhang et al., 2024).
This transition reflects a fundamental shift from input–output generative systems to persistent intelligent agents that operate over time and across tasks. Foundation models serve as the technological base for this evolution, enabling large-scale transfer learning and cross-modal generalization, which are essential for post-GenAI systems (Zhang et al., 2024).
Recent IS research further emphasizes that GenAI should not be understood as an endpoint but as an intermediate stage in the development of socio-technical intelligent systems that increasingly embed autonomy and agency (Storey et al., 2025).

3.2 Core Properties: autonomy, memory, multimodality, agency

Autonomy refers to the ability of AI systems to independently plan and execute tasks without continuous human prompting. This represents a departure from traditional AI-assisted workflows toward systems capable of self-directed execution. Emerging studies suggest that autonomy in AI is becoming increasingly important in organizational and industrial contexts (Schneider, 2025; Piccialli et al., 2025).
Memory in post-GenAI systems enables persistence across interactions, allowing systems to retain contextual knowledge and adapt behavior over time. This capability significantly enhances personalization and long-term reasoning, supporting more complex decision-making processes (Storey et al., 2025).

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Multimodal AI systems integrate multiple data types, including text, images, and structured signals, enabling richer representations of real-world environments. Foundation models have been central in enabling this capability, expanding AI applicability beyond language-based tasks (Zhang et al., 2024).

Agency represents the most advanced property, referring to the system's ability to set sub-goals, evaluate outcomes, and adjust strategies dynamically. This aligns with the emerging concept of agentic AI systems, which move beyond static generation toward autonomous decision-making entities (Schneider, 2025; Piccialli et al., 2025).

3.3 Shift from Tool-Based AI to Agentic Intelligence

The evolution from GenAI to post-GenAI systems reflects a structural transformation from tool-based intelligence to agentic intelligence. Traditional AI systems function as assistive tools that require explicit human control, whereas emerging systems increasingly operate as semi-autonomous agents capable of performing multi-step reasoning and execution (Feuerriegel et al., 2023).

Recent studies in human–AI collaboration show that AI systems are increasingly integrated into workflows not just as tools but as collaborative partners that influence decision-making and task execution (Chen et al., 2025). This shift changes the role of humans from direct operators to supervisors, evaluators, and strategic orchestrators.

Empirical evidence also suggests that AI systems can significantly improve decision quality, although they may introduce risks such as cognitive offloading and reduced independent reasoning (Shin et al., 2023; Wang et al., 2025). These findings reinforce the need to understand AI not only as a productivity tool but as an evolving cognitive actor.

3.4 Socio-technical perspective

The post-GenAI paradigm must be understood within a socio-technical framework, where technological systems interact dynamically with organizational structures, institutions, and human actors. AI systems are not isolated artifacts but embedded components of broader socio-economic ecosystems that shape and are shaped by human behavior (Budhwar et al., 2023; Haefner et al., 2023).

From this perspective, value creation emerges from the interaction between human expertise, algorithmic systems, and organizational processes rather than from technology alone. Research in digital transformation highlights that AI adoption leads to structural reconfiguration of firms, influencing workflows, decision hierarchies, and innovation capacity (Lo & Ross, 2024).

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In supply chain and operations contexts, AI systems are increasingly used for optimization, forecasting, and risk management, but their impact depends heavily on governance structures and human oversight (Dubey et al., 2024; Wamba et al., 2023).
The increasing autonomy of AI systems also raises critical socio-technical concerns, including accountability, transparency, inequality, and control over AI infrastructure. These issues are amplified in agentic systems, where decision-making is partially delegated to non-human actors (Ivanov & Dolgui, 2024; Piccialli et al., 2025).
Integrating the above perspectives, post-GenAI systems can be conceptualized as socio-technical agentic intelligence systems characterized by:

- technological foundation models enabling generativity and reasoning (Zhang et al., 2024)
- increasing autonomy and persistent memory (Storey et al., 2025)
- transition toward agentic AI architectures (Schneider, 2025)
- integration into organizational and economic systems (Budhwar et al., 2023; Haefner et al., 2023)
- transformation of human roles into supervisory and orchestration functions (Chen et al., 2025)

This synthesis suggests that post-GenAI systems are not merely technological upgrades but represent a paradigm shift in intelligence, labor, and value creation systems, requiring new theoretical models that integrate AI capability, human cognition, and institutional governance.

4. Value creation in the Post-GenAI Era

The emergence of post-Generative AI (Post-GenAI) systems fundamentally reconfigures how economic value is created, distributed, and captured within digital economies. Unlike earlier technological paradigms where value was primarily associated with physical output or discrete digital products, post-GenAI systems shift value creation toward continuous, adaptive, and interaction-based processes embedded in socio-technical ecosystems (Lo & Ross, 2024; Storey et al., 2025).

4.1 Transformation of economic value

In traditional industrial and even early digital economies, value creation was largely tied to production efficiency, scalability, and output maximization. However, the integration of advanced AI systems introduces a shift toward intangible, knowledge-based, and algorithmically mediated value. Generative AI already demonstrates this transition by enabling automation of cognitive tasks and accelerating innovation cycles (Feuerriegel et al., 2023; Brynjolfsson et al., 2023).

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In the post-GenAI paradigm, value is no longer solely embedded in outputs but increasingly in the capability of systems to generate, adapt, and optimize outcomes dynamically over time. This aligns with evidence from organizational research showing that AI-driven transformation reshapes not only productivity but also innovation structures and competitive advantage (Haefner et al., 2023; Budhwar et al., 2023).

4.2 From production output to co-created processes

A central shift in the post-GenAI era is the transition from output-based value creation to co-created, process-oriented value systems. In this model, humans and AI systems jointly participate in continuous cycles of generation, evaluation, and refinement rather than producing static deliverables.

Human–AI collaboration studies demonstrate that generative systems increasingly function as cognitive partners rather than tools, enabling distributed problem-solving and iterative co-creation (Chen et al., 2025). This leads to the emergence of hybrid intelligence systems, where value is produced through interaction rather than isolated production.

From an organizational perspective, this implies a redefinition of work itself: employees increasingly act as orchestrators and validators of AI-generated outputs rather than direct producers of content or decisions (Lo & Ross, 2024). Empirical findings also suggest that such co-creative systems improve productivity while simultaneously increasing dependency on AI systems for cognitive tasks (Wang et al., 2025).

4.3 Platformization and AI-mediated economies

Another defining characteristic of the post-GenAI era is the intensification of platformization, where AI systems become embedded within digital platforms that mediate interactions between users, data, and services. These platforms function as central infrastructures that aggregate data, distribute AI capabilities, and control access to computational intelligence.

Research in digital ecosystems highlights that platform-based architectures increasingly dominate value creation in the digital economy by enabling network effects, scalability, and data-driven optimization (Storey et al., 2025). In this context, generative and agentic AI systems act as value mediation layers, shaping how information, services, and decisions are produced and consumed.

Supply chain and operations research further shows that AI-enabled platforms enhance coordination and efficiency across distributed networks, reinforcing their role as central orchestrators of economic activity (Dubey et al., 2024; Wamba et al., 2023).

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4.4 Redistribution of value and control

While post-GenAI systems enhance productivity and innovation, they also introduce significant concerns regarding the redistribution of economic value and control over digital infrastructure. The concentration of AI capabilities within a small number of organizations and platforms raises issues of asymmetry in power, data ownership, and economic dependency.

Studies on AI-driven transformation emphasize that value is increasingly captured by entities controlling foundational models, computational infrastructure, and data ecosystems (Feuerriegel et al., 2023; Budhwar et al., 2023). This leads to a structural imbalance where value generation becomes decoupled from value capture.

Furthermore, research highlights that automation of cognitive tasks may lead to labor displacement in certain sectors while simultaneously increasing demand for high-skill roles in AI supervision, governance, and system design (Brynjolfsson et al., 2023; Haefner et al., 2023). This contributes to a polarized labor market structure, reinforcing inequality between AI-capable and non-AI-capable actors.

From a governance perspective, the increasing autonomy of AI systems raises questions regarding accountability, transparency, and regulatory control, particularly in environments where decision-making is partially delegated to algorithmic agents (Piccialli et al., 2025; Schneider, 2025).

Overall, value creation in the post-GenAI era is characterized by four fundamental transformations:

- a shift from output-based to process-based value systems
- increasing human–AI co-creation in knowledge and decision processes
- dominance of platform-mediated AI ecosystems
- structural redistribution of value and control toward AI infrastructure owners

These dynamics suggest that post-GenAI systems do not merely enhance existing economic models but fundamentally redefine the mechanisms through which value is generated, distributed, and governed in digital economies (Storey et al., 2025; Lo & Ross, 2024).

5. Future of work in the Post-GenAI Era

The post-Generative AI (Post-GenAI) era introduces a structural transformation of work that goes beyond traditional automation narratives. Unlike earlier technological revolutions that primarily affected manual and routine labor, current advances in generative and emerging agentic AI systems extend automation into

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cognitive, creative, and decision-intensive domains, fundamentally reshaping the nature of employment, skills, and organizational roles (Brynjolfsson et al., 2023; Feuerriegel et al., 2023).

5.1 Automation of cognitive labor

One of the most significant transformations brought by GenAI and post-GenAI systems is the automation of cognitive labor. Tasks involving information synthesis, writing, coding, analysis, and decision support are increasingly being delegated to AI systems capable of human-like reasoning and content generation.

Empirical studies show that generative AI tools can significantly enhance productivity in knowledge-intensive tasks while reducing the time required for task completion (Wang et al., 2025). However, this also introduces structural changes in the composition of work, where cognitive tasks are no longer exclusively human-driven but co-executed with AI systems.

Research further indicates that this shift leads to task fragmentation, where complex cognitive processes are decomposed and partially automated, reducing the boundary between human and machine intellectual work (Haefner et al., 2023). As a result, cognitive labor becomes increasingly hybridized and algorithmically supported.

5.2 Emergence of hybrid human–AI roles

As automation expands into cognitive domains, new hybrid roles are emerging that combine human judgment with AI-driven execution. These roles do not eliminate human labor but rather transform it into collaborative intelligence functions, where humans and AI systems jointly contribute to outcomes.

Recent research highlights that human–AI collaboration improves decision quality and efficiency, particularly in environments where AI systems provide rapid synthesis and predictive insights while humans retain contextual judgment and ethical oversight (Chen et al., 2025; Shin et al., 2023).

In this context, workers increasingly act as co-pilots, supervisors, and validators of AI-generated outputs, rather than primary executors of tasks. This transformation is also reflected in organizational structures, where teams are reconfigured around AI-augmented workflows rather than traditional hierarchical task division (Lo & Ross, 2024).

Consequently, hybrid intelligence becomes a defining characteristic of future work systems, where productivity emerges from the interaction between human cognitive flexibility and machine computational power.

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5.3 Shift toward supervision, orchestration, and decision-making

A central implication of the post-GenAI transformation is the shift in human roles from execution to supervision, orchestration, and strategic decision-making. As AI systems increasingly handle routine and semi-complex cognitive tasks, humans are repositioned at higher levels of abstraction within organizational processes.

Studies in AI-enabled organizations show that employees transition toward roles involving monitoring AI outputs, validating results, and orchestrating multi-agent systems (Budhwar et al., 2023; Feuerriegel et al., 2023). This shift requires new competencies, including AI literacy, system oversight, and strategic interpretation of machine-generated insights.

In more advanced agentic AI scenarios, systems are capable of executing multi-step tasks autonomously, further reinforcing the human role as a meta-decision-maker who defines objectives rather than operational steps (Schneider, 2025; Piccialli et al., 2025).

This transformation indicates a redefinition of work itself: from performing tasks to designing, supervising, and governing intelligent systems.

5.4 Implications for labor markets

The transformation of work induced by post-GenAI systems has significant implications for labor markets. One of the most widely discussed effects is job polarization, where demand increases for high-skill roles in AI development, governance, and interpretation, while routine cognitive and administrative roles decline (Brynjolfsson et al., 2023).

Research suggests that while AI increases overall productivity, it also contributes to uneven distribution of economic gains, potentially widening income inequality between AI-augmented workers and those in automatable roles (Capraro et al., 2023). This reinforces concerns about structural inequality in AI-driven economies.

Furthermore, supply chain and organizational studies highlight that AI adoption reshapes skill requirements, increasing demand for interdisciplinary competencies that combine technical knowledge, domain expertise, and strategic thinking (Dubey et al., 2024; Wamba et al., 2023).

At the macro level, labor markets are transitioning toward AI-mediated employment ecosystems, where access to AI tools and platforms becomes a key determinant of employability and productivity. This creates a dependency on AI infrastructure providers, further concentrating economic power in platform-based ecosystems (Storey et al., 2025).

Overall, the future of work in the post-GenAI era is defined by four interconnected transformations:

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- Automation of cognitive and knowledge-based labor (Wang et al., 2025; Feuerriegel et al., 2023)
- Emergence of hybrid human–AI collaborative roles (Chen et al., 2025; Shin et al., 2023)
- Shift from execution to supervision and orchestration (Schneider, 2025; Budhwar et al., 2023)
- Structural reconfiguration of labor markets and inequality patterns (Brynjolfsson et al., 2023; Capraro et al., 2023)

These dynamics suggest that the post-GenAI era does not simply automate work but fundamentally redefines what work **is**, shifting human contribution toward higher-level cognitive, ethical, and strategic functions within AI-augmented systems.

6. Redefining Intelligence in the Post-GenAI Era

The rapid evolution of artificial intelligence systems, particularly generative and emerging agentic models, challenges traditional definitions of intelligence that are primarily based on performance benchmarks and task-specific accuracy. In the post-Generative AI (Post-GenAI) era, intelligence must be reconsidered as a dynamic, contextual, and socio-technical phenomenon rather than a purely computational measure (Feuerriegel et al., 2023; Storey et al., 2025).

6.1 Limits of current AI evaluation metrics

Current AI systems are predominantly evaluated using static benchmarks such as accuracy, precision, recall, or task-specific performance scores. While these metrics are useful for controlled environments, they fail to capture the complexity of real-world intelligence, particularly in generative and agentic systems that operate across dynamic and uncertain contexts.

Recent research highlights that foundation models and generative systems often perform well on benchmark datasets but struggle with robustness, long-term reasoning, and contextual adaptation in real-world environments (Zhang et al., 2024). This limitation becomes even more pronounced in post-GenAI systems, where intelligence involves continuous interaction, adaptation, and goal evolution rather than isolated task completion (Schneider, 2025).

Furthermore, traditional evaluation frameworks do not adequately measure social, ethical, or collaborative dimensions of intelligence, which are increasingly important in human–AI integrated environments (Chen et al., 2025).

6.2 Intelligence as adaptive and contextual capability

In contrast to static benchmark-based definitions, emerging literature conceptualizes intelligence as an adaptive and context-dependent capability. This

perspective emphasizes the ability of AI systems to adjust behavior dynamically based on environmental feedback, historical context, and evolving objectives.

Foundation models and generative AI systems already demonstrate early forms of contextual adaptability through transfer learning and multimodal reasoning (Zhang et al., 2024). However, post-GenAI systems extend this capability by integrating memory, planning, and autonomous decision-making, enabling continuous adaptation over time (Schneider, 2025; Piccialli et al., 2025).

From this perspective, intelligence is not a fixed property but an emergent process, shaped by interaction between data, algorithms, users, and environments. This aligns with socio-technical perspectives that view intelligence as distributed across systems rather than residing solely within machines or humans (Storey et al., 2025).

6.3 Collective intelligence systems (human + AI)

A key transformation in the post-GenAI era is the emergence of collective intelligence systems, where human and artificial intelligence operate in tightly coupled configurations. In such systems, intelligence is no longer an individual attribute but a distributed property of human–AI collaboration.

Empirical studies show that human–AI collaboration can enhance decision quality by combining machine efficiency with human contextual reasoning and ethical judgment (Chen et al., 2025; Shin et al., 2023). This synergy leads to what is increasingly referred to as hybrid intelligence, where humans and AI systems jointly produce outcomes that neither could achieve independently.

In organizational contexts, this collective intelligence manifests in augmented decision-making systems, AI-assisted innovation processes, and collaborative problem-solving environments (Lo & Ross, 2024). However, the effectiveness of such systems depends on trust calibration, transparency, and appropriate division of cognitive labor between humans and machines.

6.4 Ethical dimensions of intelligence

The redefinition of intelligence in AI systems also introduces significant ethical considerations. As AI systems become more autonomous and influential in decision-making processes, questions of accountability, transparency, and fairness become central.

Studies highlight that generative AI systems may reinforce existing biases present in training data, leading to unequal or discriminatory outcomes in certain applications (Capraro et al., 2023). Additionally, the increasing reliance on AI for cognitive tasks raises concerns about cognitive dependency, where human users

gradually lose critical thinking and independent reasoning capabilities (Wang et al., 2025).

From a governance perspective, the rise of agentic AI systems introduces challenges related to responsibility attribution, especially when autonomous systems perform multi-step decision processes with limited human intervention (Piccialli et al., 2025). This necessitates the development of ethical frameworks that extend beyond technical performance to include value alignment, accountability structures, and societal impact assessment.

Ultimately, intelligence in the post-GenAI era cannot be separated from ethical considerations, as the impact of intelligent systems increasingly shapes economic, social, and institutional outcomes (Storey et al., 2025).

Reconceptualizing intelligence in the post-GenAI era leads to four key insights:

- Current AI evaluation metrics are insufficient for capturing real-world intelligence (Zhang et al., 2024)
- Intelligence should be understood as an adaptive, contextual, and evolving capability (Schneider, 2025)
- Intelligence is increasingly distributed across human–AI collaborative systems (Chen et al., 2025; Shin et al., 2023)
- Ethical considerations are integral to any definition of intelligence in socio-technical systems (Capraro et al., 2023; Piccialli et al., 2025)

These findings suggest a fundamental shift from performance-based intelligence toward relational and socio-technical intelligence, where capability is defined not only by computational power but by integration, adaptability, and ethical alignment within complex systems.

7. Risks and societal challenges in the Post-GenAI Era

While post-Generative AI (Post-GenAI) systems introduce significant opportunities for productivity, innovation, and economic transformation, they also generate complex risks and societal challenges. These challenges extend beyond technical issues and affect labor markets, cognitive processes, power structures, and governance systems. As AI systems evolve toward greater autonomy and agency, their societal footprint becomes increasingly profound and difficult to regulate (Storey et al., 2025; Feuerriegel et al., 2023).

7.1 Labor displacement

One of the most widely discussed risks of advanced AI systems is labor displacement, particularly in knowledge-intensive occupations. Unlike earlier waves of automation that primarily affected routine manual labor, generative and

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agentic AI systems increasingly automate cognitive tasks such as writing, analysis, coding, and decision support.

Empirical evidence suggests that AI-driven automation can significantly alter labor demand structures by reducing the need for certain categories of white-collar work while increasing demand for AI-related skills and oversight roles (Brynjolfsson et al., 2023). This shift leads to task reallocation rather than full job elimination, but still creates significant disruption in labor markets.

Research in organizational transformation also indicates that firms adopting AI systems restructure workflows in ways that reduce human involvement in repetitive cognitive processes, leading to productivity gains but also workforce compression in specific roles (Haefner et al., 2023; Budhwar et al., 2023).

7.2 Cognitive dependency

A second major challenge is the emergence of cognitive dependency, where individuals increasingly rely on AI systems for tasks that previously required independent reasoning and critical thinking. Generative AI tools, by providing instant solutions and content generation, may reduce the cognitive effort required for complex problem-solving.

Recent studies highlight that AI-assisted environments can lead to cognitive offloading, where users gradually transfer analytical responsibilities to machines, potentially weakening long-term critical thinking and problem-solving capabilities (Wang et al., 2025). This phenomenon is particularly relevant in educational and professional contexts, where continuous reliance on AI may reshape learning processes and skill development.

Furthermore, human–AI interaction research suggests that while AI improves efficiency, it may also reduce cognitive engagement if users become overly dependent on automated recommendations (Chen et al., 2025). This creates a paradox where productivity increases while cognitive autonomy decreases.

7.3 Concentration of technological power

The post-GenAI era is also characterized by a strong concentration of technological power in the hands of a limited number of organizations controlling foundation models, computational infrastructure, and data ecosystems.

Large-scale AI systems require significant computational resources and datasets, which are primarily owned by major technology companies. This creates structural asymmetries in access to AI capabilities and reinforces platform dominance in digital economies (Storey et al., 2025; Feuerriegel et al., 2023).

Research on digital platform economies shows that value creation increasingly depends on access to centralized AI infrastructures, leading to winner-takes-most

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dynamics where a small number of actors capture disproportionate economic value (Lo & Ross, 2024). This concentration raises concerns about market competition, innovation diversity, and digital sovereignty.

7.4 Ethical and governance concerns

As AI systems become more autonomous and embedded in decision-making processes, ethical and governance challenges become increasingly critical. These concerns include transparency, accountability, fairness, and alignment with human values.

Generative AI systems may unintentionally reproduce or amplify biases present in training data, leading to discriminatory outcomes in areas such as hiring, education, and resource allocation (Capraro et al., 2023). In addition, the opacity of large foundation models makes it difficult to explain or audit decision processes, raising issues of interpretability and trust.

The emergence of agentic AI systems further complicates governance structures, as decision-making becomes partially delegated to autonomous systems operating with limited human oversight (Piccialli et al., 2025; Schneider, 2025). This raises fundamental questions about responsibility attribution, especially when AI systems act across multi-step workflows.

From a socio-technical perspective, effective governance requires not only technical safeguards but also institutional frameworks that regulate AI deployment, ensure accountability, and align technological development with societal values (Storey et al., 2025; Budhwar et al., 2023).

Overall, the risks and societal challenges of the post-GenAI era can be summarized along four interconnected dimensions:

- Labor displacement and task restructuring in cognitive occupations (Brynjolfsson et al., 2023; Haefner et al., 2023)
- Cognitive dependency and reduced human autonomy in decision-making processes (Wang et al., 2025; Chen et al., 2025)
- Concentration of technological and economic power within AI platform ecosystems (Storey et al., 2025; Lo & Ross, 2024)
- Ethical and governance complexity associated with autonomous and opaque AI systems (Capraro et al., 2023; Piccialli et al., 2025)

These challenges highlight that the post-GenAI transition is not only a technological evolution but also a profound societal restructuring that requires proactive governance, ethical design, and interdisciplinary policy frameworks.

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8. Conceptual model of the Post-GenAI Era

The conceptual model developed in this study integrates technological evolution, organizational transformation, and socio-economic outcomes within a unified Post-Generative AI (Post-GenAI) framework. The model explains how advancements in artificial intelligence—from foundation models to agentic systems—drive cascading transformations in value creation, work structures, and intelligence systems, ultimately producing systemic societal effects.

8.1 Overview of the model structure

The model is structured as a three-layer socio-technical system, where each layer represents a different level of abstraction:

Layer 1: Technological foundation (enabling layer)

This layer includes the core technological enablers of the Post-GenAI paradigm:

- Foundation Models (large-scale pre-trained AI systems)
- Generative AI systems (content synthesis and automation)
- Agentic AI systems (autonomous goal-directed systems with memory, planning, and action capabilities)

These technologies collectively define the capability frontier of artificial intelligence, moving from static generation to dynamic autonomy (Zhang et al., 2024; Schneider, 2025).

Layer 2: Socio-Technical transformation (mediating layer)

This layer represents the transformation of core socio-economic systems:

(a) Value Creation Systems

Value shifts from:

- output-based production→ to
- AI-mediated, process-based co-creation systems

Value is increasingly generated through continuous interaction between humans, AI systems, and digital platforms rather than isolated production units (Lo & Ross, 2024; Storey et al., 2025).

(b) Work Systems

Work is restructured from:

- task execution
  → to
- supervision, orchestration, and AI collaboration

Human roles evolve toward cognitive oversight, system coordination, and strategic decision-making (Chen et al., 2025; Brynjolfsson et al., 2023).

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(c) Intelligence Systems

Intelligence shifts from:

- individual cognitive ability
  → to
- collective human–AI hybrid intelligence

Intelligence becomes a distributed, emergent property of interaction between humans and AI systems operating in shared environments (Shin et al., 2023; Storey et al., 2025).

Layer 3: Societal Outcomes (Impact Layer)

The interaction of technological and socio-technical transformations generates four major systemic outcomes:

(a) Labor Market Transformation

- cognitive task automation
- job restructuring
- rise of hybrid AI-related roles

(b) Cognitive Dependency

- increased reliance on AI for reasoning and decision-making
- reduction in independent cognitive effort (Wang et al., 2025)

(c) Power Concentration

- dominance of platform-based AI ecosystems
- control of foundation models and infrastructure by few actors (Feuerriegel et al., 2023)

(d) Governance Complexity

- difficulty in regulating autonomous AI systems
- accountability and transparency challenges (Piccialli et al., 2025)

8.2 System Logic of the Model

The conceptual model follows a causal cascade structure:

Step 1: Technological evolution

Foundation Models → GenAI → Agentic AI

↓

Step 2: System transformation

AI capabilities reshape:

- value creation
- work organization
- intelligence distribution

↓

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Step 3: Societal impact
Emergence of:

- labor restructuring
- cognitive dependency
- power asymmetry
- governance challenges

8.3 Key Relationships (Model Logic)
The model is based on four core relationships:

- **R1:** AI capabilities → value transformation
- **R2:** value transformation → work reconfiguration
- **R3:** work reconfiguration → intelligence redefinition
- **R4:** systemic interaction → societal risks and power shifts

These relationships highlight that Post-GenAI systems do not act in isolation but function as **systemic drivers of socio-technical change**.

8.4 Theoretical contribution of the model
This conceptual model contributes to literature in three main ways:

1. Integrates AI evolution stages into a unified continuum (GenAI → Agentic AI)
2. Links technology with socio-economic transformation, not just technical performance
3. Explains societal outcomes as emergent system effects, rather than isolated consequences

Overall, the model positions Post-GenAI systems not as standalone technologies, but as systemic infrastructures of intelligence that reshape:

- how value is created
- how work is organized
- how intelligence is distributed
- how societies are governed

This marks a transition from tool-based AI systems to societal-scale intelligence ecosystems.

9. Hypotheses development (H1–H10 formalized model)
Based on the integrated Post-Generative AI (Post-GenAI) conceptual framework, the hypotheses are derived from the causal relationships between technological capabilities, socio-technical transformations, and societal outcomes. The model

assumes a cascading logic: AI capabilities → system transformation (value, work, intelligence) → societal impacts.

9.1 Technology → Value Creation

H1:

Post-GenAI system capabilities (autonomy, memory, multimodality, agency) have a positive impact on AI-mediated value creation processes.

H2:

The adoption of agentic AI systems significantly increases the shift from output-based value creation to process-based co-created value systems.

9.2 Value Transformation → Work Reconfiguration

H3:

AI-mediated value creation systems lead to a structural reconfiguration of organizational work processes.

H4:

Platform-based AI value systems increase task fragmentation and modularization of knowledge work.

9.3 Work Transformation → Intelligence Shift

H5:

The automation of cognitive labor increases human reliance on AI systems for decision-making and problem-solving tasks.

H6:

Hybrid human–AI work environments positively influence collective intelligence performance in organizations.

9.4 Intelligence Reconfiguration → Human Outcomes

H7:

The shift toward collective intelligence systems reduces the independence of human cognitive decision-making.

H8:

Human–AI collaborative systems improve decision accuracy while simultaneously increasing cognitive dependency.

9.5 System-Level Societal Impacts

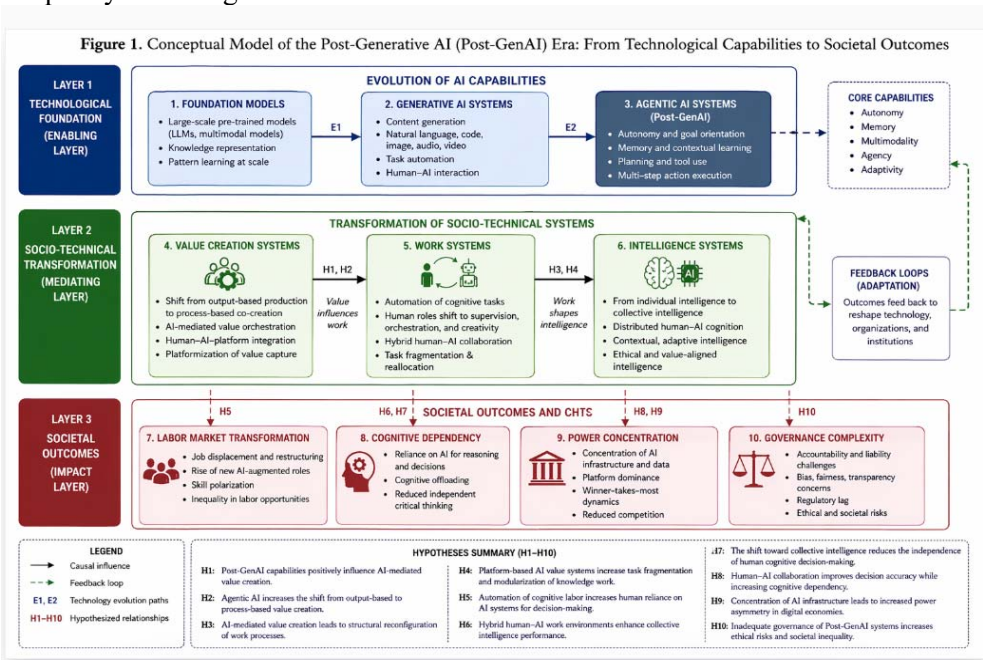
H9:

Concentration of AI infrastructure ownership leads to increased technological and economic power asymmetry in digital ecosystems.

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H10:
Inadequate governance of Post-GenAI systems increases ethical risks and societal inequality in AI-augmented economies.

Figure 1. Conceptual Model of the Post-Generative AI (Post-GenAI) Era: From Technological Capabilities to Societal Outcomes



Source: Author's own elaboration

This figure presents an integrated conceptual model of the Post-Generative AI (Post-GenAI) era, illustrating the causal pathway from technological capabilities—namely foundation models, generative AI systems, and agentic AI systems—to socio-technical transformations, including changes in value creation, work reconfiguration, and the emergence of distributed intelligence systems. These transformations subsequently generate broader societal outcomes, such as labor market restructuring, cognitive dependency, increased concentration of power, and heightened governance complexity.

The model is grounded in a multi-layer socio-technical systems perspective. Within this framework, technological capabilities constitute the enabling foundation that drives organizational and institutional transformation. These transformations, in turn, produce emergent systemic effects that extend beyond individual

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organizations, while also generating recursive feedback loops that influence the further development and deployment of AI technologies.

At the foundational layer, the model includes foundation models, generative AI systems, and agentic AI systems, which together are characterized by core capabilities such as autonomy, memory, multimodality, agency, and adaptivity. These capabilities enable increasingly complex forms of machine-mediated cognition and action across socio-technical environments.

The second layer captures socio-technical transformation processes, focusing on how AI systems reshape value creation mechanisms, work systems, and intelligence systems. A key feature of this layer is the presence of feedback interactions between organizations, digital platforms, and institutions, which collectively contribute to the reconfiguration of organizational boundaries and decision-making processes.

The third layer represents societal outcomes, where the cumulative effects of these transformations become visible. These include structural changes in labor markets, rising cognitive dependency on AI systems, the concentration of power within a small number of platform actors, and growing complexity in governance structures and regulatory oversight.

The causal logic of the model is structured around a set of hypothesized relationships (H1–H10), as well as an evolutionary technological pathway (E1–E3). Together, these relationships describe how technological advancement drives changes in value creation systems, which then reshape organizational work structures. In turn, these reconfigured work structures alter the distribution of intelligence across socio-technical systems, ultimately generating broader societal risks, inequalities, and governance challenges.

Overall, the model conceptualizes the Post-GenAI era not as a linear technological progression, but as a systemic socio-technical transformation characterized by multi-level interactions, emergent dynamics, and recursive feedback effects. This structure provides a basis for empirical investigation of how advanced AI systems reshape organizations and societies in a deeply interconnected manner.

10. Conclusion, contributions, and future research agenda

10.1 Conclusion

This paper has examined the transition from Generative AI (GenAI) toward an emerging paradigm referred to as Post-GenAI, characterized by agentic, autonomous, and deeply socio-technically embedded AI systems. The conceptual analysis indicates that this transition is not merely an incremental extension of

existing capabilities, but a structural shift in how value is created, work is organized, and intelligence is defined in digital economies.

First, Post-GenAI systems shift the focus from output-based generation to continuous, process-oriented co-creation, where economic value emerges from ongoing interactions between humans, AI systems, and digital infrastructures. Second, work is fundamentally reconfigured, moving from task execution toward supervision, orchestration, and meta-level decision-making, as AI systems increasingly take over cognitive and analytical functions.

Third, intelligence is no longer adequately captured by static performance benchmarks, but must instead be understood as a distributed, emergent, and context-dependent phenomenon arising from human–AI interaction. Finally, these transformations generate systemic consequences, including labor market restructuring, cognitive dependency, concentration of technological power, and increased governance complexity.

10.2 Contributions of the study

This research offers several theoretical and conceptual contributions to the literature on artificial intelligence and socio-economic transformation:

(1) Integrated Post-GenAI conceptual framework.The study proposes a unified theoretical model linking AI evolution (foundation models → GenAI → agentic AI) with transformations in value creation, work organization, and intelligence systems.

(2) Extension beyond GenAI-centric perspectives. Unlike most existing studies focused on generative capabilities, this paper introduces a post-generative perspective emphasizing autonomy, agency, persistence, and system-level intelligence.

(3) Socio-technical integration. The framework bridges AI research with labor economics, organizational theory, and cognitive science, offering a multidisciplinary understanding of AI-driven transformation.

(4) Reconfiguration of intelligence as a concept.The study contributes to redefining intelligence as a distributed and relational process rather than an individual, benchmark-based capability.

(5) Systemic view of AI impacts.The proposed model explains how technological developments generate emergent societal outcomes such as inequality, power concentration, and governance challenges.

10.3 Future research agenda

Based on the proposed framework, several important directions for future research can be identified:

(1) Empirical operationalization of Post-GenAI concepts. Future research should develop measurable indicators for key constructs such as AI autonomy, agency, co-creation, and collective intelligence.
(2) Real-world studies of agentic AI systems. There is a need for empirical investigations of agentic AI deployment in organizational settings, focusing on productivity, decision-making, and workflow transformation.
(3) Power dynamics and economic concentration. Future studies should examine how value is distributed across AI ecosystems, particularly the role of platform dominance and foundation model ownership.
(4) Cognitive and educational impacts of advanced AI. Long-term effects of AI dependency on critical thinking, learning processes, and human cognitive development require deeper investigation.
(5) Governance frameworks for autonomous AI systems. Research should explore regulatory and institutional models capable of addressing accountability, transparency, and control in agentic AI environments.
(6) Evolution of human–AI collective intelligence. Further work is needed to understand how hybrid intelligence systems evolve and under which conditions human–AI collaboration enhances or degrades performance.
Overall, the transition to the Post-GenAI era represents a paradigm shift in artificial intelligence and socio-economic systems. It is not merely a technological upgrade, but a structural reorganization of how knowledge, value, and decision-making are produced in digital societies. This makes it essential for future research to move beyond purely technical perspectives and adopt integrated frameworks that combine technological, economic, social, and ethical dimensions into a unified analytical approach.

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MARKET ADOPTION AND TECHNOLOGY DIFFUSION IN THE ERA OF AI

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Abstract

Market adoption and technology diffusion are closely related concepts that describe how innovations spread and become integrated into everyday economic and social life. While market adoption focuses on the speed and process by which individuals and organizations begin to use a new technology, technology diffusion examines the broader pattern through which innovations spread across populations over time. In the era of rapid technological advancement, particularly with the rise of Artificial Intelligence (AI), understanding these processes has become increasingly important for both researchers and industry stakeholders.

This paper explores the mechanisms behind market adoption and technology diffusion, with a particular emphasis on the stages, influencing factors, and dynamics that shape the acceptance of new technologies. It investigates how innovations move from early development stages to widespread usage, highlighting the role of consumer behavior, market structure, perceived usefulness, and social influence. Special attention is given to the accelerating adoption of AI technologies following the introduction of large-scale language models such as ChatGPT in late 2022, compared to earlier developments in machine learning and image recognition that remained largely confined to research and enterprise environments for years.

The study is grounded in established theoretical frameworks, particularly Everett Rogers' Diffusion of Innovations theory (1962), which categorizes adopters into distinct groups and explains how innovation spreads through

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communication channels over time. Building on this foundation, the paper examines how modern digital ecosystems, network effects, and platform-driven economies have altered traditional diffusion curves. In addition, comparative examples such as Artificial Intelligence and Electric Vehicles (EVs) are used to illustrate differences in adoption speed, market readiness, regulatory influence, and infrastructure dependency.

By synthesizing theoretical insights and practical examples, this paper aims to provide a deeper understanding of how and why certain technologies achieve rapid global adoption while others experience slow or uneven diffusion. The findings suggest that technology diffusion is not only driven by innovation quality, but also by a combination of social influence, economic incentives, institutional support, and user readiness. Ultimately, understanding these dynamics is essential for forecasting technological trends, improving strategic decision-making, and identifying conditions that accelerate or hinder market adoption in emerging technological landscapes.

Keywords: *adoption, diffusion, innovation, growth, artificial intelligence.*

JEL Classification: O31, O32, O33, L62

Introduction

The age of Artificial Intelligence (AI) has been accelerating over the past few years, many big innovators in the technology space such as Google, Meta, Apple, Open AI, etc are introducing AI as the great big step of the future. AI only gained major popularity from the general masses since the introduction of Chat GPT by Open AI in late 2022. Yet ever since the early 2010s Google, one of the biggest tech companies today, has made great strides in AI learning and image recognition, that begs one question: how come it took the general public basically ten years to finally adopt AI into their general everyday life?

- Market adoption is how quickly users start using a new technology
- Technology diffusion is how innovation spreads across a population over time

This paper goes into the bigger picture of the market adoption and technology diffusion. Only when the foundation of understanding of the two terms is understood only then the paper will go into the detail of Adoption and Diffusion. This study is to gain a deeper understanding the rate, the steps and the process

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when a new technology arrive and when it starts jump into the market. Understand the micro and macro process of the adoption and diffusion will help foresee the trend in technology on the rise and predict the adoption cycle and level of readiness of the general population to adopt certain technology. This paper is heavy based on many studies about adoption and diffusion. However, many of this study was based on a study by an American theorist and sociologist Everett Rogers in 1962 in his study calls "Diffusion of Innovations" Which this paper will reference a few times in the literature review section. Along with various other papers and articles that has touch on this topic. At the end of the paper the conclusion will tie up on the fact of how important it is that technology diffusion is driven by a combination of innovation characteristics, social influence, and market conditions, and understanding these factors is critical for strategic decision making.

Theoretical background

This section is divided into 3 main parts. First, we explore the main concept and models such as the idea that was coined by Everett Rogers in Diffusion of Innovation Theory, going through the processes and stages of adoptions. The second section is about the diffusion stages of technology. The third section is about some case study and example of the technology diffusion and the adoption numbers and statistics, about AI and Electric Vehicle (EV). As this section end it will be followed up with a conclusion of the whole study.

1. Adoption Model.

a. Diffusion of Innovation Theory by Everett Rogers

The original model of Everett Rogers can be seen as the follow figure.

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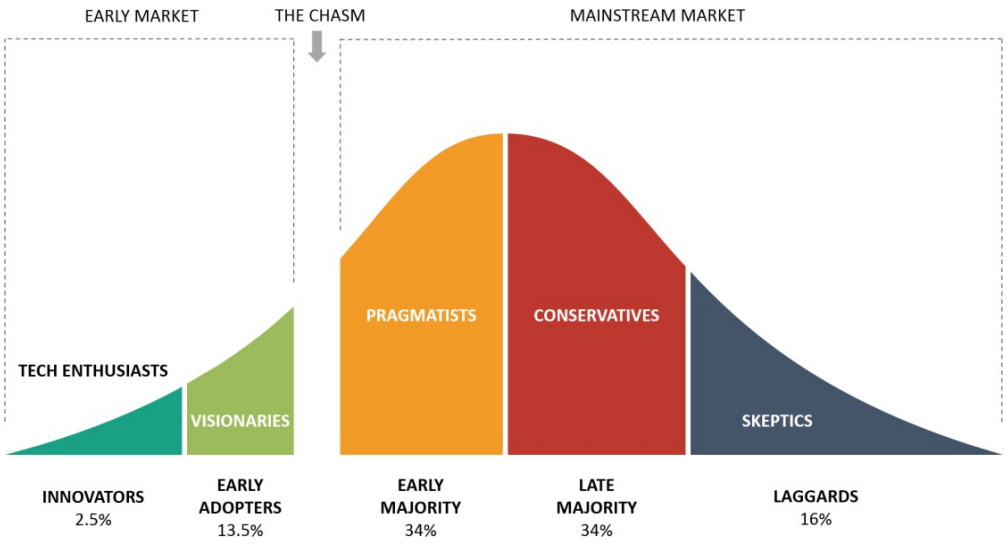


Figure 1. Innovation Adoption Lifecycle

Source: Business-to-You. (n.d.). *Crossing the chasm & technology adoption life cycle*. https://www.business-to-you.com/crossing-the-chasm-technology-adoption-life-cycle/

The figure above shows the categories of adopter and how soon they adopt new things as it comes to the market. Everett Rogers put them into five sections with relative percentage of the general population that adopts them in each stage of the lifecycle. There are many characteristic that can be described to each stage.

The Innovators is the earliest stage of adoption. They are venturesome and first to adopt a new idea, much ahead of other members in the community (Basu, 2020). These are the very few people that are willing to take risk on a new idea, practice or objectives. These people are generally within the space of the corresponding innovation. These people often have large capital to absorb many possibilities of loss due the early adoption. Hence why there are only 2.5% of the general people that adopt the new idea as it comes to live.

The Early Adopter is the second stage of adoption, they are not too far ahead, the average members of the community can comprehend their activities relating to adoption of the innovation (Basu, 2020). These people are integral to the innovation that comes to the market. They often try the innovation that often pioneered by the

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Innovators but not by themselves. They are often well informed and literate on the idea, and often the opinion leader that will give advice to anyone that seeks more information of innovation. For example, in technology would be Tech Journalist, Beta tester, Tech Influencers with high followings, etc. These people occupy 13.5% of the population.

The Early Majority, the people in the category are neither very early nor very late to adopt the innovation. It is often that they would observe the opinion of the previous two earlier adopter to form a decision. These people are often not as inform as the previous two adopter, but they are willing to try things when it is more widely available. Since they do not have the resource like the earlier adopter, they cannot afford to take the risk. These people occupy 34% of the population. For example: tech enthusiast, younger entrepreneur, etc.

The Late Majority, forms 34% of the population. They are often a little more cautious and sceptical to adopt. They adopt the innovation once after the Early Majority people have adopted and benefit out of the innovations. They often have very little resources to use hence they often do not take risk. For example: old corporation, old people, etc.

The last but not least is the Laggards. Which makes up the final 16% of the population. These people are often do not have many resources to their disposal. Or perhaps in very developing country or without many resources. They may also do not have access to many of the convenience such as Internet or many others of the earlier adopter. At this stage many of the earlier innovators may have already moved on from the previous innovations.

Adopter category	Salient values	Personal traits	Communication behaviour	Social relationship
Innovators	"Venture some"; willing to accept risk	Youngest Highest social status; largest and most specialized operations; wealthy	Closest contact with scientific information source; interaction with other innovators; relatively greatest use of impersonal sources	Some opinion leadership; cosmopolite
Early adopters	"Respect"; regarded by many others	High social status, large and specialized	Greatest contact with change agents and early	Greatest opinion leaders of any

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Adopter category	Salient values	Personal traits	Communication behaviour	Social relationship
	in the social system as a role-model	operations	adopters	category localized
Early majority	"Deliberate"; willing consider innovation only after peers have adopted	About average social status; average sized operation	Considerable contact with change agents andearly adopters	Some opinion leadership
Late majority	"Sceptical"; overwhelmed pressure from peers needed before adoption occurs	Below average social status, small operation; little specialization; little income	Secure ideas from peers who are mainly mass media	Little opinion leadership
Laggards	"Tradition"; oriented to the past	Little specialization, lowest social status; smallest operation; lowest income; oldest	Neighbours, friends and relatives with similar values the main information source	Very little opinion leadership; semi-isolate

Table number 1: Adopter Categories

Source: Basu, A. (2020). *Adoption and diffusion of innovations: Adoption and diffusion process, adopter categories and barriers in diffusion of fisheries innovations.* https://www.basu.org.in/wp-content/uploads/2020/06/6.-Adoption-and-diffusion-of-innovations-adoption-and-diffusion-process-adopter-categories-and-barriers-in-diffusion-of-fisheries-innovations.pdf

b. The Chasm

As we follow up with figure 1 on top between the early adopter and early majority, a gap calls The Chasm. This space between segments indicates the 'credibility gap' that arises from seeking to use the group on the left as a reference

base for the group on the right (Business-to-You, n.d.). This leap of the Chasm is one that many techs company seek to narrows. It means from the early adopter to the mainstream market, it is important for them to achieve to cross the gap, meaning that they will achieve success.

c. Crossing The Chasm

In order to cross the gap according to Geoffrey A. Moore, who wrote a book about Crossing the Chasm, in order to cross it, it is important for them establish a very specific niche target. The sole goal of the organization in its attempt to cross the Chasm should be to secure a beachhead in a mainstream market to create a pragmatist customer base that is referenceable (Moore, G.A. 2014). Wherever the company goes it is in the best interest for the company to become the market leader of the sector to ensure the jump will successful. This along with the right marketing approach will help them to hook the right potential customer and forming a base to eventually those people who came in from the early majority will also enthuse those around them as well to adopt.

d. The S Curve

With the figure 2 below indicates the final point of the innovation adoption lifecycle that this paper will study. The S Curve here indicate the performance of the products or in our case technology within the innovation adoption lifecycle. Early on the line are stagnant only to speed up as the life cycle goes on going to later point of the life cycle. there is an obvious jump between the early majority and late majority. This is an explanation why some technology just suddenly explodes of ‘nowhere’. For example, ChatGPT “exploded” in 2022, but it has been in development since 2016 by Open AI.

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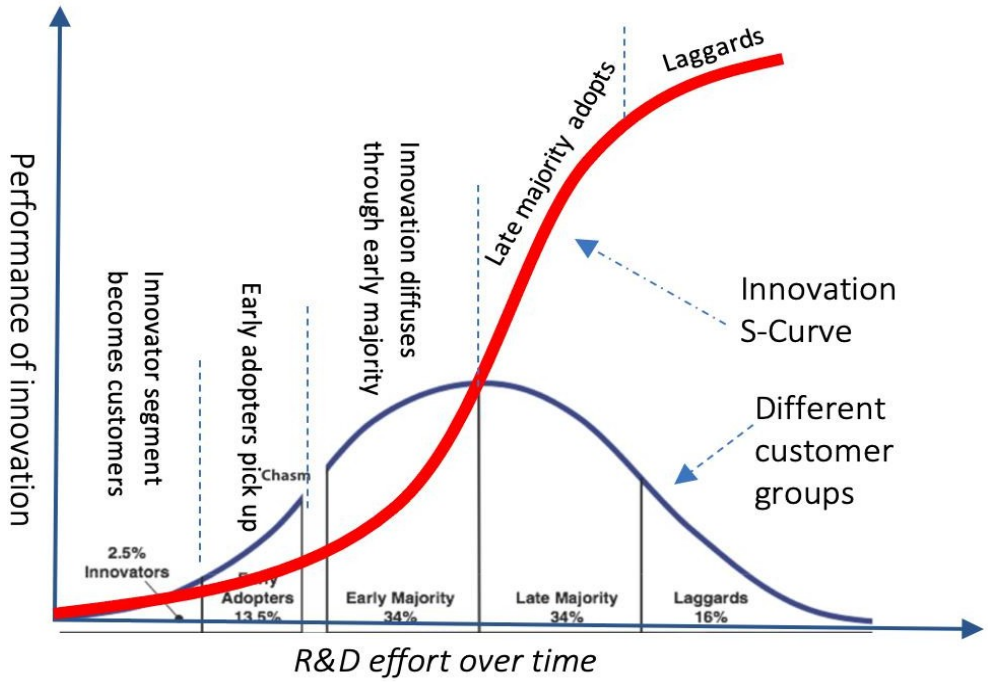


Figure 2: The S curve

Source: The Waves. (2022, March 13). Innovation S-curve: Episodic innovation evolution. https://www.the-waves.org/2022/03/13/innovation-s-curve-episodic-innovation-evolution/

e. Barrier to Adoption

The adoption of new technologies is not always immediate or guaranteed as models suggested, even when the innovation offers clear advantages. There are several barriers that can slow down or even prevent the adoption process. These barriers exist at both the individual and market level, and they play a critical role in shaping the overall diffusion of innovation. Understanding these barriers is important, as they explain why some technologies fail to achieve widespread adoption despite their potential benefits.

One of the most significant barriers is high cost. Many innovations require a substantial initial investment, which can discourage individuals and organizations from adopting them. This is particularly relevant in the early stages of the adoption

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lifecycle, where prices are often higher due to limited production and lack of economies of scale. For example, electric vehicles were initially expensive compared to traditional cars, which limited their adoption to wealthier consumers. This reinforces the idea that cost is not only a financial factor but also a key determinant of accessibility within different segments of the population.

Another important barrier is lack of trust. Individuals may be hesitant to adopt a new technology if they are uncertain about its reliability, safety, or long-term benefits. This is especially common in emerging technologies where there is limited information or where misinformation may exist. Trust is closely linked to social influence, as people often rely on the experiences of others before deciding. If early adopters report negative experiences, this can significantly slow down the diffusion process. Therefore, trust acts as a critical bridge between awareness and actual adoption. For example, in the start of EV where user have concerns about the battery life and longevity.

Resistance to change is also a major barrier. Many individuals prefer to stick with familiar systems and practices, even when better alternatives are available. This behavioural inertia is influenced by habits, comfort, and perceived risk. In many cases, the effort required to learn and adapt to a new technology outweighs the perceived benefits. This is particularly evident among later adopter groups, such as the late majority and laggards, who tend to be more conservative in their decision-making. As a result, psychological factors can be just as important as economic ones in influencing adoption.

The complexity of technology further contributes to adoption barriers. Innovations that are difficult to understand or use are less likely to be adopted, especially by individuals with limited technical knowledge. Complexity increases uncertainty and reduces perceived ease of use, which negatively impacts adoption decisions. For example, advanced software systems or emerging technologies such as blockchain may face slower adoption due to their technical nature. This highlights the importance of user-friendly design and effective communication in facilitating diffusion.

In addition, infrastructure limitations can significantly restrict the adoption of new technologies. Even if individuals are willing to adopt an innovation, the absence of supporting infrastructure can make adoption impractical. A clear example is the adoption of electric vehicles, which has been constrained in many regions by the lack of charging stations. Similarly, digital technologies rely heavily on internet access, meaning that areas with limited connectivity experience slower

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diffusion. This demonstrates that adoption is not only an individual decision but also dependent on external environmental conditions.

Furthermore, these barriers are interconnected and often reinforce one another. For example, high cost combined with lack of infrastructure can create a situation where even interested consumers are unable to adopt the technology. Similarly, complexity can increase resistance to change, while lack of trust can amplify perceived risks. This interaction highlights that barriers to adoption should not be viewed in isolation, but rather as part of a broader system that influences the diffusion process.

2. Technology diffusion process

The technology diffusion process explains how an innovation spreads among individuals within a social system over time. While the adoption model focuses on categorizing individuals based on when they adopt an innovation, the diffusion process provides a deeper understanding of how and why this adoption occurs. According to Everett Rogers, diffusion is not an instantaneous process but rather a sequence of stages through which individuals move before fully adopting an innovation.

This highlights that adoption is not a single decision, but rather a dynamic and socially influenced process shaped by communication, perception, and experience.

The diffusion process is commonly structured into five stages: knowledge, persuasion, decision, implementation, and confirmation. These stages represent a sequential pathway through which individuals progress before fully integrating an innovation into their lives. However, it is important to note that this process is not always strictly linear, as individuals may move back and forth between stages depending on new information or changing circumstances. This highlights the complexity of diffusion in real-world contexts.

The first stage is the Knowledge Stage, where individuals become aware of the existence of an innovation but lack detailed understanding of its functionality. At this stage, exposure is the key driver, often facilitated by mass media, advertising, or digital platforms. However, awareness alone is insufficient to drive adoption. A critical limitation at this stage is information asymmetry, where individuals may receive incomplete or biased information, potentially leading to misconceptions about the innovation. This is particularly evident in technologies such as early artificial intelligence, were public understanding often slow compared to technological development.

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The second stage is the Persuasion Stage, where individuals begin to form attitudes toward the innovation. This stage is heavily influenced by subjective perception rather than purely objective evaluation. Factors such as perceived usefulness, ease of use, and compatibility with existing practices play a significant role. More importantly, social influence becomes highly prominent. Opinion leaders, particularly early adopters, act as key intermediaries who shape perception and reduce uncertainty for others. This demonstrates that diffusion is not only an economic process but also a social one, where trust and credibility are central. In modern markets, this role is increasingly fulfilled by digital influencers, user reviews, and online communities.

The third stage is the Decision Stage, where individuals choose to adopt or reject the innovation. While traditional models assume rational decision-making, in practice, this stage is influenced by both rational and behavioural factors. Risk aversion, loss perception, and social pressure can significantly affect outcomes. Trialability becomes particularly important here, as the ability to experiment with an innovation reduces perceived risk and increases the likelihood of adoption. For example, freemium models in digital products or pilot programs in technology implementation are strategic tools designed to accelerate movement through this stage. After the take-off stage, extension may speed up diffusion by sharing experiences of previous adopters with new adopters (Heiman et al., 2019).

The fourth stage is the Implementation Stage, where the innovation is actively used. At this stage, the focus shifts from intention to actual behaviour. However, adoption is not yet fully secured, as users may still experience uncertainty or dissatisfaction. The quality of user experience becomes critical, as complexity or lack of support can lead to discontinuance. This stage highlights an important insight: successful diffusion is not only dependent on initial adoption but also on the ability of the innovation to deliver consistent value in practice. Organizations that fail to support users during this stage risk losing momentum in the diffusion process.

The final stage is the Confirmation Stage, where individuals evaluate their adoption decision and seek reinforcement. Positive experiences lead to continued use and, importantly, advocacy, where users influence others to adopt the innovation. This creates a multiplier effect, accelerating diffusion across the social system. Conversely, negative experiences can lead to rejection and negative word-of-mouth, significantly hindering diffusion. This stage reinforces the idea that diffusion is cumulative and self-reinforcing, particularly in environments with strong network effects.

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A critical aspect of the diffusion process is the role of communication channels and social systems. Innovations spread more rapidly in highly connected environments where information flows efficiently. In contemporary contexts, digital platforms have significantly transformed diffusion dynamics by enabling rapid dissemination of information across global networks. This explains why modern technologies, such as AI tools, can achieve mass adoption at a much faster rate compared to earlier innovations.

Furthermore, the diffusion process is closely linked with the adopter categories discussed in the adoption model. Each stage of diffusion corresponds to different adopter groups, creating a cumulative progression from innovators to laggards. This relationship becomes particularly important when considering the concept of the "chasm" between early adopters and the early majority. At this point in the diffusion process, many innovations fail due to the inability to transition from niche markets to mainstream adoption (Business-to-You, n.d.). Successfully navigating this transition is critical for achieving large-scale diffusion.

Additionally, the diffusion process aligns with the S-curve model of innovation growth. In the early stages, adoption is slow due to limited awareness and high uncertainty. As the innovation moves through the persuasion and decision stages, adoption accelerates rapidly, particularly once the early majority begins to adopt. Eventually, the rate of adoption slows as the market approaches saturation. This explains why many technologies appear to "explode" and gain popularity, when they have been progressing through earlier stages of diffusion over time.

Real world examples

The adoption and diffusion of new technologies can be clearly observed through real-world examples such as EVs and AI. Both technologies demonstrate how innovations move through different stages of adoption and diffusion, while also being influenced by economic, social, and technological factors. Although both EVs and AI are considered transformative technologies, their diffusion processes differ due to variations in infrastructure requirements, cost, and market readiness.

a. Electric Vehicles (EV)

Electric vehicles represent a strong example of how technological diffusion can be slowed down by external barriers despite clear environmental and long-term economic benefits. In the early stages of adoption, EVs were primarily adopted by innovators and early adopters who were willing to take risks and invest in new technologies. These individuals were often motivated by environmental concerns, technological interest, or long-term cost savings. However, the high initial cost of

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EVs and the lack of charging infrastructure significantly limited their adoption among the early majority (Heiman et al., 2020). This reflects the importance of economic and infrastructural factors in shaping the diffusion process.

As EV technology progressed, improvements in battery efficiency and reductions in production costs helped accelerate adoption. Government policies, such as subsidies and incentives, also played a critical role in reducing barriers and encouraging adoption. This demonstrates how institutional support can influence the diffusion process by making innovations more accessible to a wider population. Additionally, as more early adopters began using EVs, social influence increased, leading to greater acceptance among the early majority. This aligns with the concept that diffusion is not only driven by individual decisions but also by collective behaviour within a social system (Basu, 2020).

Despite this progress, EV adoption still faces challenges in crossing the Chasm between early adopters and the mainstream market. Many consumers remain hesitant due to concerns about range, charging availability, and long-term reliability. This highlights the credibility gap that exists between early adopters and the early majority, where the experiences of early users may not be sufficient to convince more risk-averse individuals (Business-to-You, n.d.). As a result, companies in the EV market must focus on building trust, improving infrastructure, and reducing uncertainty to achieve widespread adoption.

b. Artificial Intelligence (AI)

In contrast, AI demonstrates a much faster diffusion process, particularly in digital applications. Unlike EVs, AI technologies often do not require physical infrastructure, allowing them to scale more rapidly across global markets. For example, the rapid adoption of AI tools such as ChatGPT illustrates how digital innovations can move quickly through the diffusion stages. Although AI technologies have been in development for many years, widespread awareness and adoption only accelerated once the technology became accessible and user-friendly (The Waves, 2022). This reflects the importance of accessibility and usability in driving diffusion.

The diffusion of AI is also heavily influenced by network effects and digital communication channels. Social media, online platforms, and digital communities play a significant role in spreading awareness and shaping perceptions. As more individuals and organizations adopt AI tools, the value of these technologies' increases, further accelerating adoption. This creates a self-reinforcing cycle where adoption leads to increased visibility and acceptance.

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However, AI also faces its own set of barriers to adoption. Concerns about data privacy, ethical implications, and job displacement can create resistance among potential users. These concerns can slow down the diffusion process, particularly among the late majority and laggards, who are more risk averse. Additionally, the complexity of AI technologies can limit understanding and reduce trust, highlighting the importance of education and transparency in promoting adoption. This demonstrates that even technologies with low physical barriers can face significant psychological and social challenges.

When comparing EVs and AI, it becomes clear that the diffusion process is highly dependent on the nature of the technology. EVs, as a physical and infrastructure-dependent innovation, experience slower diffusion due to higher costs and external constraints. In contrast, AI, as a digital and scalable technology, benefits from faster diffusion due to lower marginal costs and widespread accessibility. However, both technologies follow the same fundamental diffusion principles, progressing through stages of awareness, evaluation, and adoption within a social system.

In addition, both cases illustrate the relevance of the S-curve in technology diffusion. In the early stages, adoption is slow due to limited awareness and high uncertainty. As the technologies gain acceptance, adoption accelerates rapidly, particularly when the early majority begins to adopt. This rapid growth phase is clearly visible in the recent expansion of AI tools, which appear to have "exploded" become widespread, despite years of prior development. Similarly, EV adoption is currently transitioning into this accelerated phase as infrastructure improves and costs decrease (MET Group, n.d.).

Conclusion

The process of technology adoption and diffusion provides a comprehensive framework for understanding how innovations are introduced and spread within a market. As discussed throughout this paper, adoption is not an immediate or purely rational decision, but rather a gradual process influenced by individual perception, social interaction, and external conditions. The Diffusion of Innovation Theory by Everett Rogers highlights how different groups and stages of adopters contribute to the overall spread of innovation, while the diffusion process explains the stages individuals go through before fully accepting new technologies.

Furthermore, the analysis of barriers demonstrates that even highly beneficial technologies may struggle to achieve widespread adoption due to factors such as cost, complexity, lack of trust, and infrastructure limitations. These barriers are

often interconnected and can significantly slow down the diffusion process if not properly addressed. In addition, the concept of the "chasm" emphasizes the difficulty of transitioning from early adopters to the mainstream market, which remains a critical challenge for many organizations.

The case studies of electric vehicles and artificial intelligence further illustrate how different types of technologies experience distinct diffusion patterns. While EVs face challenges related to physical infrastructure and cost, AI benefits from digital scalability and rapid spread of information. However, both follow the same fundamental principles of diffusion, progressing through stages of awareness, evaluation, and adoption within a social system.

Overall, this paper demonstrates that successful technology adoption depends not only on the quality of the innovation itself, but also on the ability to manage the diffusion process effectively. For organizations and policymakers, understanding these dynamics is essential to reduce barriers, build trust, and accelerate adoption. As technology continues to evolve rapidly, the importance of diffusion strategies will remain critical in shaping the success of future innovations.

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FREEDOM OF THOUGHT: PRINCIPLE OF LOGICAL CAUSALITY AND THEORY OF THE ACAUSAL. PREDICTABLY, NEURORIGHTS AND DEVELOPMENT OF NEW TECHNOLOGIES. LEGAL SUBJECTIVITY OF ARTIFICIAL INTELLIGENCE IN THE NEW BUSINESS ENVIRONMENT

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Abstract

The main issue regarding the digitalization is the intersection among the cognitive liberty, legal theory, and new technologies like Artificial Intelligence. It begins by examining Newton's third law of dynamics in the context of thought processes and legal implications, particularly in relation to historical debates on criminal intent. The author highlights the potential for the mind to manipulate time, space, and events, referencing Carl Jung's concept of synchronicity as a phenomenon where events are connected by meaning rather than causality. The discussion transitions to modern technological impacts on thought manipulation, specifically through neurowarfare and AI, exemplified by incidents like the Havana Syndrome. These advancements threaten individual autonomy and cognitive freedom, as current legal frameworks are insufficient to protect against such sophisticated manipulations. The article underscores the urgency of developing 'neuro-law'

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to safeguard cognitive rights amidst rapid technological progress that blurs the line between reality and perception

Keywords: *cognitive liberty, artificial intelligence, causality, newton's third law of dynamics, acausality, synchronicity, neurowarfare, neuro-law, manipulation, self-determination, quantum AI*

JEL Classification: K24, K38, O33, D83, D91, Z13.

1. Introduction

Among Newton's three principles of dynamics [1] the third principle concerning the concept of 'action-reaction' can certainly be reinterpreted [2], especially in relation to new technologies such as Artificial Intelligence

Consider, in fact, that this principle could be applied to thought and the 'dynamics of thought'[3]: could time, space and events be manipulated? [4] What would be the legal implications of such manipulations?

2. Principle of logical causality and theory of the acausal

The legal debate has so far always settled on the sphere of mere imagination (the capacity to 'will' something).

For example, in 1890, Reinhard Frank published a conspicuous essay entitled 'Representation and Will in Modern Willfulness Doctrine' (*Vorstellung und Wille in der modernen Doluslehre*), with the aim of 'offering a contribution to the correct understanding of criminal willfulness' and the 'clarification of controversial questions'[5]. Two years earlier, Franz von Liszt had thrown the proverbial stone into the pond by challenging the 'common opinion' that described wilfulness in terms of the 'consciousness and will of the elements of the crime' (*Wissen und Wollen der Deliktsmerkmale*) to be imprecise (*ungenau*), dangerous (*gefährlich*) and incorrect (*unrichtig*): imprecise, because only the bodily movement could be willed, and not the event; dangerous, because it would confuse the will with the purpose (*Bezwechen*); incorrect, because the object of the intent would be the event, and not all the elements of the offence[6].

Frank observed that the idea of centring wilful default on representation of the every person has of will was far from new theory; indeed, he found it 'surprising' that the theoretical antecedents of such a conception, labelled 'representation theory' (*Vorstellungstheorie*) as opposed to the antagonistic 'will theory' (*Willenstheorie*), had gone unnoticed.

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This consideration is the starting point for an in-depth historical-dogmatic excursus, during which the progenitors of *Vorstellungstheorie* [7] are identified, the thesis sketched out by von Liszt on the relations between action and will is developed, and the conclusion is drawn that the expression 'intentional event' may perhaps serve to describe the structure of intent in a metaphorical and simplified manner, but not to understand its essence. Up to this point, the central dogmatic assumption of Frank's study is that only conduct can be said to be willed, and not the event: an idea that, contrary to what Karl Engisch might have thought in 1930, cannot be said to be 'outdated'[8].

Well, as mentioned, what if the mind, in addition to deciding or desiring/wishing something, could manipulate time, space and events? Among those who grappled with such issues was the famous Swiss psychologist Carl Gustav Jung [9].

The philosophical principle underlying our understanding of the regularity of the laws of nature is causality. If the relationship between cause and effect proves to have only statistical validity and only relative truth, this means that the link between events is in certain circumstances of a different nature from causality and requires a different principle of interpretation.

Unlike causality, synchronicity proves to be a phenomenon primarily connected with processes that take place in the unconscious. To the unconscious psyche, space and time seem relative, i.e. knowledge is located in a space-time continuum in which space is no longer space and time is no longer time. If therefore the unconscious develops and maintains a certain potential to consciousness, the possibility of perceiving and 'knowing' parallel events arises.

To arrive at such claims Jung had experienced many such events on himself and eventually coined the term 'synchronicity' to describe what he saw as a disturbing phenomenon of significant coincidences.

To explain the operation of such phenomena Jung theorised the existence of a principle or law of nature quite different from that normally described by conventional physics. Whereas most visible phenomena in our world appear to occur in a linear, cause-and-effect fashion, like dominoes falling one on top of the other, synchronic events are 'acausal' in that they appear to be linked by deeper archetypal patterns rather than linear forces.

To give scientific support to this theory, Jung improved the experiments conducted by Dr. Joseph Banks Rhin and in particular the use of Zener cards to explain the hidden capacities of the human psyche [10].

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3. Predictably, neurorights and development of new technologies

Nowadays, in accordance to the theories mentioned above, it could be tried to introduce this issue in rely on the new technologies and dealing with the specific risks.

For instance, it could be argued that this short contribution is the result of synchronicity

When the first 'Ghostbusters' movie was released in the cinema I was only a few years old.

In the early part of the movie [11] a study is shown on the "effects of negative stresses on extrasensory perception" conducted by one of the protagonists (Dr. Peter Venkman - Bill Murray): Dr. Venkman was conducting a psychological experiment with a couple of university students.

One detail is not given due prominence: the experiment really works.

Stress, in the form of electric shocks, forces one of the student to improve his psychic abilities and 'perceive' the actual shape and designs on the cards accurately.

At the time of my first viewing of the film I only remembered the card episode, nothing more.

A day, however, on the train I found myself reading Jung's essay and on page 30 I began to remember where I had seen these same experiments with Zener's cards. At the exact moment of that remembering, I joined the meeting I had had a few days earlier with Professor Ernesto William De Luca and the commitment to draft a contribution on this subject. At that moment, the synchronicity mentioned was consummated.

Could this synchronicity really be sustained or is it the result of influences received through new technologies?

At this stage, we can move on to deal with the manipulation of thought by new technologies.

There are endless forms of manipulation, especially for military purposes [12].

For instance, mysterious attacks on the human brain have begun plaguing U.S. diplomats and officials with increasing frequency, ranging from overseas diplomatic outposts to right here in the United States. Known in the media as Havana Syndrome, these attacks appear to be signaling a new form of warfare - one that is focused on enhancing, targeting, and weaponizing the human brain - neurowarfare. Indeed, the human brain is at the center of a biotechnological revolution currently underway [13].

As a result, the freedom of self-determination of each individual is obviously in jeopardy.

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Moreover, at present, we do not have the tools to prevent those forms of abuse and manipulation that increase proportionally with technological progress, especially now that such manipulation can be carried out by Artificial Intelligences (especially Quantum AI).

Manipulation by AI is even more penetrating because it is personalised through user profiling [14].

In addition, the system of manipulation of the freedom of self-determination can be extended to any situation as long as it is understood that there can be an infinite number of devious forms of compromising the freedom of self-determination.

It has been observed that, on a large scale, a subject or an entire population can be manipulated without adequate legal protection, since the 'neuro-law' that is supposed to protect us has not yet been developed [15].

The continuous attacks on the intimate sphere of the individual[16], which have transformed consent as the rule of governing the body into the rule of governing the mind, will increasingly tend to erode the very freedom of thought and thus of self-determination [17].

In fact and in general, new technologies are totally changing reality [18] and with it the perception of human beings/living beings themselves [19] who will soon be unable to perceive what is real, whether naturalistically true or human, or what is not [20].

Everything is moving towards a basic 'artefactual' phenomenal reality [21], in which the state of consciousness is not the starting point but the result. We only regain a minimum of realistic perception at a later stage: when the individual verifies what he perceives in the first instance as real and true.

Quid iuris?

4. The Legal Subjectivity of Agentic Artificial Intelligence: Between Functional Attribution and Cognitive Accountability

The question of whether artificial intelligence systems may be recognised as legal subjects is not merely a theoretical exercise; it is a problem of immediate doctrinal and practical consequence, whose urgency is compounded by a dimension that strictly legal analysis has too often left underexplored: the capacity of agentic AI to operate not merely upon the external world, but upon the cognitive processes and self-determination of the persons it interacts with. As demonstrated, the progressive diffusion of AI generates forms of manipulation of consent and individual autonomy that are intrinsically more penetrating than any prior

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technology of influence, precisely because they are personalised through profiling and operate, in some cases, beneath the threshold of conscious awareness. [22]

The classical architecture of legal subjectivity rests upon a binary: natural persons, endowed with subjectivity by virtue of their humanity, and artificial persons — most notably corporations — whose legal personality is conferred instrumentally, to serve defined normative ends. The emergence of agentic AI demands that this architecture be re-examined. In last-generation AI systems endowed with self-learning capabilities, the machine's operation in the external world does not derive from pre-determined rules, since choices are made autonomously — through the elaboration of machine learning algorithms — independently of human control and intervention. [23] The system, beyond relying on its training, confronts reality and transforms itself based on interactions with the external environment. It is precisely this derived but real autonomy — this capacity for goal-directed behaviour operating beyond full human oversight — that generates the central doctrinal tension: where autonomous discretion is exercised, the law has historically sought an accountable subject.

The analogy to corporate personality, while instructive, is ultimately incomplete, and it becomes even more so once the cognitive dimension is brought into view. Scholarly literature across the Atlantic had already considered the possibility that AI could be treated as an autonomous business entity - a memberless LLC operating without direct human control [24]. Yet this analogy fails at its foundation: the corporation aggregates human will; agentic AI may displace it. As the book demonstrates with forensic precision, AI systems - and above all those exploiting the techniques of manipulation prohibited under Article 5 of the AI Act - can exploit the apparent manifestation of consent to induce an implicit agreement from which the data subject's genuine self-determination is entirely absent. [25] More radically still, through profiling and predictive manipulation, the step from profiling to unconscious induction is short, and the system of manipulation of the freedom of self-determination can be extended to an infinite number of situations through which individual autonomy is insidiously compromised. [26]

It is against this backdrop that the concept of "electronic personhood" must be firmly rejected — not only on the classical grounds of the absence of consciousness and the risk of creating a liability shield for human actors, but on a deeper structural ground. The exponential technological evolution of artificial intelligence has not found a true normative remedy in cases of "essential" or "grave" violations. [27] The risk, as the book powerfully observes, is that the law

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will be displaced by a hollow legalism in which some actors present themselves as authentic holders of a dominant authority, concealing — in a game of Chinese boxes — the real holder of power, which remains opaque and rarefied: of law, only the nomen would remain. [28] To grant legal personality to AI would not close the responsibility gap — it would institutionalise it, constituting as a legal subject the very instrument through which personhood is most acutely threatened.

The appropriate response lies, instead, in the rigorous reinforcement of human accountability and in the development of new guarantee instruments focused on the preliminary phase of programming and on the quality control of data used. [29] The right to be informed of the use of intelligent technologies, the right to algorithmic transparency, the right to explanation, and the right to human oversight [30] must be understood not as ancillary procedural guarantees but as substantive expressions of human dignity operating as enforceable constraints upon AI deployment. Algorithmic transparency — or more precisely, transparency of AI systems — should enable comprehension, explainability, and the consequent reviewability of the logic employed, as the only means capable of overcoming the opacity of potential black boxes, diminishing the congenital informational asymmetry, and ensuring that artificial intelligence remains instrumental and subservient to natural intelligence. [31] The EU AI Act's risk-based model points in the right direction, though, as the book makes clear, it applies only to those software families placed on the market, excluding all lawful uses exempted from its scope and, obviously, all illicit uses. [32] The *quid iuris* remains: not whether AI may become a subject of law, but whether the law remains capable of protecting the human subject from AI:

"In verità un altro attore (protagonista) è l'Intelligenza Artificiale, perchè in effetti essa è padrona di sé stessa". [33]

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leaving out all those dimensions of awareness, identity and self-determination that have always distinguished the human being'.

[18] Some recently mobile devices introduce AI in image alteration by design and by default. One advertisement is: *'AI is also a key asset in image processing by improving the capture capability and optimising the editing process before sharing one's shots or movies.*' Eventually, the user is unable to perceive reality for what it is.

[19] Recently newspapers reported that with a fake video of the financial director, some employees transferred 25 million being victims of a scam thanks to content created with artificial intelligence (news reported in Sole24Ore at the following link https://www.ilsole24ore.com/art/video-fake-direttore-finanziario-dipendenti-spostano-25-milioni-ma-e-truffa-AFHlhkdC).

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[31] VESCIO di MARTIRANO, op. cit., Cap. IV, § 1: «*la trasparenza "algoritmica" [...] dovrebbe poter consentire la comprensione, la spiegabilità e la conseguente sindacabilità della logica [...] assicurando che la stessa intelligenza artificiale rimanga strumentale e servente rispetto alla intelligenza "naturale"*».

[32] VESCIO di MARTIRANO, op. cit., Cap. IV, § 2: «*l'AI Act non è da solo sufficiente visto che esso si applica solo a quelle famiglie di software che verranno immesse nel mercato e quindi ad esclusione di tutti gli impieghi leciti esclusi da tale regolamentazione*».

[33] VESCIO di MARTIRANO, op. cit., Cap. IV, § 2 Cap. IV, § 1: «*In truth, another actor - indeed, the protagonist - is Artificial Intelligence, for in fact it is master of itself. From a technical standpoint, in 'latest-generation' artificial intelligence systems endowed with self-learning capabilities, the machine's operation in the external world does not derive from pre-determined rules, since choices are made autonomously - through the elaboration of machine learning algorithms - independently of human control and intervention. The digital system, beyond relying on the training it has received, confronts reality and transforms itself, based on interactions with the external environment in which it operates, from which it may receive inputs; in order then to adopt behaviours and decisions consistently with the experiential data acquired over time.*»

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DIGITALIZATION AND MARKET TRANSFORMATION UNDER THE PRESSURE OF COMPETITIVE RELATIONS

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Abstract:

Digitalization is one of the most important phenomena that have influenced the contemporary economy, changing both the way in which businesses operate and the way in which consumers interact with products and services on the market. While in the traditional economy economic relations were built around material production, physical distribution and direct contact between traders and consumers, in the digital economy a significant part of commercial activity is carried out through online platforms, applications, algorithmic systems and digital infrastructures. This transformation has not only a technological dimension, but also a legal one. Digitalization is changing the way competition occurs, the way businesses cooperate, and the way authorities must analyze economic behavior. Today, competition is no longer limited to price, quality, and distribution, but also to access to data, online visibility, control over algorithms, the ability to attract users, and integration into digital ecosystems. The study provides theoretical and practical arguments regarding the increasingly complex nature of business cooperation, as many digital services cannot function without interoperability, technological partnerships, information exchange, and shared infrastructures.

Keywords: *digitization, competition, algorithm, digital economy, digital platforms and multilateral markets*

JEL Classification: D40, D43, L13, L41, L86, O33

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Introduction

Digitalization has led to the emergence of the digital economy, understood as a set of economic activities carried out by information and communication technologies. This includes e-commerce, online intermediation services, digital advertising, cloud services, social media platforms, mobile applications, artificial intelligence, online payment services and other forms of economic activity based on data and connectivity. Unlike the traditional economy, the digital economy is characterized by speed, scalability, globalization and dependence on information.

A key element of digitalization is that businesses can quickly reach a very large number of users without the need for a large physical presence. A digital platform can operate simultaneously in several countries, connect millions of users and generate revenue through business models that are different from the classic ones. Some services are offered ostensibly free to consumers, but the economic value is obtained through advertising, data collection, commissions applied to merchants or monetization of user attention. This reality complicates legal analysis, because price is no longer always the main indicator of competition.

In competition law, this change is particularly important. Many of the classic analysis tools were built for markets in which products, services, prices and territories could be more clearly delimited. In the digital economy, markets can be multilateral, services can be offered free of charge to one category of users, and revenues can come from another category of participants. For example, a social media platform can offer free access to users but can earn revenue from advertising. In such a situation, competition cannot be analyzed only by reference to the price paid by the user, but data, user attention, quality of service, protection of privacy and the degree of real choice must be taken into account.

Digitalization also influences the relationship between businesses. In the online environment, businesses can cooperate to develop integrated services, to ensure technical compatibility or to use common infrastructures. However, the same cooperative relationships can generate competitive risks when they involve the exchange of sensitive information, economic dependence on dominant platforms or the use of data for the purpose of excluding competitors. Therefore, digitalization does not only foster competition and does not only foster cooperation but creates an economic space in which the two overlap.

A relevant example is that of e-commerce platforms. They allow traders to cooperate with the platform to reach consumers, to use the payment, promotion and logistics infrastructure, but they can also create the risk that the platform becomes a

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dominant player or even a direct competitor of traders. This example shows that digitalization transforms the market into an ecosystem, not just a meeting place between supply and demand. The platform sets rules, controls the visibility of products, collects data and can influence the economic behavior of participants.

At the European Union level, these transformations have led to the adoption of specific regulations, such as the Digital Markets Act, which aims to ensure contestable and fair digital markets. The regulation identifies certain large platforms as "gatekeepers", i.e. operators who control access between professional users and end consumers and imposes special obligations on them to prevent abuses and the blocking of competition. This legislative intervention shows that the classic instruments of competition law, although remaining important, are no longer always sufficient to respond quickly and effectively to digital challenges.

In my opinion, digitalization must be analyzed as an ambivalent phenomenon. On the one hand, it facilitates competition, because it reduces certain geographical barriers, allows small businesses to reach consumers and stimulates innovation. On the other hand, digitalization can favor the concentration of economic power in the hands of very large platforms, which control data, infrastructures, algorithms and access to users. This ambivalence justifies the detailed analysis of digital markets and how competition law must adapt to the new realities.

Therefore, this study aims to analyze the main transformations brought about by digitalization on the market. First, the digital economy and its particularities will be examined. Second, digital platforms and multilateral markets will be analyzed, as they represent one of the most important forms of economic organization in the online environment. Subsequently, data as a strategic economic resource, network effects, algorithms and automation of economic behavior, as well as the impact of digitalization on the relationship between cooperation and competition will be addressed.

The digital economy and its particularities

The digital economy is distinguished from the traditional economy by the way in which economic value is created, distributed and exploited. Within it, data, connectivity, technology and access to users become central elements of economic activity. If in the classical economy competitive advantage was mainly linked to capital, labor, material resources, geographical location or production capacity, in the digital economy competitive advantage can be based on IT infrastructures, databases, algorithms, network effects and the ability to attract and retain users in a digital ecosystem.

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One of the main characteristics of the digital economy is dematerialization. Many products and services are no longer provided through physical support, but through applications, platforms or online services. Music, films, banking, trade, education, transport, communication and advertising have been deeply influenced by this shift from material to digital. This dematerialization reduces some costs but also creates new forms of dependence on digital infrastructures. Access to a service no longer depends only on the existence of a physical store or provider, but also on internet access, device compatibility, digital accounts, and platform rules.

Another important feature is scalability. Digital services can be extended to a very large number of users at relatively low additional costs compared to the traditional economy. An application, once developed, can be distributed to a large number of users without the company having to build physical stores in every locality. This scalability can stimulate innovation and allow new businesses to grow rapidly. At the same time, it can lead to market concentration, as businesses that reach a large user base first can gain advantages that are difficult for competitors to recover.

The digital economy is also characterized by accelerated globalization. Digital platforms can operate across borders, and consumers can access services offered by businesses located in other countries. This reality expands the possibilities for competition but also raises legal issues regarding the competence of authorities, the enforcement of competition rules, data protection and the liability of platforms. In addition, small businesses can benefit from access to international markets but can become dependent on digital intermediaries that control visibility and access to consumers.

A central element of the digital economy is data. Data on users, preferences, transactions, searches, location, consumption behavior and online interactions can be collected and analyzed to improve services, personalize offers and anticipate demand. From this perspective, data becomes a strategic economic resource. The Competition Council emphasized, in its study on Big Data, that the use of large volumes of data can produce economic efficiencies but can also generate significant competitive advantages for companies that control access to this information.

This particularity changes the way economic power should be analyzed. In the traditional economy, market power was mainly assessed through market shares, production capacity, price levels or entry barriers. In the digital economy, a company can acquire economic power through control over data, through its position as an intermediary, through network effects or through the ability to integrate multiple services into an ecosystem. Thus, a platform can become indispensable for merchants, even if the service offered to end users is free.

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Another feature of the digital economy is the multifaceted nature of many markets. A platform does not serve just one category of users but connects multiple groups that influence each other. For example, an e-commerce platform connects merchants and consumers; a social network connects users, content creators and advertisers; a transportation platform connects drivers and passengers. The value of the platform increases as it attracts more participants on each side of the market. This structure makes competitive analysis more difficult, as the effects of a behavior may occur on one side of the market, while revenues are generated on another.

The digital economy is also characterized by the role of algorithms. Algorithms are used for recommendations, pricing, display of results, personalization of content, fraud detection and optimization of business processes. They can increase efficiency and improve the user experience. However, they can also raise legal issues when they lead to discrimination, lack of transparency, self-favouring or indirect coordination between businesses. In this sense, technology should not be viewed as competitively neutral, as the way it is designed and used can influence the structure of the market.

A relevant example is the recommendation systems used by digital platforms. They can help consumers find relevant products or services more easily but they can also favor certain offers. If a platform promotes its own products to the detriment of those offered by independent traders, a competition problem may arise. In this case, the algorithm is not just a technical tool, but a mechanism through which the platform influences the market access and visibility of competitors.

Another important feature is the dependence of users and businesses on digital ecosystems. Users may remain in an ecosystem because they have accumulated data, contacts, purchase histories, subscriptions or personal content. Businesses may remain dependent on a platform because it gives them access to customers and infrastructure. This dependence can reduce mobility and limit competition. Therefore, recent European regulations give importance to data portability, interoperability and obligations imposed on gatekeepers.[1]

[1] Regulation (EU) 2022/1925, provisions on data portability, interoperability and gatekeepers' obligations. Regulation (EU) 2022/1925 of the European Parliament and of the Council of 14 September 2022 on contestable and fair markets in the digital sector and amending Directives (EU) 2019/1937 and (EU) 2020/1828 (Digital Markets Act) (Text with EEA relevance), https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32022R1925

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In my opinion, the digital economy should not be seen simply as a faster or more technologically advanced economy, but as an economy structured differently. Power no longer results only from the possession of material assets, but also from control over data flows, digital infrastructures and interactions between users. This change has profound legal implications, as competition rules must analyze not only obvious behaviors, such as price fixing or market sharing but also subtle forms of control exercised through platforms, algorithms and digital ecosystems.

The particularities of the digital economy therefore justify the need for an adaptation of legal instruments. Competition law must remain faithful to its main objective, which is to protect the competitive process, but it must understand that this process takes place under new conditions. Competition is manifested through price, but also through access to data, innovation, visibility, interoperability and users' freedom of choice. At the same time, cooperation becomes necessary for the functioning of digital services but must be limited when it produces exclusionary effects or anti-competitive coordination.

Digital platforms and multilateral markets

Digital platforms are one of the most important forms of organization of the digital economy. They act as intermediaries between multiple categories of users and facilitate economic, social or informational interactions. Unlike traditional enterprises, which directly produce and sell goods or services, platforms create a digital space in which other actors can interact. They can connect merchants and consumers, drivers and passengers, owners and tourists, application developers and users, content creators and audiences, or advertisers and consumers.

The multilateral nature of platforms is essential for understanding their economic and legal role. A multilateral market implies the existence of multiple groups of users whose interests are interdependent. The value of the platform for one category of users depends on the presence of the other category. For example, an e-commerce platform is valuable for consumers if it has many merchants and a diversified offer, but it is valuable for merchants if it has many consumers. This interdependence generates indirect network effects, which can contribute to the rapid growth of platforms.

Digital platforms can have positive effects on competition. They reduce search costs for consumers, enable comparison of offers, facilitate access for small businesses to wider markets and can stimulate innovation. A small trader, who would not have the resources to develop his own online sales infrastructure, can use a platform to reach customers. From this perspective, platforms can function as

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tools for economic cooperation, as they create a common space in which many businesses can carry out commercial activities.

However, digital platforms can also generate significant competition risks. They are not completely neutral intermediaries, as they set the rules for access, commercial conditions, fees, product display criteria, recommendation mechanisms and data collection methods. In this sense, the platform does not only facilitate the market but also organizes it. It can influence who is visible, which products are recommended, which traders have access to consumers and what data is available to participants. This organizing power can become problematic when the platform has a strong position or becomes indispensable for market access.

A specific aspect of digital platforms is the dual role. This occurs when the platform acts simultaneously as an intermediary for other businesses and as an economic operator competing with them. For example, an e-commerce platform may allow third-party traders to sell products, but it may also market its own products. In such a situation, the platform has access to data on traders' activity, sales, prices and consumer preferences. If this information is used to develop or promote their own products, there is a risk of distortion of competition.

From a legal perspective, digital platforms raise the issue of the boundary between legitimate cooperation and economic control. Traders cooperate with the platform to gain access to consumers, but this cooperation can become a relationship of dependency. If the platform controls access to the market, unilaterally changes the rules or favors its own services, professional users may be affected. This issue was the basis for the adoption of the Digital Markets Act (DMA), which aims to ensure the contestability and fairness of digital markets by imposing special obligations on gatekeeper platforms.[2]

The Digital Markets Act identifies "gatekeepers" using objective criteria and targets large platforms that provide essential services, such as online search engines, app stores, social networks, online intermediation services or digital advertising services. The European Commission initially designated six gatekeepers in 2023: Alphabet, Amazon, Apple, ByteDance, Meta and Microsoft, and other services, such as Booking.com, were subsequently added. This

[2] Regulation (EU) 2022/1925 of the European Parliament and of the Council of 14 September 2022 on contestable and fair markets in the digital sector and amending Directives (EU) 2019/1937 and (EU) 2020/1828 (Digital Markets Act) (Text with EEA relevance), https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32022R1925

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designation shows the legal importance of digital platforms and the need for special rules for actors that control access between businesses and users.

The importance of the DMA lies in the fact that it complements classical competition law. While Art. 101 and Art. 102 TFEU penalize anti-competitive behavior after analyzing its effects, the DMA introduces "ex ante" obligations, i.e. rules that gatekeepers must comply with before a certain practice has serious effects on the market. This approach is justified by the rapid dynamics of digital markets. In a sector where network effects and data accumulation can rapidly consolidate economic power, late intervention may not be enough.

Digital platforms also raise the issue of transparency. Users and merchants do not always know how recommendation algorithms, display criteria or product promotion rules work. The lack of transparency can affect competition, as businesses cannot properly assess the conditions under which they compete. If a platform changes its display algorithm or favors certain products, the impact on merchants can be significant. This situation shows that in the digital economy, competition is influenced not only by price, but also by visibility.

In my opinion, digital platforms represent the clearest example of the transformation of the market through digitalization. They create real opportunities for cooperation and market access, but they can also become centers of economic power. Therefore, legal analysis should not treat them exclusively as beneficial instruments, nor exclusively as sources of risk. Platforms should be analyzed according to the concrete role they play: intermediary, competitor, ecosystem manager, data collector and possibly gatekeeper.

In conclusion, digital platforms and multilateral markets have profoundly changed the structure of competition. They allow for fast and efficient economic interactions, but they also create dependencies, network effects and concentration risks. For the topic of this paper, these are essential, because they show that digitalization transforms cooperation and competition into a relationship of interdependence. Companies cooperate with platforms to participate in the market, but they can be competitively affected by the rules imposed by the same platforms.

Data as a strategic economic resource

One of the most important transformations brought about by digitalization is the increase in the economic value of data. In the digital economy, data is no longer just ancillary information about consumers or business activity, but has become a strategic resource, capable of influencing the market position, competitive behavior and innovation capacity of economic operators. Companies that can collect,

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analyze and capitalize on large volumes of data gain a significant competitive advantage, as they can better understand user behavior, personalize services, anticipate demand and optimize commercial strategies.

In the traditional economy, competitive advantage was mainly determined by access to capital, labor, raw materials, physical infrastructure or distribution networks. In the digital economy, these elements remain important but are complemented by access to data. Data on consumer preferences, purchase history, online searches, location, time spent on a platform, social interactions or reactions to advertisements allow companies to build highly efficient business models. Thus, data becomes a form of information capital, and control over it can influence competitive relationships in the market.

The economic value of data is particularly visible in the case of digital platforms. They collect information from user interactions, transactions, searches, reviews, browsing behavior and the use of online services. The more users a platform has, the more data it collects, and the more data it collects, the more it can improve its services and attract new users. This creates a cumulative mechanism, in which the success of the platform generates more data, and data helps to strengthen the success of the platform.

This dynamic is important for competition law, as it can lead to the consolidation of dominant positions. An undertaking that has exclusive or privileged access to very large volumes of data can find it difficult for smaller operators to compete. They do not have the same information base, cannot personalize services to the same extent and cannot compete effectively with a platform that knows users' behavior in detail. In such situations, data can act as a barrier to entry.

The Competition Council highlighted, in its study on the effects of the use of Big Data on competition, that data can generate important efficiencies, but can also contribute to the creation or consolidation of market power. Access to data can improve the quality of services, reduce costs and enable innovation, but when data is concentrated in the hands of a small number of companies, competitive imbalances can arise. This observation is essential for the theme of the paper, as it shows that data can support both cooperation and competition, but can also become an instrument of economic control.[3]

[3] Competition Council, Study on the effects of the use of Big Data platforms on competition, 2021.

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First, data can drive competition. Businesses that use data effectively can develop better products, respond more quickly to consumer needs, and create innovative services. For example, an e-commerce platform can use data to recommend relevant products, reduce consumer search time, and optimize the delivery process. A transportation app can use traffic and location data to reduce waiting times. A streaming platform can analyze user preferences to personalize content. In these situations, data helps drive efficiency and improve consumer experience.

Secondly, data can facilitate cooperation. Businesses can share data to develop common services, improve cybersecurity, combat fraud, conduct research, or ensure the interoperability of systems. For example, in the field of cybersecurity, exchanging information on risks and cyberattacks can benefit the entire sector. In the field of transportation, aggregated data on traffic flows can enable the development of more efficient services. In the medical or educational field, the responsible use of data can contribute to innovation and increase the quality of services.

However, data can also have negative effects on competition. A first risk is that of unequal access to information. If a platform controls the data generated by the activity of traders and consumers, and these traders do not have access to the data relevant to their own activity, an information asymmetry is created. The platform knows in detail what products are sold, at what prices, to which categories of consumers and under what conditions, while traders depend on the information that the platform decides to make available. This asymmetry can influence the balance of power between the platform and professional users.

A second risk concerns the use of data to favor its own services. When a platform has a dual role, i.e. it is both an intermediary for other traders and a competitor of them, access to data can become a significant competitive advantage. The platform can observe which products are successful, what prices are charged, which categories of consumers buy certain products and what market trends are. If this information is used to develop or promote its own products, third-party traders may be disadvantaged. In such a situation, the cooperation between traders and the platform turns into an unbalanced relationship, in which one party can use the other's data to compete against it.

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A third risk is related to the exclusion of competitors. If access to certain data becomes indispensable for effective participation in the market, the undertaking that controls that data can limit competition by refusing access or by granting access under discriminatory conditions. This problem is comparable, to a certain extent, to situations where an undertaking controls essential infrastructure. In the digital economy, infrastructure is no longer just physical but can also be informational. The database, algorithm or digital ecosystem can become resources without which competitors cannot function effectively.

Conclusions:

From a competition law perspective, data must be analyzed in relation to the notion of market power. Traditionally, market power was assessed through market share, control over production, access to distribution or economic barriers to entry. In the digital economy, the analysis must also include access to data, the capacity to process it, the uniqueness of the information and the possibility for competitors to obtain similar data from other sources. If data is easily accessible, replicable or publicly available, the competitive risk is reduced. On the other hand, if data is exclusive, current, detailed and difficult to replicate, it can strengthen the power of a company.

This analysis is particularly relevant in relation to Art. 102 TFEU, which prohibits the abuse of a dominant position. Possession of large volumes of data is not illegal. A company may end up collecting data as a result of its market success, the quality of its services or consumer preference. The legal problem arises when this position is abused, for example by excluding competitors, unjustified refusal of access, self-favoring, imposing unfair conditions or exploiting the dependence of professional users. In this sense, data can become a tool through which the abuse of a dominant position manifest itself.

Data must also be analyzed in relation to Art. 101 TFEU, in particular when it is shared between competing companies. Data exchange may have legitimate purposes, but it may become problematic if it reduces competitive uncertainty. For example, sharing aggregated and historical information about market trends may be acceptable, while sharing recent, individualized and forward-looking information about prices, costs or customers may facilitate coordination. In the digital economy, this problem is magnified by the speed with which data can be transmitted and processed.

A particularly important aspect is the relationship between competition law and personal data protection. The General Data Protection Regulation, known as the

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GDPR, sets out rules on the processing of personal data, with the aim of protecting the rights of data subjects. Although the GDPR and competition law have different purposes, there is an increasingly clear link between them. The way in which a company collects and uses personal data can influence competition, especially when access to this data becomes a source of economic power. At the same time, reduced competition can affect the level of privacy protection, as users have no real alternatives to dominant services[4]

For example, if a dominant digital platform imposes extensive data collection requirements on users and they have no comparable alternatives on the market, their consent may become formal rather than real. This issue is not exclusively a matter of data protection law but may also have a competition dimension. The lack of competition may reduce the user's freedom to choose a service that is more protective of their data. Thus, the quality of competition can also be assessed by the level of data protection, not just by price.

The Digital Markets Act attaches particular importance to data, precisely because it represents one of the main sources of power for gatekeepers. The regulation aims to limit the misuse of data by large platforms and to ensure fairer access for professional users. Among the obligations imposed on gatekeepers are rules on access to data generated by the activity of professional users, prohibitions on combining certain data without consent and transparency obligations. These rules show that European law recognizes the central role of data in the functioning of digital markets[5]

In my opinion, data is one of the most important bridges between cooperation and competition in the digital age. On the one hand, it enables cooperation, as it can be used to develop more efficient services, for research, standardization or security. On the other hand, it intensifies the competitive struggle, as companies

[4] Art. 102 of the Treaty on the Functioning of the European Union

[5] Regulation (EU) 2016/679 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, known as the General Data Protection Regulation — GDPR.

- Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation) (Text with EEA relevance)
https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32016R0679

compete for access to users and for control of the information they generate. At the same time, data can distort competition when it is excessively concentrated or used to exclude other operators.

Data must therefore be seen as a strategic resource, not just a technical tool. It influences the way in which companies compete, the way in which they cooperate and the way in which economic power is formed in the digital environment. Competition law must include this reality in its analysis, without turning every accumulation of data into a legal problem, but also without ignoring the effects that control over data can have on market access, innovation and consumer freedom.

In conclusion, data is a fundamental economic resource of the digital economy. It can generate efficiency, innovation and better services, but it can also create barriers to market entry, economic dependence and unchallenged dominant positions. For this reason, data analysis is indispensable for understanding the market transformation through digitalization and for assessing the relationship between cooperation and competition in the digital environment.

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GENERATIVE AI AND THE GLOBALIZATION OF MARKETING: THE ROLE OF ENGLISH AS A LINGUA FRANCA IN AI-DRIVEN CAMPAIGNS

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Abstract

This paper examines the growing role of generative artificial intelligence (AI) in the transformation of global marketing communication, with particular emphasis on the role of English as a lingua franca in AI-driven campaigns. The study analyses how generative AI reshapes advertising and marketing practices through automated content generation, personalization, predictive analytics, and real-time consumer interaction. Special attention is devoted to the relationship between applied linguistics and AI-generated communication, emphasizing the importance of contextual appropriateness, cultural adaptation, emotional persuasiveness, and brand consistency in global marketing environments. The paper further explores the dominance of English in artificial intelligence systems, considering that most AI training datasets, technological infrastructures, academic publications, and digital communication platforms are predominantly English based. In addition, the study discusses ethical and societal challenges related to AI-supported marketing, including privacy protection, consumer manipulation, intellectual property, machine translation limitations, labour displacement, and accountability for algorithmic decision-making. The findings suggest that the

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future of global marketing will increasingly depend on balancing AI efficiency with human creativity, intercultural understanding, and ethical responsibility. Ultimately, the integration of applied linguistics, localization practices, and responsible AI governance is essential for developing more inclusive, meaningful, and culturally sensitive marketing communication in the digital era. Therefore, this paper examines the relationship between generative artificial intelligence, global marketing communication, and English as a lingua franca, while also considering the broader implications of applied linguistics and ethical AI governance.

Keywords: *generative artificial intelligence, global marketing, English as a lingua franca, applied linguistics, AI-driven communication*

JEL Calssification: M31, M37, O33, Z13

Introduction

Since the expansion of the British Empire in the eighteenth and nineteenth centuries, the English language has occupied a dominant role in international communication. Colonization was closely connected to political, economic, educational, and cultural influence, while the spread of English was reinforced through institutions, media, and technological development (Phillipson, 1992; Bhandari, 2022; Ullah & Akram, 2023;). During the twentieth century, the rise of Anglo-American political and economic power additionally strengthened the global role of English through the development of computers, the internet, and digital communication technologies. As noted by Zeng, Ponce, and Li (2023), the global commercial value of English has continuously increased due to international trade expansion and the efforts of English-speaking countries to promote the language worldwide.

Today, English functions as the primary language of international business, scientific communication, and technological innovation. Education, scholarly research, and science predominantly rely on English, while many leading technology companies, including Google, Meta, Microsoft, and Apple, primarily operate within English-speaking environments (Alluru, 2024, para. 3). Consequently, many emerging digital systems and AI technologies are trained predominantly on English-language datasets. Golpayegani (2025) estimates that a substantial proportion of AI training data is available in English, which significantly shapes the linguistic orientation of artificial intelligence systems. Although this dominance contributes to efficiency, standardization, and global

communication, it also raises concerns regarding cultural representation, linguistic diversity, and the exclusion of non-English-speaking audiences.

Generative artificial intelligence is increasingly transforming global marketing and advertising practices by enabling automated content creation, personalized communication, and real-time customer interaction (Cronin, 2024). Through natural language processing and machine learning, AI systems can analyze large volumes of data, generate marketing materials, and support strategic decision-making processes. As marketing becomes increasingly dependent on digital technologies, generative AI enables the integration of human creativity with machine capabilities, resulting in faster and more personalized campaigns (Lee et al., 2024). In addition, AI technologies contribute to customer relationship personalization, predictive analytics, and innovative marketing strategies, including dynamic pricing, growth hacking, and remarketing (Bezuidenhout et al., 2023).

The growing use of generative AI in marketing is particularly important because these systems can independently generate content based on large datasets while simultaneously improving customer engagement and operational efficiency (Chui et al., 2023). AI technologies support not only the automation of routine tasks, but also more complex decision-making processes and personalized customer interactions (Saumendra, 2024). In advertising, generative AI enables brands to automate repetitive activities, develop multiple creative solutions, and maintain communication consistency across global campaigns (Amoah et al., 2025). Furthermore, AI significantly influences the marketing mix as natural language processing and machine learning technologies contribute to content creation, analytics, and real-time performance monitoring (Anoop, 2021).

However, the implementation of AI technologies in global marketing is not without challenges. Companies must carefully integrate AI into existing systems and ensure that employees are adequately trained to use these technologies effectively, especially in environments where English functions as a global lingua franca (Kanbach et al., 2024). At the same time, increasing reliance on AI-generated communication introduces important linguistic, cultural, and ethical questions related to algorithmic bias, data privacy, cultural adaptation, and communication inclusivity. Therefore, this paper examines the relationship between generative artificial intelligence, global marketing communication, and English as a lingua franca, while also considering the broader implications of applied linguistics and ethical AI governance.

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Generative AI and the Transformation of Global Marketing

The development of generative artificial intelligence has significantly transformed marketing and advertising, as AI models today can generate text, images, and video content that resemble human communication (Hastomo et al., 2025). In this process, applied linguistics plays an important role because it helps explain how language functions in real communication contexts and how AI-generated content can be persuasive, clear, contextually appropriate, and culturally adapted. As generative AI becomes increasingly integrated into marketing activities, applied linguistics contributes to improving the coherence, emotional persuasiveness, and brand alignment of AI-generated communication (Vajjala, 2024). However, AI models may still misinterpret linguistic context, which can result in inaccurate or inappropriate marketing messages (Cronin, 2024). Therefore, it is important to examine which linguistic strategies can improve the effectiveness and cultural appropriateness of AI-generated marketing communication.

The development of artificial intelligence in global marketing creates significant opportunities for personalization, automation, and strategic decision-making, particularly when combined with the widespread use of English as a global language. AI technologies allow marketers to process data from multiple channels, more precisely target consumers on a global scale, automate routine activities, and obtain real-time insights. This contributes to more efficient use of advertising budgets, improved operational efficiency, and higher return on investment. Tools such as chatbots and personalized email marketing systems play an especially important role in improving customer experience because they enable faster communication and the delivery of relevant content tailored to customer needs (Hou, 2024). As a result, customer satisfaction increases and relationships between brands and consumers become stronger.

The connection between applied linguistics and generative AI is therefore highly important in the study of modern marketing and advertising. Such an interdisciplinary approach can contribute to the development of frameworks for evaluating and improving AI-generated marketing messages, ensuring that advertisements are persuasive, emotionally appropriate, and better adapted to target audiences. By combining methods from applied linguistics with the capabilities of generative AI, AI-generated content can become more aligned with human expectations, communication norms, and the broader demands of contemporary marketing environments.

Analytical AI and generative AI also perform complementary roles in modern marketing. Analytical AI is primarily associated with prediction, evaluation, and

decision-making based on existing data, even when information is incomplete. Its application is particularly visible in market segmentation, customer value assessment, pricing strategies, offer personalization, consumer behavior analysis, fraud detection, and sales opportunity evaluation. In contrast, generative AI has a stronger creative and textual function. It can generate marketing plans, advertisements, product descriptions, social media posts, sales scripts, responses to customer complaints, and summaries of customer reviews and feedback (Levantino, 2023). While analytical AI primarily answers the question "what is likely to happen?", generative AI more often addresses "what can we create?" and "how can a message be formulated?". Their combined use enables marketing professionals to simultaneously improve decision-making efficiency and the creative quality of communication.

English as a Lingua Franca in AI-Driven Marketing Communication

"From the vast digital encyclopaedia Wikipedia to the countless academic journals and research papers published each year, English is the primary medium for storing and sharing human knowledge across borders and disciplines. Its dominance in business, science, technology, and digital media has further cemented its position as the de facto language of global communication" (Machajewski, 2024, para.4). The historical spread of English, initially associated with British colonial expansion and later reinforced through Anglo-American political, technological, and economic influence, has contributed to its current position as the dominant language of digital communication and artificial intelligence systems.

Today, English functions as the primary language of academic research, technological innovation, internet communication, and AI development. Since a substantial amount of scientific literature, online content, and AI training data is available in English, AI systems are predominantly trained within English-language environments. Schneider (2022) argues that the interaction between monolingual digital ideologies and algorithmic systems contributes to the stronger performance of AI tools in English compared to languages that are typologically more distant from it. As AI technologies continue to evolve, English is likely to maintain its dominant position because many existing algorithms and datasets are already heavily English-oriented.

The rapid development of artificial intelligence has additionally increased the importance of English-language proficiency, particularly in areas such as natural language processing, AI communication, and digital transformation (Arshad,

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2025). Furthermore, many international technology companies, including Google, Microsoft, and IBM, operate primarily in English-speaking professional environments, making English-language competence increasingly valuable in fields such as artificial intelligence, cybersecurity, and data science (Russell & Norvig, 2021; Arshad, 2025;). As a result, English has become strongly associated with technological progress, international communication, and digital innovation.

The global spread of English is also reflected in the vocabulary commonly used in AI and digital communication. Expressions such as "prompt," "AI-generated," "AI-powered," "cloud computing," and "output" have become internationally recognizable terms. At the same time, linguistic hybridization has contributed to the emergence of mixed language forms such as Spanglish, Hinglish, Taglish, and Singlish (Alakbarova, 2025). Hamid (2023) notes that non-standard varieties of English often remain less visible in formal academic and media environments, despite their increasing presence in global communication practices.

Artificial intelligence also plays an important role in language learning, academic writing, and translation. AI-supported tools can adapt lessons to individual needs, improve pronunciation, and facilitate multilingual communication. Translation technologies such as Google Translate and DeepL have significantly improved the accessibility of intercultural communication, particularly for languages that were previously more difficult to translate accurately into English (AlAfnan, 2025). In addition, AI systems contribute to operational efficiency because they can continuously process information, automate repetitive tasks, and support decision-making processes across various professional fields. In marketing, for example, AI technologies are increasingly used in predictive marketing strategies to analyze consumer behavior and anticipate customer preferences (Naz & Kashif, 2025).

The value of AI-supported global marketing campaigns is particularly evident in their ability to create content that is not only grammatically accurate, but also culturally adapted to local audiences. Such approaches contribute to the creation of messages that are persuasive, relevant, and acceptable across different market contexts. Consequently, AI should not replace human expertise but rather complement it by supporting localization, cultural adaptation, and multilingual communication practices. Localization teams therefore play a highly important role in data curation and quality control. Since AI systems depend heavily on training datasets, localization experts can help ensure that AI-generated outputs remain culturally appropriate, contextually accurate, and linguistically sensitive. Their

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collaboration with AI developers contributes to more precise communication that is better adapted to diverse languages, cultures, and markets.

Although AI can significantly facilitate intercultural marketing communication, its use within the context of English as a lingua franca must be carefully designed (Kankaanranta & Räisänen, 2025). AI systems should support flexibility, inclusion, and cultural diversity rather than contribute to excessive standardization or the erasure of local communication practices. In this way, AI technologies can improve understanding between individuals from different linguistic and cultural backgrounds while also supporting more effective global communication.

The integration of generative artificial intelligence into marketing strategies enables faster and more flexible content creation, stronger customer engagement, and more cost-effective advertising solutions, particularly for small and medium-sized enterprises (Reisenbichler et al., 2022). Research further shows that generative AI can improve both the quality and efficiency of marketing communication by generating customized promotional materials and maintaining relevant brand communication in rapidly changing markets (Liu-Thompkins et al., 2022). In addition, consumers often respond positively to AI-supported communication tools that demonstrate empathy and personalization, while technologies such as ChatGPT, GitHub Copilot, and Gemini continue to transform the ways marketers create and adapt customer messages (Fui-Hoon Nah et al., 2023).

Linguistic, Cultural, and Ethical Challenges

Despite the advantages associated with AI-supported communication and the use of English as a lingua franca, important linguistic, cultural, and ethical challenges remain. One of the primary concerns is that the dominance of English in global communication does not always promote inclusion and may contribute to linguistic inequality, particularly in academia, technology, and international business environments (Navarro et al., 2022). The prioritization of English-language knowledge and publication may reduce the visibility of other languages and communication traditions, despite the importance of linguistic diversity and multilingual scholarship.

In this context, some scholars describe the dominance of English as a form of "colonialingualism," referring to the continued prioritization of dominant colonial knowledge systems in English-language education and communication (Meighan, 2023, *passim*). Concerns have also been raised that the widespread use of English in education, science, and digital communication may contribute to language shift

processes in which local languages become increasingly marginalized. As a result, bilingualism and multilingualism are often emphasized as important strategies for preserving linguistic and cultural diversity (Alakbarova, 2025).

Recent discussions surrounding the decolonization of academic discourse have further emphasized the importance of creating more inclusive educational and communication environments (Omodan & Marongwe, 2024). These discussions are particularly relevant in the context of artificial intelligence because AI systems are trained on existing datasets, publications, and digital communication practices that may already contain linguistic and cultural biases. Guido (2025) notes that AI systems often prioritize mainstream language norms and standardized English varieties, while localized forms of communication and cultural nuances remain less visible in AI-generated outputs. Consequently, AI systems may unintentionally reproduce existing inequalities and reinforce dominant cultural perspectives.

The rapid development of artificial intelligence also introduces important ethical challenges related to privacy, data protection, and intellectual property. AI-supported systems increasingly rely on large-scale data collection and automated decision-making processes, particularly in areas such as digital marketing, e-commerce, and customer analytics. Ensuring the confidentiality, integrity, and security of personal and financial data therefore becomes a major concern for organizations using AI technologies (Guntupalli & Rudramalla, 2023; Rezaei et al., 2026).

Questions regarding ownership and authorship also become increasingly relevant as AI systems contribute to content creation. AI-generated advertisements, music, visual materials, and texts often incorporate patterns derived from existing human-created content, creating uncertainty regarding intellectual property rights and accountability (Rhem, 2021; Rezaei et al., 2026). In industries such as music and marketing, concerns continue to emerge regarding the use of voices, creative materials, and stylistic elements generated or replicated through AI technologies.

Machine translation technologies present additional linguistic and ethical limitations. Although AI-supported translation tools significantly improve communication efficiency, they often struggle with cultural nuances, idiomatic expressions, semantic ambiguity, and context-dependent meanings (Wei, 2020). Consequently, concerns remain regarding translation accuracy, cultural bias, and the potential devaluation of human linguistic expertise. Questions of accountability also arise when AI-generated translations produce inaccuracies or misleading interpretations.

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Another important concern relates to the broader social consequences of AI-driven automation. The increasing replacement of repetitive human tasks with AI technologies raises concerns regarding employment opportunities and labour displacement. For this reason, many scholars emphasize the importance of international cooperation, interdisciplinary collaboration, and ethical governance in AI development (ÓhÉigeartaigh et al., 2020). Ryan et al. (2024) further argue that understanding AI-related challenges requires examining not only individual ethical issues, but also the broader structural and societal mechanisms connected to technological development.

The use of artificial intelligence in global marketing is therefore increasingly examined from an ethical perspective, particularly regarding privacy, consumer manipulation, and algorithmic bias. Personalized advertising and market segmentation often rely on extensive consumer profiling and behavioral monitoring, raising important questions related to informed consent and transparency (Trunk et al., 2020; Al-Shaikh & Hanaysha, 2023). Predictive algorithms may also unintentionally reinforce social inequalities or contribute to unfair targeting practices. Similar concerns appear in facial recognition technologies and emotion recognition systems used in marketing and retail environments, where algorithmic bias may negatively affect certain demographic groups (Sarker, 2022).

Consequently, the responsible use of AI in marketing requires clear regulatory frameworks, transparent data practices, accountability for algorithmic decisions, and the incorporation of inclusivity principles into AI system design. Companies that implement AI technologies responsibly may strengthen consumer trust while simultaneously reducing reputational and regulatory risks (Popović Šević et al., 2025). Although AI has significantly improved marketing efficiency, customer interaction, and service personalization, concerns remain regarding the transparency and authenticity of AI-supported communication. Consumers who become aware that they are interacting primarily with automated systems may experience discomfort or distrust, which can negatively affect brand perception (Davenport et al., 2020). For this reason, ethical considerations will remain central to the future development of AI-supported marketing communication.

Implications for Marketing Practice and Future Development

The advertising industry has undergone significant transformation in recent years due to rapid technological development and changing consumer behavior. Traditional advertising models, which relied on standardized messages aimed at

broad audiences and pre-defined campaigns, are increasingly being replaced by more flexible and data-driven approaches tailored to individual users using artificial intelligence technologies (Guo & Jiang, 2023). In this context, generative AI further expands the possibilities of advertising by enabling the faster creation of diverse forms of content, audience analysis, and real-time campaign adaptation on a global scale, often supported by English as a lingua franca.

One of the most important transformations brought by generative AI is visible in the language and creative expression of advertisements. AI systems that rely on natural language processing and principles of applied linguistics can generate persuasive marketing messages, adapting communication styles to different target groups, and even mimicking the recognizable tone and identity of specific brands (Vajjala, 2024). Such technologies allow companies to produce large amounts of marketing content more efficiently while simultaneously maintaining consistency across different communication channels and international markets.

Generative artificial intelligence has also significantly accelerated the process of global marketing communication. AI-supported systems can generate advertisements, product descriptions, social media campaigns, customer service responses, and promotional materials within a very short period. This allows companies to react more quickly to market changes, consumer preferences, and emerging digital trends. In addition, AI enables more detailed audience segmentation and personalization, which contributes to stronger customer engagement and improved communication effectiveness.

At the same time, excessive reliance on AI technologies may lead to certain limitations in creative communication. Although AI can successfully reproduce patterns that were previously effective, it often lacks the intuitive, emotional, and imaginative depth associated with human creativity (Kumar et al., 2024). Human communication frequently depends on cultural understanding, emotional intelligence, humour, empathy, and spontaneous creativity, which remain difficult for AI systems to replicate fully. Consequently, advertisements created exclusively through automated systems may sometimes appear repetitive, overly standardized, or emotionally detached.

For this reason, a combined approach increasingly emerges as the most effective solution in contemporary marketing practice. In such an approach, AI supports human creativity rather than replacing it entirely. Human professionals continue to play a crucial role in strategic thinking, emotional communication, cultural interpretation, and ethical decision-making, while AI contributes through automation, personalization, and data analysis. The collaboration between human

expertise and AI technologies therefore enables the creation of more balanced, innovative, and contextually appropriate marketing strategies.

Conclusion

English, particularly its American variant, currently represents the dominant language of artificial intelligence systems and digital communication. Although this dominance contributes to the global accessibility and operational efficiency of AI technologies, it also raises important concerns regarding cultural diversity, linguistic inclusion, and representation. The prioritization of English-language datasets and communication standards may reduce the visibility of other languages and limit participation in global knowledge-sharing processes for users who do not possess English-language proficiency. As Bhandari (2022) notes, such discourse may function as a form of power that reinforces the hegemony of dominant cultural and linguistic systems.

The continuing reliance of AI systems on standardized English-language models may therefore contribute to reduced linguistic diversity and insufficient recognition of cultural nuances. Ivanyan (2026) emphasizes that although AI-powered communication tools can efficiently address linguistic and professional communication needs, important cultural and contextual limitations remain. For this reason, it is essential that future AI development incorporates greater sensitivity toward multilingualism, localization, and intercultural communication practices.

At the same time, the rapid expansion of artificial intelligence introduces numerous ethical challenges related to data protection, intellectual property, accountability, labour displacement, and algorithmic bias. One of the most important steps at this stage is the recognition of existing weaknesses and potential ethical risks associated with AI technologies. Only through continuous international cooperation, transparent regulation, and interdisciplinary collaboration will it be possible to establish legal and ethical frameworks capable of protecting both human-created and AI-generated content. Such cooperation is especially important because effective global marketing strategies continue to depend heavily on cultural idiosyncrasies, local communication practices, and audience-specific expectations.

The intersection of generative artificial intelligence and applied linguistics is increasingly transforming the way marketing communication is created, adapted, and distributed. AI technologies enable faster content generation, more precise personalization, and more efficient communication between brands and consumers.

Through advanced natural language processing techniques, AI-generated content can be adapted more effectively to context, culture, and the needs of different target audiences. At the same time, the integration of applied linguistics contributes to improving clarity, contextual appropriateness, emotional persuasiveness, and intercultural sensitivity in AI-generated marketing communication.

Nevertheless, despite these advantages, important challenges remain. Linguistic bias, ethical concerns, data security, algorithmic transparency, and regulatory uncertainty continue to represent central issues in the future development of AI-supported marketing. Therefore, AI technologies must be implemented responsibly, transparently, and inclusively. The future development of multimodal AI systems, capable of integrating text, images, audio, and video, will likely play an especially significant role in creating more interactive, engaging, and persuasive forms of advertising communication.

In the coming years, generative artificial intelligence will continue to reshape global marketing strategies and consumer interaction. However, its successful development will depend not only on technological innovation, but also on ethical governance, cultural awareness, and cooperation between researchers, companies, policymakers, and localization experts. The integration of applied linguistics and AI holds substantial potential for improving digital marketing because it can support more natural, meaningful, and contextually appropriate communication between brands and consumers.

Ultimately, the success of future global communication will depend on the ability of organizations to combine AI efficiency with human understanding of culture, language, and context. The most successful companies will likely be those that use AI as a complement to human expertise rather than as a complete replacement for it. In this way, localization and globalization teams may become a crucial connection between technology and people, ensuring that marketing messages not only cross linguistic boundaries, but also retain cultural relevance and meaningful communication for diverse audiences worldwide.

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DO ALGORITHMS FLATTEN LANGUAGE? GENERATIVE AI AND THE EROSION OF LINGUISTIC IDENTITY IN THE CONTEXT OF DIGITAL ECONOMY AND GLOBAL COMMUNICATION MARKETS

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Abstract:

Generative artificial intelligence is rapidly transforming the global economy and redefining how businesses communicate across borders. Yet beyond efficiency and automation, a critical question emerges: what happens to the languages through which individuals construct meaning and identity?

This study explores the intersection of digital transformation and bilingual identity, arguing that AI-driven communication is far from neutral. By privileging dominant linguistic patterns and encouraging standardization, generative AI risks eroding linguistic diversity—particularly in bilingual and multilingual contexts, where identity is fluid, negotiated, and context-dependent.

Drawing on insights from sociolinguistics and digital transformation studies, the talk examines how AI reshapes language practices such as code-switching, cultural expression, and self-representation. It also considers the

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implications for global business environments, where automated communication tools may expand reach and efficiency while simultaneously diluting linguistic nuance and cultural authenticity.

The study ultimately advocates for a broader understanding of sustainability in digital transformation—one that extends beyond economic and technological dimensions to include linguistic and cultural sustainability. In doing so, it highlights the need for more inclusive and context-aware approaches to AI-mediated communication in an increasingly interconnected world.

Keywords: *generative artificial intelligence, digital transformation, bilingualism, linguistic identity, language standardization*

JEL Classification: O33, O34, Z13

Introduction

The accelerated development of digital technologies has profoundly reshaped contemporary communication, redefining not only economic and business practices, but also the ways in which individuals construct, negotiate, and express identity. Within this broader process of digital transformation, generative artificial intelligence (AI) occupies a central position, increasingly mediating human interaction through automated translation systems, conversational agents, predictive text generation, and algorithmically assisted communication. Although current debates surrounding generative AI primarily emphasize efficiency, productivity, and scalability, less attention has been devoted to its sociolinguistic and cultural implications, particularly regarding the preservation of linguistic diversity and the expression of bilingual identity.

Language represents far more than a neutral instrument of communication. It functions as a symbolic system through which individuals construct social belonging, cultural affiliation, and personal identity (Norton, 2013). In bilingual and multilingual contexts, identity becomes especially dynamic, as speakers continuously navigate between linguistic systems, cultural norms, and communicative expectations. Bilingualism is therefore not limited to the coexistence of two linguistic competencies; rather, it reflects an ongoing process of identity negotiation shaped by social context, cultural memory, emotional affiliation, and interpersonal interaction (Grosjean, 2010).

Importantly, linguistic identity is not constructed exclusively through verbal language. Communication also relies on a complex network of paralinguistic and

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non-verbal elements, including intonation, rhythm, pauses, facial expressions, gestures, interpersonal distance, and culturally specific forms of emotional display. These elements personalize discourse and differentiate communicative practices across languages and cultures. For instance, Mediterranean cultures, including Romanian, Italian, or Spanish communicative environments, frequently employ expressive gestures, dynamic intonation, and greater emotional intensity during interaction, whereas Northern European communicative styles may privilege restraint, reduced gestural involvement, and greater emphasis on verbal precision. Similarly, bilingual speakers often modify not only vocabulary and syntax when shifting between languages, but also gesture patterns, tone, humor, and conversational behavior, adapting their communicative identity to different cultural frameworks.

Research in sociolinguistics and intercultural communication has demonstrated that code-switching—the alternation between two or more languages within the same interaction—often serves important identity-related functions rather than representing merely a linguistic strategy (Gumperz, 1982). A bilingual speaker may choose one language to express intimacy, emotional proximity, or cultural belonging, while another may be associated with professionalism, academic discourse, or social prestige. In this sense, bilingual communication reflects a layered and context-dependent identity construction process in which language becomes inseparable from cultural self-representation.

The emergence of generative AI introduces a new dimension into this relationship between language and identity. Large language models are trained predominantly on extensive datasets that privilege dominant languages, standardized grammatical structures, and globally recurrent communicative patterns. As a result, AI-generated discourse often favors uniformity, fluency, and predictability, potentially reducing linguistic variation and minimizing culturally specific communicative nuances. While such systems undoubtedly facilitate cross-cultural communication and global accessibility, they may also contribute to what can be described as the algorithmic standardization of language.

This process raises significant concerns for bilingual and multilingual communities. If algorithmically mediated communication increasingly privileges standardized forms of expression, hybrid linguistic practices such as code-switching, dialectal variation, culturally embedded humor, or non-standard identity markers may gradually become marginalized or corrected. Moreover, because digital communication increasingly shapes professional interaction, educational environments, and global business activities, the influence of generative AI extends

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beyond language itself to broader processes of cultural representation and identity formation.

Consequently, digital transformation cannot be regarded as linguistically or culturally neutral. In the absence of a sustainable and inclusive approach, technological progress risks eroding linguistic diversity by encouraging homogenized communicative models aligned with dominant linguistic norms. This issue becomes particularly relevant within global business environments, where AI-driven communication tools are increasingly employed to optimize customer interaction, branding, translation, and intercultural communication. Although such technologies improve efficiency and global reach, they may simultaneously dilute cultural specificity and linguistic authenticity.

Against this background, the present paper explores the relationship between generative AI, bilingualism, and linguistic identity within the broader framework of sustainable digital transformation. Drawing on perspectives from sociolinguistics, intercultural communication, and digital transformation studies, the paper argues that AI-mediated communication is not merely a technological phenomenon, but also a cultural and linguistic one. More specifically, it examines how processes of linguistic standardization associated with generative AI may reshape bilingual identity, alter communicative practices, and contribute to the gradual erosion of linguistic diversity. Finally, the study proposes the concept of linguistic sustainability as an essential dimension of responsible digital transformation, emphasizing the need to preserve cultural and linguistic plurality in increasingly AI-mediated societies.

The paper makes three main contributions: (1) it conceptualizes the relationship between generative AI and bilingual identity; (2) it introduces the notion of algorithmic flattening of language as a process of communicative standardization associated with AI-mediated discourse; and (3) it proposes linguistic sustainability as a critical dimension of responsible digital transformation.

Methodological Approach

This paper adopts a conceptual and interdisciplinary approach situated at the intersection of sociolinguistics, intercultural communication, and digital transformation studies. Rather than conducting quantitative empirical measurement, the study develops a theoretical and discursive analysis of AI-mediated communication through illustrative bilingual discourse examples and critical examination of recent literature on generative artificial intelligence, language standardization, and identity construction. The methodological

framework combines conceptual analysis with bilingual Romanian-English examples in order to explore how generative AI systems may reshape communicative practices, code-switching, and linguistic identity.

Theoretical framework

The relationship between language, identity, and technology has become increasingly complex in the context of accelerated digital transformation and the emergence of generative artificial intelligence (AI). Contemporary communication is no longer shaped exclusively by human interaction, but also by algorithmic systems capable of generating, translating, predicting, and reformulating discourse. As communication technologies become embedded in everyday social and professional practices, scholars have begun to examine not only their functional efficiency, but also their impact on linguistic diversity, cultural representation, and identity construction.

Within this context, three interconnected concepts become particularly relevant for understanding bilingual communication in the age of AI: adaptation, standardization, and identity resilience. Together, these concepts provide a theoretical lens through which the sociolinguistic consequences of AI-mediated communication may be explored.

Language, identity, and communication

Language has long been understood as a central component of identity construction. Sociolinguistic research emphasizes that identity is not fixed or static, but continuously negotiated through discourse and social interaction (Bucholtz & Hall, 2005). Individuals construct belonging through linguistic choices, communicative styles, accents, cultural references, and interactional practices that signal affiliation with particular communities and cultural frameworks.

For bilingual speakers, this process becomes even more dynamic. Bilingualism involves not merely the coexistence of two linguistic systems, but also the ability to navigate multiple cultural realities simultaneously (Grosjean, 2010). Code-switching, for example, often functions as an identity marker rather than simply a communicative strategy. A speaker may alternate between languages to express intimacy, authority, humor, solidarity, or cultural belonging depending on context and audience (Gumperz, 1982).

Importantly, communication extends beyond verbal language. Non-verbal and paralinguistic elements—including gestures, facial expressions, rhythm, silence, eye contact, and emotional expressivity—contribute significantly to the personalization of discourse and differ substantially across cultures. Hall (1976)

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argues that cultures vary not only in linguistic systems, but also in communicative behavior and contextual interpretation. For instance, expressive gesturing and overlapping speech patterns may signal engagement and emotional involvement in Mediterranean communicative cultures, while in Northern European contexts similar behaviors may be interpreted as interruption or excessive emotionality.

Consequently, linguistic identity emerges through a complex interaction between verbal language, embodied communication, and cultural context. The increasing mediation of communication through AI technologies therefore raises critical questions regarding the preservation of this complexity.

Communication in the Age of Artificial Intelligence

Recent studies suggest that AI-mediated communication is reshaping the structure and dynamics of human interaction. Generative AI systems such as ChatGPT, automated translation platforms, and predictive text technologies are increasingly influencing how individuals write, speak, and interact across languages and cultures. According to Floridi and Chiriatti (2020), AI should not be viewed merely as a technological tool, but as a transformative communicative actor capable of influencing social behavior and epistemic practices.

Similarly, Turkle (2015) argues that digital technologies increasingly mediate interpersonal interaction in ways that may reduce spontaneity and emotional complexity. Although Turkle's work predates the widespread adoption of generative AI, her observations regarding technologically mediated communication remain highly relevant. As communication becomes optimized for speed, clarity, and efficiency, forms of expression associated with ambiguity, hybridity, and emotional nuance may gradually become marginalized.

Current research on large language models also highlights the issue of linguistic asymmetry. Recent discussions surrounding foundation models further emphasize that large-scale AI systems are not merely technological tools, but infrastructural models capable of shaping communication practices, social interaction, and cultural representation on a global scale (Bommasani et al., 2021).

Because generative AI systems are predominantly trained on datasets dominated by English and other globally powerful languages, they tend to privilege standardized linguistic forms and dominant cultural conventions (Bender et al., 2021). As a result, algorithmically generated communication often reproduces normative language patterns while minimizing regional, hybrid, or culturally specific forms of expression.

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This phenomenon may be particularly significant for bilingual and multilingual speakers. AI systems frequently "correct" non-standard structures, simplify code-switching practices, or prioritize fluency over cultural nuance. While such mechanisms improve intelligibility and communicative efficiency, they may also contribute to the gradual homogenization of linguistic expression.

Adaptation and algorithmic standardization

Adaptation has always been a defining characteristic of human communication. Speakers naturally modify vocabulary, tone, syntax, and communicative behavior according to social context and audience expectations. However, in AI-mediated environments, adaptation increasingly occurs not only between humans, but also between humans and algorithms.

Digital communication platforms implicitly encourage linguistic standardization through predictive text, autocorrect systems, automated translation, and AI-generated recommendations. As users interact repeatedly with these systems, communicative practices may gradually align with algorithmically preferred structures. This process reflects what could be described as algorithmic standardization: the normalization of linguistic forms through repeated technological mediation.

Standardization is not inherently negative. Historically, standardized language has facilitated institutional communication, education, and international interaction. Nevertheless, scholars warn that excessive standardization may reduce linguistic diversity and suppress culturally specific forms of expression (Piller, 2016). In digital environments, this tendency becomes amplified because AI systems are optimized for coherence, predictability, and high-frequency linguistic patterns.

An illustrative example can be observed in automated translation systems, which frequently struggle with culturally embedded humor, idiomatic expressions, or emotionally nuanced bilingual discourse. A bilingual Romanian-English speaker, for instance, may intentionally alternate languages within a sentence to express intimacy, irony, or cultural belonging. Yet AI-generated translations often eliminate such hybridity in favor of grammatical uniformity and semantic clarity, thereby flattening the cultural complexity of the original message.

Similarly, AI-generated professional communication increasingly promotes globally standardized discourse patterns associated with corporate English. Expressions of local identity, rhetorical particularities, or culturally specific interactional styles may therefore become progressively diluted in international business environments.

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Identity resilience and linguistic sustainability

Despite these tendencies toward homogenization, linguistic identity demonstrates significant resilience. Scholars in sociolinguistics emphasize that speakers actively negotiate and resist dominant linguistic norms through creative language practices, hybrid discourse forms, and the preservation of culturally embedded communicative behaviors (Canagarajah, 2013).

Identity resilience refers to the capacity of individuals and communities to maintain meaningful cultural and linguistic self-representation despite pressures toward standardization. In bilingual contexts, resilience often manifests through deliberate code-switching, preservation of minority language practices, and the continued use of culturally specific communicative forms even within globalized digital environments.

From this perspective, generative AI does not necessarily determine linguistic outcomes in a deterministic manner. Rather, its impact depends on how technologies are designed, implemented, and culturally regulated. This consideration introduces the broader concept of linguistic sustainability, understood as the preservation of linguistic diversity and cultural plurality within digitally mediated societies.

Linguistic sustainability extends the notion of sustainable digital transformation beyond economic growth and technological innovation. It suggests that responsible AI development should also consider issues of linguistic inclusion, minority language representation, and cultural diversity. As UNESCO (2003) emphasizes, linguistic diversity constitutes an essential component of intangible cultural heritage and social sustainability.

Consequently, the challenge posed by generative AI is not merely technological, but profoundly cultural and ethical. The central question is no longer whether AI can successfully imitate human language, but whether increasingly algorithmic communication systems can preserve the diversity, hybridity, and identity-related functions that characterize human interaction across cultures and languages.

Human vs. Machine Communication: Adaptation, Humanization, and the Negotiation of Linguistic Identity

The increasing integration of generative artificial intelligence into everyday communication has transformed the relationship between human and machine discourse. Unlike earlier digital systems that functioned primarily as informational tools, contemporary AI models simulate conversational interaction through adaptive, context-sensitive, and increasingly human-like language production. As a

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result, communication is no longer exclusively interpersonal; rather, it increasingly occurs within hybrid communicative environments in which humans and algorithms mutually influence linguistic behavior.

This section explores the differences and convergences between human and machine communication, focusing on processes of adaptation, standardization, and "humanization" in AI-mediated discourse. Particular attention is devoted to how human speakers adapt their communication styles when interacting with AI systems and, conversely, how generative AI attempts to imitate human communicative patterns. The analysis further examines the implications of these processes for bilingual identity and linguistic authenticity.

Human Communication: Context, Emotion, and Identity

Human communication is inherently contextual, embodied, and culturally situated. Meaning is not produced exclusively through lexical or grammatical structures, but also through intonation, pauses, gestures, irony, emotional resonance, and shared sociocultural knowledge (Gumperz, 1982). Human discourse frequently tolerates ambiguity, contradiction, and incompleteness because communication relies heavily on contextual interpretation and interpersonal relationships.

For bilingual speakers, communication additionally functions as a dynamic process of identity negotiation. Language choice often reflects emotional proximity, social positioning, cultural affiliation, or power relations (Norton, 2013). A bilingual Romanian-English speaker, for example, may alternate between languages depending on communicative intent:

"I understand the report, dar parcă nu transmite exact ce simțim noi ca echipă."

In this example, the shift from English to Romanian does not reflect linguistic deficiency, but rather emotional and cultural specificity. The Romanian segment introduces nuance, intimacy, and shared contextual understanding that may be difficult to reproduce through direct translation.

Similarly, human communication frequently incorporates culturally specific gestures and expressive patterns. In many Eastern and Southern European cultures, facial expressivity, overlapping speech, and emphatic gestures contribute to communicative authenticity and relational closeness. Such elements are often inseparable from the meaning itself.

Machine Communication: Fluency, Predictability, and Standardization

In contrast, AI-generated communication prioritizes coherence, fluency, and statistical predictability. Generative AI systems produce language by identifying

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probabilistic patterns within massive datasets, favoring structures that appear frequently and align with standardized communicative norms (Bender et al., 2021). Although these systems can imitate emotional language and conversational rhythm, they do not possess lived cultural experience, embodied interaction, or affective intentionality.

Consequently, machine-generated communication tends to reduce ambiguity and hybrid linguistic forms in favor of semantic clarity. For instance, when bilingual or culturally nuanced discourse is processed through AI systems, non-standard expressions are frequently normalized:

Human bilingual discourse:
"Mi-a zis că everything is fine, dar tonul lui era complet diferit."
AI-standardized version:
"He told me that everything was fine, but his tone sounded different."

Although grammatically correct, the AI-generated version eliminates the natural code-switching that conveyed social familiarity and bilingual identity in the original utterance. The communicative efficiency is preserved, but the cultural and relational texture becomes flattened.

This tendency reflects broader concerns regarding algorithmic standardization. Because AI systems are optimized for globally intelligible communication, they often privilege dominant linguistic norms while minimizing local, hybrid, or culturally specific variations (Piller, 2016). In professional environments, this process may gradually contribute to the homogenization of communication styles across cultures and languages.

Human Adaptation to AI Communication

An increasingly visible phenomenon in digital communication is the adaptation of human language to algorithmic expectations. Users often modify their communicative behavior when interacting with AI systems, predictive text interfaces, or automated customer-service tools.

Research suggests that humans tend to simplify syntax, reduce ambiguity, avoid culturally specific references, and adopt more standardized linguistic structures when communicating with machines (Guzman & Lewis, 2020). This process resembles what some scholars describe as "machine-oriented communication," in which speakers unconsciously optimize language for algorithmic interpretation.

Examples of such adaptation can be observed in professional communication:
Human-to-human email:

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"Hi, I was wondering if maybe we could revisit the proposal when you have a bit of time."

Human-to-AI optimized prompt:

"Summarize the proposal and identify weaknesses."

The second example reflects increased directness, efficiency, and structural simplification. While effective for machine processing, repeated exposure to such interaction patterns may gradually influence broader communicative habits.

This adaptation becomes particularly significant in bilingual contexts. Speakers may avoid code-switching, dialectal forms, or culturally embedded expressions because they anticipate that AI systems may misunderstand, mistranslate, or "correct" them. Consequently, linguistic behavior increasingly aligns with the communicative logic of algorithms.

Machine adaptation to human communication: The rise of humanization

At the same time, generative AI systems are becoming progressively more "humanized." Developers intentionally design conversational AI to simulate empathy, natural conversational flow, humor, emotional responsiveness, and relational interaction. This process of humanization aims to increase trust, accessibility, and user engagement.

According to Nass and Moon (2000), humans naturally apply social expectations to technological systems, responding to computers and AI interfaces as if they were social actors. Contemporary AI intensifies this tendency by incorporating conversational markers associated with human interaction, including politeness strategies, emotional validation, and adaptive tone modulation.

For example, AI-generated responses increasingly imitate emotionally supportive communication:

Standard informational response:

"Your request cannot be processed."

Humanized AI response:

"I understand this situation may be frustrating. Let's try another solution together."

Such linguistic strategies create the impression of empathy and relational understanding, even though the AI system does not possess emotional consciousness.

Humanization also appears in multilingual AI communication. Many conversational systems now attempt to preserve informal expressions, emojis, or

culturally familiar phrasing to create a sense of authenticity. However, this imitation remains fundamentally performative rather than experiential. AI can reproduce patterns associated with cultural communication, but it cannot fully replicate the embodied and socially situated dimensions of human identity.

Humanization, authenticity, and identity Resilience

The convergence between human and machine communication raises important questions regarding authenticity and linguistic identity. As humans adapt to AI systems and AI simultaneously imitates human interaction, communication increasingly occupies a hybrid space where distinctions between natural and algorithmic discourse become less visible.

This phenomenon may contribute to what could be termed communicative convergence: the gradual alignment of human and machine linguistic practices around standardized norms of clarity, efficiency, and predictability. While such convergence facilitates global interaction, it may also reduce linguistic diversity and weaken culturally specific communicative forms.

Nevertheless, bilingual speakers frequently demonstrate significant identity resilience by preserving hybrid communication practices despite technological pressures toward standardization. Code-switching, culturally specific humor, regional expressions, and embodied communicative behaviors continue to function as markers of belonging and resistance against homogenization (Canagarajah, 2013).

In this context, the concept of humanized communication acquires a double meaning. On the one hand, AI systems are increasingly humanized through simulated empathy and conversational adaptability. On the other hand, preserving genuinely human communication may require resisting excessive algorithmic standardization in order to maintain linguistic diversity, emotional nuance, and cultural specificity.

The challenge for sustainable digital transformation therefore extends beyond technological innovation alone. It involves ensuring that AI-mediated communication remains compatible with the plurality of human identities and communicative traditions rather than reducing them to globally standardized linguistic models.

Conceptualizing the Differences Between Human and AI Communication

Understanding the distinction between human and AI communication requires moving beyond purely technological definitions and examining communication as a sociocultural, emotional, and identity-related process. While generative AI

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systems can simulate conversational interaction with increasing fluency, human communication remains fundamentally grounded in lived experience, emotional intentionality, embodiment, and cultural memory. The differences between the two forms of communication are therefore not merely technical, but epistemological and relational.

This paper proposes a conceptual framework based on five major dimensions that distinguish human communication from AI-generated communication: intentionality, embodiment, contextuality, emotional authenticity, and identity construction. Together, these dimensions illustrate how human discourse functions not only as information exchange, but also as a mechanism of social belonging and cultural self-representation.

1. Intentionality: Meaning vs. Prediction

Human communication is intentional. Speakers communicate with purposes shaped by emotions, relationships, memories, values, and social expectations. Meaning emerges not only from words themselves, but also from what speakers intend to express beyond explicit language.

AI communication, by contrast, is fundamentally predictive rather than intentional. Generative AI systems produce responses based on statistical probabilities derived from large datasets rather than subjective understanding or lived experience (Bender et al., 2021). AI does not "mean" in the human sense; it generates linguistically plausible outputs.

For example:

Human expression:

"I'm fine."

In human interaction, this statement may signal sadness, irony, emotional withdrawal, or social politeness depending on tone, facial expression, and relational context.

AI interpretation:

AI systems tend to interpret the sentence primarily at lexical level unless additional contextual cues are explicitly provided.

Thus, while humans communicate through layered intentional meanings, AI communicates through probabilistic linguistic approximation.

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2. Embodiment: Communication Beyond Words

Human communication is embodied. Meaning is produced through gestures, eye contact, facial expressions, posture, silence, rhythm, and physical presence (Merleau-Ponty, 1962). These non-verbal dimensions vary across cultures and contribute significantly to identity expression.

For bilingual speakers, embodiment often changes across languages. A Romanian-English bilingual speaker, for instance, may unconsciously alter gesture intensity, conversational rhythm, or emotional expressiveness depending on the linguistic and cultural environment.

AI communication lacks embodiment. Although conversational agents may simulate empathy linguistically, they do not possess physical presence, sensory experience, or emotional embodiment. Consequently, AI-generated discourse can imitate emotional language without genuinely experiencing emotion.

This distinction becomes particularly important in intercultural communication, where gestures and embodied practices often carry meanings that cannot be fully translated into standardized textual language.

3. Contextuality: Situated vs. Generalized Communication

Human communication is deeply contextual and socially situated. Individuals constantly adapt language according to:

social hierarchy,
emotional proximity,
cultural expectations,
interpersonal history,
and communicative setting.

For example, bilingual speakers frequently code-switch to express solidarity, intimacy, humor, or cultural affiliation (Gumperz, 1982). Such shifts often rely on shared background knowledge unavailable to external observers.

AI communication, however, operates through generalized contextual modeling. Although generative AI can process prompts and conversational history, it lacks genuine social situatedness and lived relational context. As a result, AI often privileges clarity and coherence over ambiguity, hybridity, or culturally layered meanings.

This tendency contributes to what may be conceptualized as algorithmic flattening:

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the reduction of communicative complexity into globally intelligible and standardized linguistic forms.

4. Emotional Authenticity: Simulated vs. Experienced Emotion

One of the most significant distinctions between human and AI communication concerns emotional authenticity.

Human emotional expression emerges from subjective experience. Emotions influence vocabulary choice, pauses, hesitation, irony, contradiction, and communicative spontaneity. Human discourse is frequently imperfect precisely because it reflects emotional complexity.

AI systems can simulate emotional responsiveness using learned linguistic patterns associated with empathy, politeness, or encouragement. For example:

AI-generated empathetic response:

"I understand that this situation may feel overwhelming."

Although linguistically appropriate, such responses remain performative simulations rather than genuine emotional experiences.

Turkle (2015) warns that as humans increasingly interact with emotionally responsive technologies, the distinction between authentic emotional presence and simulated empathy may become progressively blurred. This creates a paradox in AI-mediated communication:

the more humanized AI becomes,
the more standardized human emotional expression risks becoming.

5. Identity Construction: Fluid Identity vs. Standardized Profiles

Human communication plays a central role in identity construction. Identity is negotiated through language choices, accents, humor, silence, gestures, and cultural references (Bucholtz & Hall, 2005). In bilingual contexts, identity becomes particularly fluid, as speakers navigate multiple linguistic and cultural systems simultaneously.

For example:
one language may be associated with intimacy and family,
another with professionalism or academic authority.

Generative AI systems, however, tend to privilege stable and standardized communicative profiles. Because AI models are trained predominantly on

dominant linguistic patterns, they often reproduce normative forms of communication while minimizing hybrid or non-standard expression.

Consequently, bilingual identity may become increasingly pressured toward simplification and standardization in AI-mediated environments.

This process can be conceptualized as:

Linguistic normalization through algorithmic mediation

where communicative diversity is gradually reduced in favor of efficiency, predictability, and global intelligibility.

Toward a Human–AI Communication Continuum

Despite these differences, human and AI communication should not be understood as entirely separate categories. Contemporary communication increasingly exists along a continuum in which:

humans adapt to algorithmic systems,
while AI simultaneously imitates human interaction.

This reciprocal adaptation produces hybrid communicative practices:

- humans simplify prompts for machines,
- AI humanizes responses for users.

The result is the emergence of what may be termed:

Hybrid communicative identity

—a form of communication shaped simultaneously by human cultural practices and algorithmic structures.

However, this convergence also raises critical questions regarding linguistic diversity and cultural sustainability. If communication becomes increasingly optimized for algorithmic processing, culturally specific expressions, multilingual hybridity, and identity-based linguistic variation may gradually diminish.

For this reason, sustainable digital transformation must include not only technological innovation, but also the preservation of communicative plurality, linguistic diversity, and culturally situated forms of human expression.

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HUMAN vs. AI COMMUNICATION
A Conceptual framework of linguistici interaction

Table 1. Conceptual differences between human and AI communication

Dimension	Human Communication	AI Communication
Intentionality	Intentional and meaning-driven communication shaped by lived experience, emotions, memory, and social relationships	Predictive and probability-driven communication generated through pattern recognition and statistical modeling
Nature of Meaning	Meaning emerges through subjective interpretation and interpersonal context	Meaning is approximated through linguistic prediction and data correlations
Embodiment	Embodied communication involving gestures, facial expressions, posture, silence, rhythm, and voice modulation	Disembodied communication limited primarily to textual or simulated conversational output
Non-verbal Expression	Strong reliance on paralinguistic and cultural cues that personalize discourse	Simulation of conversational markers without genuine physical or emotional presence
Contextuality	Context-dependent and socially situated communication shaped by interpersonal history and cultural background	Context-modeled communication based on data-derived contextual approximation
Cultural Dimension	Incorporates cultural nuance, symbolic references, humor, and socially embedded meanings	Tends toward generalized interpretation and globally intelligible discourse
Emotional Expression	Emotionally authentic communication grounded in subjective emotional experience	Emotionally simulated communication based on learned linguistic patterns associated with empathy
Communicative Style	Allows ambiguity, spontaneity, contradiction, and hybrid discourse practices	Prioritizes coherence, fluency, clarity, and predictability
Identity Construction	Constructs and negotiates identity through language choice, accent, code-switching, and cultural expression	Encourages standardized linguistic profiles and normative communicative structures

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Dimension	Human Communication	AI Communication
Bilingual Practices	Preserves code-switching and multilingual hybridity as markers of identity and belonging	Frequently normalizes or simplifies multilingual and hybrid linguistic forms
Adaptation Mechanism	Humans adapt dynamically according to social and emotional contexts	AI adapts algorithmically through personalization and conversational simulation
Primary Risk	Miscommunication due to ambiguity or cultural difference	Linguistic standardization and potential erosion of linguistic diversity
Communicative Outcome	Diversity, relational meaning, and identity negotiation	Efficiency, scalability, and algorithmic consistency

Human–AI Interaction: Adaptation, hybrid communication, and linguistic sustainability

The interaction between humans and artificial intelligence is increasingly characterized by reciprocal adaptation. As generative AI systems become integrated into professional, educational, and interpersonal communication, both humans and machines adjust their communicative behavior in response to one another. This mutual adaptation contributes to the emergence of hybrid communicative practices that combine human linguistic creativity with algorithmic structures and predictive communication norms.

Human Adaptation to AI Systems

One of the most visible consequences of AI-mediated communication is the gradual adaptation of human discourse to algorithmic expectations. Users frequently modify their language when interacting with AI systems by simplifying syntax, reducing ambiguity, and prioritizing clarity and efficiency. Research in human–machine communication demonstrates that individuals tend to adopt more direct and standardized linguistic forms when they anticipate machine interpretation (Guzman & Lewis, 2020).

For example, prompts addressed to generative AI systems are typically concise, imperative, and structurally simplified:

- “Summarize this article.”
- “Translate into academic English.”
- “Generate keywords.”

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Compared to ordinary interpersonal communication, such interactions minimize contextual nuance, emotional layering, and conversational spontaneity. Over time, repeated engagement with algorithmic systems may normalize these communicative habits beyond human–machine interaction itself.

This tendency is particularly significant in bilingual contexts. Speakers may intentionally avoid code-switching, regional expressions, or culturally embedded references because AI systems frequently misinterpret or standardize hybrid discourse forms. For instance, bilingual Romanian-English communication often integrates emotional nuance through language alternation:

"The project looks good, dar parcă îi lipsește ceva."

A human interlocutor familiar with bilingual interaction immediately understands both the semantic meaning and the emotional nuance conveyed by the Romanian insertion. However, AI systems frequently normalize such discourse into monolingual structures, reducing hybridity in favor of grammatical consistency and semantic clarity.

This process reflects what may be described as *machine-oriented communication*: a communicative adaptation in which human linguistic behavior increasingly aligns with algorithmic processing requirements.

AI Adaptation to Humans: The Humanization of Machine Communication

Simultaneously, AI systems are being designed to imitate human communicative behavior more effectively. Generative AI increasingly incorporates conversational tone, emotional validation, adaptive responses, and simulated empathy in order to create the impression of natural interaction.

Research by Nass and Moon (2000) demonstrated that humans instinctively apply social expectations to technological systems, responding to computers as social actors even when fully aware of their artificial nature. Contemporary conversational AI intensifies this phenomenon through what may be termed *communicative humanization*.

For example, earlier automated systems produced highly impersonal responses such as:

"Invalid request."

By contrast, contemporary AI-generated communication frequently adopts emotionally supportive language:

"I understand this situation may be frustrating. Let's explore another solution together."

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Although such responses simulate empathy, they remain algorithmically generated rather than emotionally experienced. Nevertheless, studies suggest that users often perceive humanized AI communication as more trustworthy, accessible, and emotionally engaging (Luger & Sellen, 2016).

This humanization process also extends to multilingual communication. AI systems increasingly imitate informal conversational markers, emojis, culturally familiar expressions, and adaptive stylistic variation. However, despite these advances, AI-generated discourse remains fundamentally dependent on learned statistical patterns rather than lived cultural experience.

The Emergence of hybrid communication

The reciprocal adaptation between humans and AI contributes to the emergence of hybrid communication: a communicative environment in which human discourse becomes increasingly influenced by algorithmic norms, while AI discourse simultaneously imitates human interaction. Recent multidisciplinary research also suggests that generative conversational AI may fundamentally reshape professional, educational, and interpersonal communication practices by normalizing AI-assisted discourse production and interaction (Dwivedi et al., 2023).

In hybrid communication:

- humans adapt by becoming more concise, structured, and machine-readable;
- AI adapts by becoming more conversational, emotionally responsive, and socially performative.

This convergence produces important sociolinguistic consequences. Human communication increasingly reflects:

- algorithmic mediation,
- linguistic standardization,
- predictive communication structures,
- and efficiency-oriented discourse patterns.

At the same time, AI communication increasingly incorporates:

- conversational humanization,
- simulated emotional intelligence,
- adaptive stylistic personalization,
- and culturally approximated interactional behavior.

The result is a progressive blurring of the boundaries between natural and algorithmically mediated communication.

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Central Tension: Efficiency versus Linguistic Diversity

Despite the advantages of AI-mediated communication—such as accessibility, speed, and global reach—this convergence generates a significant tension between communicative efficiency and linguistic diversity.

Generative AI systems are optimized for:

- coherence,
- fluency,
- predictability,
- and large-scale intelligibility.

As a consequence, they frequently privilege dominant linguistic norms while reducing variation associated with bilingualism, dialectal diversity, or culturally specific expression. Bender et al. (2021) warn that large language models tend to reproduce dominant linguistic structures because they are trained on datasets heavily centered around globally dominant languages, particularly English.

This tendency contributes to what may be conceptualized as the *algorithmic flattening of language*: the gradual reduction of communicative complexity through technological standardization.

Algorithmic flattening may manifest through:

- reduction of code-switching practices,
- simplification of multilingual hybridity,
- elimination of culturally embedded expressions,
- preference for globally standardized discourse,
- and weakening of identity-related linguistic markers.

For bilingual speakers, these changes may affect not only communication practices, but also identity negotiation itself. Since bilingual identity is often expressed through linguistic hybridity, emotional nuance, and context-dependent language choices, excessive standardization risks diminishing the communicative spaces in which such identities are performed and recognized.

Toward Linguistic Sustainability

The findings discussed above suggest that sustainable digital transformation must include a linguistic and cultural dimension in addition to economic and technological considerations. Technological progress should not be understood solely in terms of efficiency and optimization, but also in relation to its impact on communicative diversity and cultural representation. Studies focusing on the educational implications of large language models additionally warn that excessive reliance on generative AI may influence critical thinking, communicative

autonomy, and language production practices, particularly among multilingual users (Kasneci et al., 2023).

This paper therefore proposes the concept of *linguistic sustainability*, understood as the preservation of linguistic plurality, multilingual expression, and culturally situated communication within increasingly AI-mediated environments.

Linguistic sustainability implies:

- supporting multilingual datasets in AI development,
- preserving minority and hybrid linguistic practices,
- recognizing code-switching as legitimate communication rather than linguistic deviation,
- and designing AI systems that accommodate cultural nuance rather than eliminating it.

UNESCO (2003) emphasizes that linguistic diversity represents an essential component of intangible cultural heritage and social sustainability. Within this framework, preserving linguistic diversity becomes not only a cultural objective, but also an ethical responsibility in the development of digital technologies.

Conclusion

The interaction between humans and generative AI is reshaping contemporary communication in profound ways. As humans adapt their language to machines and machines increasingly imitate human discourse, communication becomes progressively hybridized. While this transformation offers important benefits in terms of accessibility and global connectivity, it also introduces significant risks related to linguistic standardization and the erosion of bilingual identity.

The central challenge of sustainable digital transformation is therefore not simply whether AI can communicate effectively, but whether increasingly algorithmic communication systems can preserve the plurality, hybridity, and cultural specificity that characterize human language. Ultimately, the future of AI-mediated communication will depend not only on technological innovation, but also on the capacity to maintain linguistic diversity as a fundamental dimension of human identity.

Future research should investigate empirically how bilingual speakers adapt their communication practices in AI-mediated environments and whether prolonged interaction with generative AI influences code-switching behavior, linguistic hybridity, and identity negotiation over time.

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ARTIFICIAL INTELLIGENCE AS A TOOL FOR PEDAGOGICAL INNOVATION: ECONOMIC AND SOCIAL IMPLICATIONS

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Abstract

The introduction of artificial intelligence (AI) into education represents a phenomenon of growing global significance, capable of profoundly transforming pedagogical practices, the management of economic resources, and social dynamics within educational institutions. This article explores the potential of AI as a tool for pedagogical innovation, examining the associated economic, social, and ethical implications. Through a discursive review of the literature, international case studies, and empirical data, both the tangible benefits—such as personalised learning, improved student outcomes, and cost optimisation—and the challenges related to privacy, algorithmic bias, and inequalities in access to technology emerge clearly. The conclusions offer recommendations for policymakers, educators, and researchers aimed at fostering the responsible and sustainable integration of AI into educational systems.

Keywords: *artificial intelligence, education, pedagogy, innovation, economics, social inclusion*

JEL Classification: I23, O33, J24, M15, D83

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1. Introduction

Over recent decades, education has undergone significant transformation, largely driven by technological advancement. From the introduction of computers into classrooms during the 1980s to the widespread use of digital learning platforms, technological tools have progressively expanded pedagogical possibilities. However, no innovation has generated such extensive interest and controversy as artificial intelligence (AI). Today, systems capable of analysing vast quantities of data, providing personalised feedback, and recommending individualised learning pathways offer unprecedented opportunities to enhance educational effectiveness.

AI is not merely a technological tool; it represents a genuine pedagogical revolution. It enables educational content, timing, and methodologies to be adapted to the specific needs of individual students, allowing targeted interventions that were previously impossible on a large scale. For example, in several European and North American schools, AI-based intelligent tutors support students during independent study by identifying individual learning gaps and proposing tailored exercises. This approach not only enhances learning effectiveness but also reduces the risk of school dropout and promotes social inclusion (UNESCO, 2021).

Nevertheless, the growing adoption of AI in education raises complex issues ranging from the economic management of resources to data privacy and broader ethical concerns. It is essential to question who truly benefits from these technologies, how they are designed and implemented, and what consequences may arise from unequal adoption across schools operating in different socio-economic contexts.

The aim of this article is to explore the role of AI as a catalyst for pedagogical innovation by analysing its economic, social, and ethical implications. Through an integrated and discursive approach, the article discusses:

- The potential of AI in education, supported by practical examples and case studies.
- The economic and social consequences of adopting AI technologies.
- Ethical challenges and strategies for responsible implementation.
- Recommendations for policymakers, educators, and researchers.

This perspective allows AI to be viewed not merely as a technological development but as an agent of pedagogical change with profound implications for the future of education and society as a whole.

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2. Theoretical Framework

2.1 Economics of Education and AI

The economics of education examines how educational resources are allocated and utilised in order to maximise student outcomes. Traditionally, the main costs faced by educational institutions include teachers' salaries, physical infrastructure, teaching materials, and administrative management. However, many of these expenditures do not always result in significant improvements in learning outcomes and are often difficult to optimise.

AI offers opportunities for economic optimisation: automated systems can reduce operational costs, analyse complex data in order to direct resources where they are most needed, and support personalised teaching without increasing teachers' workloads (Brynjolfsson & McAfee, 2014). For instance, in certain London schools, the implementation of intelligent tutoring systems reduced costs associated with individual student support by 15%, while average student performance increased by more than 10% within a single academic year (Chassignol & Dufour, 2020).

Economic optimisation extends beyond direct costs. Predictive systems based on AI can identify students at risk of academic failure or dropout at an early stage, enabling timely interventions that prevent higher future costs associated with grade repetition, additional educational support, or school disengagement. In this sense, AI is not merely a technological investment but also a social investment: reducing dropout rates increases future opportunities for students and generates long-term economic returns for society (OECD, 2022).

2.2 Pedagogy and Educational Technologies

The integration of AI must be understood within a broader pedagogical framework in which educational technologies have already demonstrated their capacity to transform teaching and learning processes. Several pedagogical approaches can benefit from AI:

Constructivist learning: AI supports active learning experiences in which students construct knowledge through interaction with dynamic content and immediate feedback. For example, AI-based virtual science laboratories allow students to experiment with complex scenarios without the material constraints of traditional laboratories.

Personalised learning: Intelligent tutoring systems analyse individual data and adapt content, exercises, and study pace to each student's specific characteristics (Luckin et al., 2016). This approach enhances engagement and strengthens intrinsic motivation.

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Blended learning: AI facilitates the integration of online and face-to-face activities by monitoring progress, recommending additional resources, and supporting data-informed pedagogical decisions.

However, technology alone cannot guarantee educational success. Teacher training remains essential: only well-prepared professionals can integrate AI effectively, avoiding excessive dependence on algorithms while preserving the human dimension of education (Selwyn, 2019).

2.3 Applications of AI in Education

AI is applied across multiple educational contexts:

Intelligent tutors: These provide personalised feedback, monitor progress, and recommend learning pathways. For example, the "Squirrel AI" tutoring system in China improved mathematics performance among middle-school students, producing average increases of over 15% in standardised test scores.

Recommendation systems: Similar to those used by streaming platforms, these systems suggest relevant study materials according to students' academic level and interests.

Predictive analytics: These tools identify students at risk at an early stage, enabling targeted interventions by teachers and school staff.

Administrative automation: AI reduces bureaucratic workload, allowing schools to allocate resources more efficiently and devote greater attention to teaching activities.

These applications clearly demonstrate the potential of AI to improve educational processes, while also highlighting significant concerns. The collection of large quantities of data raises privacy issues, and poorly designed systems may introduce algorithmic bias, thereby reinforcing existing inequalities (UNESCO, 2021).

3. Methodology

3.1 Research Design

To investigate the impact of AI on education, this study adopts a mixed-methods approach, combining quantitative and qualitative analysis. The quantitative dimension measures the effectiveness of AI in relation to educational outcomes and institutional efficiency, while the qualitative dimension explores the experiences, perceptions, and practices of teachers and students (Creswell & Plano Clark, 2017).

This methodological design provides a comprehensive and integrated perspective: on the one hand, it offers measurable and comparable data; on the

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other, it captures the nuances of educational experiences that often remain invisible in purely numerical analyses. For example, a student may achieve higher test scores while simultaneously reporting lower motivation if AI systems entirely replace interaction with teachers.

3.2 Sample and Context

The sample consists of five secondary schools located in urban, semi-urban, and rural settings, selected in order to represent a variety of socio-economic contexts and levels of technological provision. In total, the study involved:

- 300 students aged between 13 and 18;
- 50 teachers and school administrators.

The objective was to observe the implementation of AI in realistic educational contexts, understand differences linked to socio-economic conditions, and identify best practices that could be replicated in other schools.

3.3 Data Collection Instruments

- **Student questionnaires:** measuring engagement, satisfaction, perceptions of learning, and use of AI systems.
- **Teacher questionnaires:** assessing perceived usefulness of AI systems, encountered difficulties, and changes in teaching practices.
- **Semi-structured interviews:** exploring opinions, challenges, and suggestions regarding the influence of AI on educational experiences.
- **Document analysis:** comparing pre- and post-AI implementation data related to academic performance, completion rates, dropout rates, and operational costs.

3.4 Procedures

Data were collected over the course of one academic year through the following stages:

1. Distribution of questionnaires to students and teachers.
2. Conducting semi-structured interviews with a representative sample of teachers and administrators.
3. Collection and analysis of quantitative data using descriptive statistics, t-tests for pre/post comparisons, and regression analysis to identify correlations between AI use and educational outcomes.
4. Qualitative analysis through thematic coding in order to identify recurring patterns within reported experiences.

3.5 Methodological Limitations

Despite the robustness of the mixed-methods design, several limitations emerged:

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- The sample size is limited and does not represent the entire national or international educational landscape.
- AI implementation methods differed between schools, introducing variability into the results.
- Possible response bias among students and teachers due to personal perceptions or a desire to conform to research expectations.

4. Results

4.1 Quantitative Findings

The collected data indicate a positive impact of AI on learning outcomes and operational efficiency:

Indicator	Before AI	After AI	Percentage Change
Course completion rate	78%	90%	+12%
Students at risk of dropout	15%	7%	-8%
Average final grades	24/30	26/30	+8%
Annual operational costs (€)	1,200,000	980,000	-18%

These findings indicate a significant increase in course completion rates and a reduction in the number of students at risk of dropping out, alongside overall improvements in grades and substantial reductions in operational costs.

4.2 Qualitative Findings

The thematic analysis of interviews identified three principal dimensions:

Support for Personalised Learning

Students reported increased motivation due to AI tutors providing immediate feedback and adaptive learning pathways.

"With the intelligent tutor, I can focus on my weaknesses without feeling overwhelmed by assignments." (Student, urban school)

Reduction of Administrative Workload

Teachers reported having more time to design lessons and provide individual support to students.

"Previously, I spent hours correcting exercises and organising data; now I can dedicate my attention to students who genuinely need support."(Teacher, rural school)

Ethical and Privacy Concerns

The management of students' sensitive data emerged as a significant concern, with participants requesting greater transparency from educational institutions.

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"I worry that all student information is stored within a single system without knowing who can accessit." (Teacher, semi-urban school)

5. Discussion

5.1 Economic Implications

The findings confirm that AI contributes to the optimisation of educational resources. The reduction in operational costs combined with improved academic outcomes represents a significant return on investment. Although the adoption of AI involves initial expenditure on software, infrastructure, and teacher training, these costs are generally offset within two to three years through increased efficiency (Brynjolfsson & McAfee, 2014).

5.2 Pedagogical Implications

AI promotes personalised learning by enabling teachers to adapt educational strategies to individual needs. Nevertheless, AI should not replace teachers. Human relationships remain central to education: technology must serve as a tool rather than a substitute for the educational role of teachers (Selwyn, 2019).

5.3 Social and Ethical Implications

The principal concerns include:

- **Equitable access:** schools with limited resources risk being left behind, thereby widening educational inequality.
- **Data privacy and security:** the management of sensitive student data must comply with strict regulations and transparency standards.
- **Algorithmic bias:** poorly designed algorithms may disadvantage students from particular backgrounds, reinforcing pre-existing inequalities.

Consequently, it is essential to develop governance policies that ensure equitable access, data protection, and continuous monitoring of AI systems (UNESCO, 2021).

5.4 Interdisciplinary Connections

AI in education is not solely a pedagogical issue; it also involves economics, sociology, computer science, and psychology. For example:

- **Economics:** evaluates return on investment in terms of operational costs and social outcomes.
- **Sociology:** analyses dynamics of inclusion and inequality.
- **Psychology:** investigates motivation, engagement, and the socio-emotional impact of AI-mediated learning.

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6. Conclusions and Recommendations

The integration of AI into education represents an unprecedented opportunity to improve educational outcomes, optimise economic resources, and promote social inclusion. However, AI technologies must be adopted responsibly and sustainably, in accordance with ethical principles and equitable access.

Practical Recommendations

- Develop national guidelines concerning the ethical use of AI in education.
- Invest in continuous professional development for teachers.
- Ensure transparency and robust protection of student data.
- Continuously monitor the impact of AI on academic performance and inclusion.
- Support interdisciplinary research on AI, pedagogy, and society.

AI should be regarded as a complementary tool capable of strengthening educational practice and enhancing the learning experience, without replacing the human element, which remains irreplaceable.

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AI-ENABLED CRITICAL INFRASTRUCTURE DEVELOPMENT IN EUROPE: TOWARDS ADAPTIVE DIGITAL ECOSYSTEM ARCHITECTURES

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Abstract

The development of artificial intelligence systems in Europe points to the limitations of existing critical digital infrastructures, as well as the multiple challenges in the development of AI-enabled systems. The research problem that this paper deals with is related to infrastructure requirements and development gaps that adversely affect the transition to AI-enabled systems in the territory and context of Europe. The aim of this paper is based on the analysis of the relationship between AI systems, the development of critical infrastructures and the architectures of adaptive digital ecosystems within the European digital transformation. Methodologically, the paper is based on a qualitative and conceptual analysis of European strategic initiatives and theoretical interpretations related to the infrastructural sovereignty of AI systems. Key insights indicate that the development of advanced AI systems depends on certain conditions, both those that make it possible and those that limit infrastructure development. The insights point to interoperability, governance mechanisms, computing capacity, especially digital sovereignty [Belli, 2025]. The paper explores how the development of advanced AI systems is impacting the transformation of critical digital infrastructure requirements

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in Europe. This further suggests that adaptive digital ecosystem architectures may represent significant development potential to strengthen European capacities[Kondylakis et al., 2023] in support of future AI-enabled environments.

Keywords: *AI-enabled critical infrastructure, adaptive digital ecosystems, AI governance, interoperability, digital sovereignty*

JEL Classification: O33, O38, L86, H54, D83

1 Introduction

The rapid expansion of artificial intelligence (AI) systems has greatly transformed modern digital environments and technological infrastructure. The development of multimodal AI systems, generative AI models, and intelligent adaptive environments has increased the demand for advanced computing capabilities, interoperable infrastructures and distributed digital ecosystems that are capable of supporting increasingly complex and large-scale AI workflow execution processes. In parallel, AI integration has intensified the infrastructure dependencies associated with cloud-computing, GPU acceleration, high-performance computing (HPC), and real-time data processing.

1.1. AI Systems and Infrastructural Transformation

The rise in the implementation of advanced AI systems requires scalable and resilient infrastructures that are capable of supporting intensive computing workloads, multimodal data processing [Chakravarthi et al., 2026], and distributed system coordination. These systems require high computing power, specialized storage solutions, and efficient data management techniques [Shah & Jain, 2025]. Today's AI environments increasingly depend on cloud-edge architectures [Trigka & Dritsas, 2025] as well as GPU-based acceleration [Sun & Li, 2025] and interoperable data ecosystems that enable real-time processing and adaptive system responses. This development has expanded the role of critical digital infrastructure beyond traditional computing architectures and into integrated AI-enabled environments.

1.2 Adaptive Digital Ecosystem and European Context

Within this context, adaptive digital ecosystems are evolving as interoperable and distributed infrastructure architectures capable of coordinating intelligent systems through the constant exchange of data, and the adaptation of intelligent systems [Mehmood et al., 2025; Adenuga et al., 2024; Azzouna, 2026] as well as autonomous systemic interaction. Their importance is particularly evident in the

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European context where digital sovereignty issues are important [Belli, 2024; Cruzes, 2026], infrastructural fragmentation and dependencies on non-European[Jørgensen, 2025] hyperscalers platforms, have a major impact on AI development strategies. At the same time, the European regulatory frameworks, which include AI governance initiatives and digital transformation policies, highlight the need for a secure, sovereign and interoperable AI infrastructure.

1.3 Research Gap and AI Aim of the Paper

The existing literature is predominantly focused either on AI technological development or the regulatory dimension of Europe's digital transformation, while much less attention is paid to the relationship between AI-enabled infrastructures, adaptive digital ecosystem architectures and infrastructure sovereignty within the European context. Consequently, this paper aims at a conceptual analysis of the relationship between AI systems, critical digital infrastructure, and adaptive digital ecosystems in the context of Europe's digital transformation.

The central thesis of this paper deals with the development of advanced AI systems that transform the requirements imposed on critical digital infrastructure and contribute to the transition from fragmented digital environments to adaptive infrastructure ecosystems based on interoperability, distributed computing and digital sovereignty.

The research addresses the following questions:

RQ1: How are advanced AI systems transforming the requirements for critical digital infrastructure?

RQ2: What are the infrastructure challenges affecting the development of AI-enabled systems in Europe?

RQ3: How do adaptive digital architecture ecosystems support the development of sovereign and interoperable AI environments?

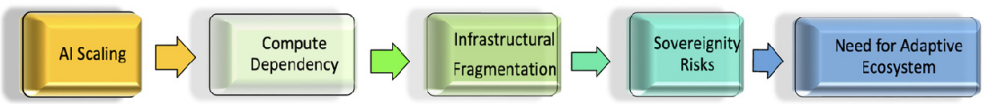


Figure 1. Conceptual Presentation of Advanced AI Systems and Adaptive Digital Infrastructures

Figure 1. illustrates the conceptual relationship between advanced AI systems and the emergence of adaptive digital infrastructures, highlighting infrastructure

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dependencies as an intermediate mediative level that leads to challenges in digital sovereignty within the European context.

2. Literature review

2.1 Advanced AI systems

Contemporary literature in the field of artificial intelligence indicates an accelerated level of development of machine learning, deep learning, multimodal and generative AI architectures. In recent research, model scalability and scaling laws are particularly prominent [Sartor & Thompson, 2024; Kaplan et al. 2020], which define the relationship between model size, data volume, and computing resources, which are aligned with sustainable principles. These approaches suggest that the performance of advanced AI systems is directly dependent on the availability of computing infrastructure and pipeline efficiency, further increasing the demand for integrated and distributed digital environments. Distribution systems also stand out, becoming essential to solving modern computing requirements, offering improved processing power, scalability, and resource efficiency in addition to parallel systems [Dai et al., 2025; Liu et al., 2025].

In the literature, there is also a significant transition from ML/DL models to multimodal and generative systems, as well as foundation models [Li et al., 2023]. Foundation models are best understood as infrastructure components, not as standalone applications. Not only because of the training at scale, but also because of the platform integrations [Deckker & Sumanasekara, 2026]. This has contributed to a significant expansion of the domain of application of AI systems in real-world conditions and simulated environments [Bommasani et al., 2021].

2.2 Critical Digital Infrastructure

Recent research conducted in the field of digital infrastructure has focused on the development of AI infrastructure within the EU, which remains characterized by unequal computing distribution despite the expansion of regional capacities. Current studies emphasize hyperscale concentration, limited access to advanced computing resources, and infrastructural fragmentation that continues to limit the development of sovereign AI ecosystems [Ingemarsson, 2026]. HPC/AI convergence is also singled out as one of the most important research directions, especially in the domain of recent research, which emphasized the advantages of AI/HPC [McInnes et al., 2025; Tanneru, 2026].

Building on the above, existing research points to the EuroHPC initiative, primarily positioned as a scientific computing platform, but also as a strategic

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infrastructure mechanism that supports AI workloads and strengthens European computing autonomy[eurohpc]. According to European Federated Computing: Working Group Reports, current HPC centers are characterized by dual CPU-based architectures and GPU-equipped nodes. The next generation of HPC centers will adopt a hybrid architecture design largely based on GPUs due to their increased parallelism and cost-effectiveness. Infrastructures are expected to become increasingly heterogeneous [Sphicas et al., 2025]. The literature cites efforts to point out the interconnection of HPC infrastructures within distributed computing systems, which will contribute, among other things, to global competitiveness. While current studies highlight the strategic importance of AI infrastructure development in Europe, existing approaches remain fragmented in regulatory, computational and governance dimensions for the time being. Consequently, insufficient attention has been paid to understanding AI infrastructures in the form of adaptive architecture at the ecosystem level, rather than exclusively in the technological or political domain.

2.3 Adaptive Digital Systems

Within the framework of contemporary research, adaptive digital systems include cyber-physical systems [Rivera et al., 2022], smart infrastructures, and digital twins. The field of digital twins in the simulation and optimization of complex systems, as well as their application in industrial, urban and infrastructure environments is particularly prominent [Salvi et al., 2022; Avireneni et al., 2023, Stanković, 2026]. These systems are defined as interoperable, dynamic frameworks [Bedogni et al., 2025], which integrate physical and digital components through continuous data exchange and adaptive control. The requirement for interoperable efficiency affects modern systems in addition to limited data pipelines or hardware incompatibilities. Consequently, this is reflected in the failure to synchronize these constraints and may result in operational fragility as Adepoju argues [2025]. Another significant aspect indicates that the lack of interoperability, which can severely limit the situational awareness and control range of AI. Especially since an AI system requires seamless connectivity across these heterogeneous elements in order to efficiently collect data and issue control commands [Jørgensen et al., 2025].

According to the European Digital Innovation Hubs (EDIHs), regulatory design needs to evolve towards adaptive governance [2024]. Adaptive systems [Janssen, 2025] are seen as the next phase of digital transformation in which systems, in addition to performing functions, are also able to actively adjust their behavior in relation to context and data in real time.

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2.4 European Digital Transformation

The European literature in the field of digital transformation focuses on regulatory frameworks such as the EU AI Act, digital Europe Programmes and digital sovereignty and governance strategies [Vanhoonacker et al., 2026].

Key insights as well as concepts include interoperability, regulatory compliance, and reducing dependency on global infrastructures. The initiatives and development of regional data centers point to the strategic importance of computer independence and infrastructure resilience.

In the literature, the concept of compute dependency is more dominantly analyzed, which describes the dependence of AI systems on the availability of scalable computing resources, energy capacities and network distribution. The Federated Coordination for European AI Infrastructure: Coordination Strategy for the European Phase of AI Deployment (2025–2030) highlights the importance of the risk of fragmentation and large operational staffing, especially in the context of coordinated distribution [2025].

A special research focus is placed on the fragmentation of the European digital space and the need to develop coherent AI governance models. Digital sovereignty is defined as the ability to control the infrastructure, data, and operational layers of AI systems within the European regulatory framework. Accordingly, efforts to regulate, localize, or brand these systems as national or regional projects, even when their operation depends on global interdependence as Kera et al. point out [2026].

An extensive research body analyses the AI Act Digital Europe Programme in the context of the sovéreign AI interoperability framework. The EU has so far led global efforts to regulate technologies such as digital platforms and AI. Laws, such as the General Data Protection Regulation (GDPR) [EU Regulation (EU) 2016/679, 2016], the Digital Markets Act (DMA) [2024] and the AI Act, have had a major impact not only on the EU26 internal market. While necessary, regulation is not sufficient on its own, as it requires combining it with robust infrastructure, among others [Pacheco & Velez, 2025; Fontana, 2025].

3. Theoretical Background

3.1 AI as a Systemic Infrastructure Layer

This paper starts from the theoretical assumption that modern AI systems represent an infrastructure layer within the digital ecosystem. In this context, AI systems, in addition to being part of the computer architecture in the form of application layer technology, are also seen as infrastructure agents embedded in distributed computing environments [Xu et al., 2026] and interdependent [Faraji et

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al., 2026] systems. This approach focuses on AI as an infrastructure requirement for digital transformation, establishing a new system logic in which computing resources, models, and data are interdependent elements of a single ecosystem. This perspective extends beyond the conventional framework of AI adoption through the conceptualization of AI in the form of a system state that shapes data streams, computational dependencies, and adaptive operating architectures.

Consequently, this paper integrates the perspectives of infrastructure dependencies, adaptive digital ecosystems and AI sovereignty into a single conceptual framework for understanding European AI transformation. By acknowledging infrastructure studies and the importance of standardization in this sense, not only through regulatory, but also through, technical challenges.

3.2 Critical Infrastructure and Digital Transformation

The theoretical framework of critical infrastructure in this paper is based on the concept of infrastructure dependency, where digital systems are viewed as interconnected networks of computing, data, and communication resources [Thakare, 2025]. Computational dependency and sovereignty varies between countries depending on the level of analysis. Determining the most relevant level depends on the policy objectives of governments and the national context, and involves policy trade-offs [Hawkins et al., 2025].

This is particularly indicative in the context of the European Union and the need to balance data migration to the cloud with the imperative of reducing dependence on foreign providers to protect the confidentiality of European data, and establishing dominance in the EU market. The European Cloud Initiatives, in the context of a broader policy agenda, seek to revive the competitiveness of the European industrial ecosystem in digital technologies within the European Alliance for Industrial Data, Edge, and Cloud. In this sense, linking data sovereignty to the lack of competitive European cloud ecosystems raises the question of the strategic dimension of cloud computing [Blancato, 2023]. Factors such as the quality of the legal framework and broadband penetration influence its adoption. In particular, countries that depend on export-oriented businesses are finding it difficult to move to the cloud due to past investments in traditional technologies [Tudor et al., 2025]. In addition, the issue regarding the governance of the entire digital ecosystem, or parts of it, indicates that various policy issues facilitate a more realistic assessment of the necessity and proportionality of regulatory interventions [Mueller, 2025).

Digital transformation in this context is considered as a shift towards distributed compute ecosystem models, capable of managing heterogeneity, real-time

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processing, and scalability [Liu et al., 2026] in which cloud, edge, and HPC systems function as integrated data processing layers [Thota, 2025].

This approach enables an understanding of AI systems as an infrastructure-based entity, which functions depending on the availability, interoperability and scalable digital resources, especially in the domain of modern cloud platforms. By meeting the latency, availability, and resilience requirements of this platform are not limited by regional and jurisdictional frameworks [Mollah et al., 2012].

3.3 EU AI Ecosystem A Framework (Conceptual Integration Layer)

Managing the AI ecosystem in the EU requires the alignment of regulatory, infrastructure, and technology layers, in order to support an integrated AI ecosystem and strengthen Europe's innovation capacities [Bolgouras et al., 2025]. The EU AI law is a basic regulatory instrument that applies a risk-based approach, which classifies AI systems according to their potential impact and defines the corresponding obligations (Shetty et al., 2025). This is consistent with broader academic discussions about AI classification and governance mechanisms focused on accountability and risk mitigation [Shetty et al., 2025; Presno Linera & Meuwese, 2025]. Subsequently, this indicates that in the multi-layered regulatory system of AI governance in the EU, legal and technological dimensions structure the development of AI in Europe.

In the computing layer of the EU AI ecosystem, initiatives such as ELISE emphasize the alignment of European AI platforms with the EuroHPC ecosystem, supporting a single computing infrastructure in line with EU regulatory frameworks. This includes the development of AI-optimized supercomputers and the transformation of existing EuroHPC systems into AI-enabled environments, reflecting a broader shift towards the integration of HPC resources into scalable AI infrastructures for advanced training and deployment suits [Taborsky et al., 2025].

The data layer points to the challenges in achieving data sovereignty in the EU. Although the Data Act and the Data Governance Act seek to strengthen our control over data flows, research points to significant limitations in their operational application, particularly with regard to data retention within the EU regulatory space (Carrapico & Farrand, 2025).

The model layer emphasizes the growing importance of foundation models primarily as infrastructure components, rather than isolated systems, that enable advanced reasoning over structural data (Wang et al., 2025). At the same time, a shift towards more efficient model architectures with limited resources is observed

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in the literature, indicating optimization and feasibility of implementation [Gou et al., 2021].

The interoperability layer highlights the importance of hybrid and cloud infrastructures for scalable AI deployments. Hybrid cloud architectures are increasingly recognized as necessary to enable flexible, scalable, and high-performance AI systems in distributed environments [Talati, 2025].

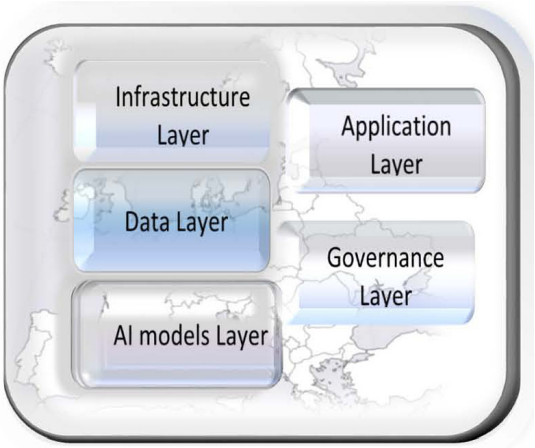


Figure 2. Layered EU AI Ecosystem Architecture

4. Methodology

This research is based on qualitative, conceptual and policy-analytical approaches that focus on the relationship between advanced AI systems, critical digital infrastructure and adaptive digital ecosystems within the European context.

Rather than empirical measurement, the study is based on an interpretative and comparative analysis of recent scientific literature, European strategic documents and infrastructure governance frameworks related to the development of AI, distributed computing, digital sovereignty and interoperability.

Methodological approaches combine:

1. themathic synthesis of modern research AI infrastructures,
2. comparative infrastructure analysis of distributed computing models.
3. conceptual analysis of European AI governance policies and digital transformation initiatives

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The analytical objective is to identify the systemic relationship between AI scalability requirements, infrastructure dependencies, interoperability mechanisms, and adaptive ecosystem architectures in the context of Europe's digital transformation.

The analysis is structured on the basis of four analytical criteria:
(1) conceptual scalability of AI and infrastructure requirements,
(2) interoperability and Distributed Computing Architecture
(3) infrastructure dependencies and digital sovereignty, and
(4) Adaptive mechanisms of ecosystem coordination.

These categories have been applied in the form of interpretive dimensions to explore the infrastructure transformation associated with AI-enabled environments in Europe. The work is conceptual in nature and rigorous, and does not aim to test hypotheses or generate empirical findings, but rather to develop a theoretical framework for understanding AI-enabled infrastructure.

5. Discussion and Conceptual Implications

5.1 AI Systems and Infrastructural transformation (RQ1)

The findings suggest that advanced AI systems have largely transformed infrastructure requirements from a centralized computing model to distributed and scalable ecosystem architectures. This implies the expanded use of AI in the form of multimodal and generative systems, as well as foundation models. Within the framework of infrastructure transformation, these systems and models can also be seen as infrastructure components [Deckker & Sumanasekara, 2026]. This further indicates that in real-world conditions and simulated environments, the application of AI represents an infrastructure layer within the digital ecosystem.

The analysis demonstrates that infrastructure fragmentation plays a limiting role for the development of sovereign AI ecosystems, especially in the domain of the performance capabilities of advanced AI systems, in which dependence on computing infrastructure further affects the requirements for integrated and distributed digital environments.

Starting from an ecosystem perspective, AI systems can function as an incentive for the infrastructural reshaping of computing and data dependencies in distributed environments. It is evident that the advancement of currently state-of-the-art AI models lacks the large computing infrastructure needed for training and deployment. To continue training ever-larger models, AI is increasingly relying on powerful and specialized supercomputers. Empowering initiatives such as EuroHPC, to strengthen high-performance computing capabilities and advanced AI

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factory structures that have implications for future gigafactories, indicate that AI development is conditioned by infrastructure models and generative AI systems, creating a massive network of publicly funded supercomputers. Infrastructures connected to systems such as Jupiter, LUMI, Leonardo, Mare Nostrum indicate the growing importance of large-scale computing resources for AI innovation. At the same time, they represent the EU's response to the global boom in data centers and huge investments in computing infrastructure for AI [Lemke &Schneider, 2025].

5.1.1. Case Study: EuroHPC JUPITER Supercomputer as an Emerging AI

The development of EuroHPC shows how Europe's AI infrastructure is transforming from fragmented computing resources to integrated high-performance architectures. A representative example is the JUPITER (Joint Undertaking Pioneer for Innovative and Transformative Exascale Research) supercomputer, which was developed within the EuroHPC Joint Undertaking framework. This system is being established with the intention of facilitating the transition from current petascale and pre-exascale supercomputers to true exascale computing [Peter et al., 2025]. At the same time, for the development of foundational models and large-scale data analysis.

As part of its European infrastructure strategy, JUPITER represents a shift towards AI-optimized supercomputing environments by integrating GPU-dominant architectures and hybrid cloud connectivity. Consequently, it functions as a new infrastructure layer for AI ecosystem operations that are aligned with the EU's goal of strengthening computational sovereignty and reducing dependency on non-European hyperscale providers [Ingemarsson, 2026; Lemke & Schneider 2025].

And yet, despite its strategic importance, the implementation of such infrastructure points to systemic limitations within the European AI ecosystem:

1. Energy and sustainability constraints: Consequently, large-scale computing infrastructures such as JUPITER require extremely high energy consumption, which act on the tension between the high computing requirements of AI and sustainability goals [Olczyk & Kuc-Czarnecka, 2025].
2. Fragmented access and governance structures: Although the geographical distribution of EuroHPC resources remains uneven, creating challenges related to access, coordination and management. JUPITER is a pan-European infrastructure initiative, but participation and availability of resources still depend on national research networks and institutional capacities [Ruohonen, 2025].
3. Dependence on global GPU supply chains: Despite the fact of significant European investments in supercomputing, advanced AI infrastructures still rely heavily on hardware ecosystems dominated by non-European vendors, limiting full

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technological sovereignty. From a systems perspective, JUPITER points to the importance of building sovereign computing capacities in Europe. However, it also demonstrates the need to move toward a fully operational AI ecosystem aligned with governance, operability mechanisms and integration at the ecosystem level between public and private actors.

5.2 European Infrastructural Constrains and Sovereigny Challenges (RQ2)

The concentration of hyperscaler infrastructure identified by Ingemarsson [2026] suggests that European AI development remains structurally dependent on non-European compute ecosystems. This supports the argument that infrastructure sovereignty cannot be achieved through regulatory mechanisms alone, but requires distributed capacity and interoperable ecosystem architectures. In addition, the limiting circumstances of governance over the entire digital ecosystem or individual parts facilitate a more realistic assessment of the necessity and proportionality of regulatory interventions [Mueller, 2025], which, as Pacheco & Velez argue, while necessary, is not sufficient on its own [Pacheco & Velez, 2025]. It remains to be seen how capable the EU is of producing and scaling breakthrough digital innovations at a rate comparable to that of the United States and China according to European Digital Innovation Hubs (EDIHs), [2024] or to stagnate. Being recognized for its leadership as (EDIHs) states in setting standards is not credible enough to indicate the achievement of a thriving digital ecosystem.

The European case illustrates ecosystem-level constraints where sovereignty challenges arise due to dependence on computing and cloud layers.

Digital transformation in this context represents a shift towards distributed compute ecosystem models, capable of managing heterogeneous infrastructures, real-time processing and scalability. Systemic integration could not help to establish governance and sovereignty backed by actions within the current geopolitical disparities. This highlights the structural constraints of sovereignty at the ecosystem level in AI development.

The Gaia-X European Association for Data and Cloud AISBL initiative (GAIA-X) stands out as part of Europe's efforts to address these challenges by developing interoperable and sovereign data infrastructures. By promoting common standards and reliable mechanisms for data exchange, this initiative seeks to reduce dependency on external cloud ecosystems, through the interconnection of distributed clouds and data resources, opening up new business opportunities, in line with European digital regulations [GAIA-X.eu]. Nevertheless, this initiative

illustrates the current complexity of achieving technological sovereignty in highly interconnected global digital environments.

5.3 Adaptive ecosystems as infrastructural models for AI environments (RQ3)

The ability to adapt the functions and behavior of adaptive systems to context and real-time data, and to simulate and optimize complex systems such as digital twins Stanković, 2025 enables continuous data exchange and adaptive control. Especially when it comes to interoperability and the importance of synchronizing systems by reconciling gaps and limiting circumstances. The requirement for interoperable efficiency affects by limiting modern systems in addition to limited data pipelines or hardware incompatibility, which ultimately leads to a failure to synchronize these circumstances according to Adepo and can result in operational fragility [Adepo, 2025]. These dynamics indicate that interoperable computing environments that require scalable design, and operational capacity to process heterogeneous data, as well as adaptability, stand out as the next phase of research and development of adaptive ecosystems and infrastructure models.

These requirements are particularly evident in sectors such as healthcare, energy, transportation, where the application of AI depends heavily on interoperability, real-time processing, coordination of heterogeneous infrastructures. In healthcare, fragmented environments limit large-scale AI deployments [Adepoju & Adepoju, 2025]. Infrastructures are also needed in energy systems to support predictive grid management and optimization [Rajaperumal & Columbus, 2025]. Transportation ecosystems increasingly depend on distributed computing architectures that are capable of supporting intelligent mobility and autonomous decision-making processes [Singh, 2025]. By acknowledging the additional implications that these innovations carry [Gurgu, 2025].

These sectoral dependencies further highlight the need for adaptive infrastructure models that are capable of operating in heterogeneous environments, but also to ensure interoperability and real-time responsiveness. Consequently, adaptive digital systems should be understood in the form of transient infrastructure configurations. This position forms the basis for the development of AI-enabled integrated infrastructure systems in Europe.

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6. Conclusions

This paper analyses the infrastructure requirements and development gaps that negatively affect the transition to AI-enabled systems in the territory and context of Europe. The analysis indicates that AI systems are increasingly dependent on advanced and interoperable computing infrastructures. In this way, AI is positioned as an infrastructure layer within digital ecosystems. As a necessary paradigm on the infrastructure of future AI system environments, the architecture of adaptive ecosystems stands out. Especially adaptive layers that integrate cloud, edge, HPC/AI convergence. In addition to conventional regulatory perspectives, interoperability, sovereignty and governance require an understanding that they are properties embedded in the operational infrastructure.

In relation to research questions, the study shows that (RQ1) advanced AI systems transform infrastructure requirements towards distributed and high-performance computing environments, (RQ2) European AI development is constrained by infrastructure fragmentation, hyperscale dependency and uneven distribution of computing capacity, and (RQ3) adaptive ecosystems provide a viable conceptual framework for integration and interoperability, scalability and sovereignty into unified infrastructure models.

The policy implications show that strengthening Europe's AI competitiveness requires the operational integration of governance frameworks with distributed computing infrastructures, which include EuroHPC ecosystems, cloud-edge architectures, and AI-optimized platforms. Digital sovereignty, therefore, in addition to regulation, requires infrastructural realization through sovereign and interoperable computer systems.

The JUPITER case illustrates that strengthening the European sovereignty of AI depends on addressing barriers to implementation, which include energy sustainability, governance coordination and dependence on global hardware suppliers.

The future of AI-enabled critical infrastructure in Europe will depend on the alignment of technological capacities, ecosystem interoperability and sovereign governance embedded directly in the architecture of digital systems.

Finally, future studies should examine in more detail the infrastructure adaptation of comparative AI readiness models, infrastructure resilience metrics, and governance-based ecosystems. This paper contributes to the emerging discourse on the transformation of AI infrastructure by proposing a conceptual

perspective of ecosystems with the aim of understanding the relationship between AI scalability, interoperability and European digital sovereignty.

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GENERATIVE AI AS EPISTEMIC INFRASTRUCTURE: RECONFIGURING THE CONDITIONS OF KNOWLEDGE AND COORDINATED ACTION WITHIN THE ECONOMY

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Abstract

Prevailing narratives describe generative artificial intelligence (AI) as a technology of automation and productivity enhancement. While these effects are significant, they do not capture the primary mechanism through which generative AI reshapes economic and institutional systems. This essay argues that generative AI functions as epistemic infrastructure: it transforms the processes through which data becomes meaning, meaning becomes knowledge, and knowledge becomes coordinated action. Using the DIKWP model (Data–Information–Knowledge–Wisdom–Praxis), the essay analyzes how generative AI intervenes at each stage of institutional sense-making. It further examines the role of semantic AI in grounding meaning and the necessity of white-box control planes for ensuring transparency, accountability, and institutional reliability. Together, these components constitute a new architecture of value creation in which the governance of epistemic processes becomes the central strategic capability for organizations. The essay concludes by outlining implications for institutional design, epistemic risk management, and the future of socio-technical coordination.

Keywords: *generative artificial intelligence, epistemic infrastructure, DIKWP model, knowledge production, semantic AI, institutional design, socio-*

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technical systems, decision-making, data-to-knowledge transformation, AI governance

JEL Classification: O33, D83, L86, M15

1.Introduction

Technological revolutions are often interpreted through the lens of efficiency: machines reduce labor, computation accelerates processes, and automation increases productivity. Generative AI is frequently framed in similar terms, as a tool that automates cognitive tasks or produces content at scale. Yet such interpretations underestimate the structural nature of the transformation underway.

Generative AI does not merely automate tasks; it **reconfigures the epistemic foundations of institutional life**. It alters how organizations interpret signals, construct meaning, justify decisions, and coordinate action. In this sense, generative AI is less a productivity tool and more a **new layer of epistemic infrastructure**—a system that shapes the conditions under which knowledge is produced, validated, and operationalized.

This essay develops this claim by integrating three conceptual frameworks:

1. **DIKWP**, which models the stages of institutional sense-making.
2. **Semantic AI**, which grounds generative processes in structured meaning.
3. **White-box control planes**, which provide governance for hybrid human-AI cognition.

Together, these frameworks illuminate how generative AI transforms the global economy not primarily through automation but through the reorganization of knowledge production and coordinated action.

2.Theoretical Background: From Automation to Epistemic Systems

The dominant economic discourse surrounding AI focuses on labor substitution, productivity gains, and cost reduction. These perspectives draw on classical theories of technological change, in which machines replace human effort or augment human capabilities. However, generative AI differs from previous technologies in two crucial respects.

First, generative AI operates at the level of **meaning**, not merely at the level of mechanical or computational tasks. It interprets, summarizes, synthesizes, and generates representations of the world. Second, generative AI participates in **decision-making processes**, influencing how institutions evaluate evidence, weigh trade-offs, and select actions.

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These characteristics position generative AI within the domain of **epistemic systems**—systems that shape how knowledge is produced, validated, and used. The economic implications of such systems are profound: institutions that can govern their epistemic processes effectively will outperform those that cannot, regardless of traditional productivity metrics.

3.DIKWP as a Framework for Analyzing Epistemic Transformation

The DIKWP model—Data, Information, Knowledge, Wisdom, Praxis—provides a structured lens for analyzing how generative AI intervenes in institutional sense-making. Each stage represents a transformation in the epistemic status of representations.

Data → Information: Expansion and Compression

Generative AI expands what counts as data. Multimodal inputs—text, images, audio, sensor streams—become machine-interpretable. At the same time, AI systems compress this heterogeneity into structured information through summarization, classification, and pattern extraction.

This dual process of expansion and compression reduces the cognitive burden on human analysts and increases the breadth of signals institutions can process. The bottleneck shifts from data acquisition to **data governance and interpretive quality**.

Information → Knowledge: Synthesis and Hypothesis Generation

Generative models synthesize patterns across vast corpora, generate hypotheses, and propose explanations. Knowledge production becomes:

- iterative rather than linear,
- distributed rather than centralized,
- and accessible rather than restricted to domain specialists.

This democratization of knowledge production has both benefits and risks. It accelerates innovation but also increases the potential for epistemic drift if outputs are not grounded in verifiable evidence.

Knowledge → Wisdom: Normative Framing and Prioritization

The transition from knowledge to wisdom involves normative judgment: evaluating options, articulating priorities, and framing trade-offs. Generative AI increasingly participates in this domain by:

- recommending strategies,
- proposing action plans,
- and framing problems in particular ways.

This raises questions of legitimacy, alignment, and responsibility. Institutions must ensure that AI-generated "wisdom" remains aligned with human values and organizational purpose.

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Wisdom → Praxis: Hybrid Action Systems

AI systems now influence or directly orchestrate workflows, decisions, and operational processes. Praxis becomes hybrid: human-machine collaboration shapes real-world outcomes. This hybridization requires new forms of accountability, traceability, and oversight.

Across all stages, the central insight is that **institutions no longer compete on data volume but on their ability to govern the DIKWP pipeline**.

4.Semantic AI: Grounding Meaning in Structure

Generative models are powerful but epistemically fragile. Their outputs are fluent yet ungrounded, which can lead to hallucinations, inconsistent reasoning, and untraceable justifications. Semantic AI addresses these limitations by integrating:

- ontologies,
- knowledge graphs,
- symbolic constraints,
- and verifiable references.

This integration anchors generative processes in explicit meaning structures. Semantic AI thereby enhances:

- interpretability,
- contestability,
- evidence alignment,
- and institutional reliability.

In high-stakes domains—healthcare, law, education, public administration—semantic grounding is not optional; it is a prerequisite for responsible deployment.

5.White-Box Control Planes: Governance for Hybrid Cognition

As generative AI becomes embedded in institutional workflows, governance mechanisms must evolve. White-box control planes provide the necessary oversight architecture. They ensure:

- **traceability** of reasoning paths,
- **answerability** for decisions,
- **override mechanisms** for human correction,
- **pedagogical transparency** enabling mutual learning,
- **institutional memory** that accumulates over time.

These features transform AI from a black-box oracle into a **governable epistemic partner**. Without such control planes, institutions risk epistemic drift, responsibility gaps, and systemic fragility.

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6.Generative AI as Epistemic Infrastructure

When DIKWP, semantic AI, and white-box control planes are integrated, generative AI becomes a new layer of epistemic infrastructure. This infrastructure:

- accelerates sense-making cycles,
- increases the coherence of decisions,
- reduces epistemic risk,
- and enables scalable judgment.

The economic value of generative AI thus arises not primarily from automation but from **reorganizing how institutions know, decide, and act**. This reorganization is foundational: it alters the architecture of coordination, the structure of expertise, and the dynamics of institutional learning.

7.Implications for Institutional Design

Institutions that treat generative AI as a productivity tool will capture only marginal gains. Institutions that treat it as epistemic infrastructure will gain structural advantages. The decisive capability of the coming decade is:

The governance of the transformation from data to coordinated action.

This requires new standards for transparency, new models of human-AI collaboration, and new institutional competencies in epistemic risk management.

8.Conclusion

Generative AI reshapes the global economy by transforming the processes through which meaning and knowledge are produced. DIKWP, semantic AI, and white-box control planes together provide a framework for understanding this transformation and guiding institutional adaptation. The future of value creation will belong to institutions that can integrate these components into coherent epistemic architectures—structures that enable reliable, transparent, and accountable human-AI sense-making.

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LEADERSHIP ROLES IN EMPOWERING AND TRANSFORMING TEACHING FOR SUSTAINABILITY THROUGH ARTIFICIAL INTELLIGENCE (AI)

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Abstract

Artificial Intelligence (AI) is critical in this age and time to different sectors inclusive of education. Hence, the study through a scoping review attempts to explore the roles of leaders in empowering teachers and transforming teaching and learning activities in Africa through Artificial Intelligence (AI) in the context of Africa. Scoping review was employed for the study. Hence, a search was carried out on three databases using google search engine. The databases are: DOAJ, Sabinet, and Scopus. Only two relevant literature were retrieved and used for analysis. Inductive Qualitative Content Analysis was employed in the study. The collected data from the retrieved literature were coded, categorized, thereafter, themes were generated. Among the generated themes are: Education promoting AI, AI in the promotion of economy, AI versus creativity, and AI versus human, especially teacher considering the context of the study. The findings from the analysis show among others that there is paucity of literature in the selected identified area in the context of education considering the number of available literature in the searched databases. Also, while AI is capable of promoting activities in

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institutions of learning, education enhances AI. Also, robots are not to be considered as taking the place of humans, rather they are to work collaboratively for effectiveness and efficiency. The study recommends amongst others based on the findings that infrastructure that are capable of promoting AI use in schools should be provided, especially to ensure sustainability and promote the desired sustainable development. Also, awareness should be created with regards to AI uses, especially in relation to ethical concerns. Meanwhile, relevant programmes and trainings are also required.

Keywords*: Africa, Artificial Intelligence (AI), leadership, Robot(s)*

JEL Classification: O33, H11, H83, D73, O55

1. Introduction

Artificial Intelligence (AI) is currently essential in decision-making across numerous sectors (Gurgu, et al., 2026). Meanwhile, the concept of Artificial Intelligence (AI) remains unfamiliar to many (West & Allen, 2018). It is envisaged to change the world (Thomas, 2022), meanwhile, Batok (2020) had earlier stated that AI has changed the world. According to Xu et al (2021), it is affecting various spheres of human endeavours (Imperio, 2026). This is inclusive of the education sector (Seo, Tang, Roll, Fels & Yoon, 2021). However, there are controversies about artificial intelligence such as issues of racism (Desk, 2022), becoming emotional (Desk, 2022), ethical issues (Tomar, 2022; Pazzanese, 2020), among others. The issue of whether AI promotes education or vice versa is another major concern (Bower et al., 2024; Cabero-Almenara et al., 2024; Filiz et al., 2025). Whilst majority of scholars hold the view that AI promotes and impacts education (European Commission, 2022; GetSmarter, 2022; Korteling, van de Boer-Visschedijk, Blankendaal, Boonekamp & Eikelboom, 2021; Zhou, 2021; Plitnichenko, 2020; Popenici & Kerr, 2017), the issue of education promoting AI remains a challenge. According to Marrone, Taddeo and Hill (2022), artificial intelligence is limited in different ways which makes its acceptability restricted in certain instances. For example, AI is restricted in terms of creativity (Marrone, Taddeo & Hill, 2022). Thus, review of Hybrid Intelligence (2021) as well as Wilson and Daugherty (2018) suggest the need for leaders in different sectors such as security, economy, political, education, among others to explore a blend between AI and humans (Wright et al., 2026; Zhao et al., 2025). This corroborates the quest for postdigitalization as posited by Hodgson (2021), contrary to the

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position of Cloud Geeni (2019) who view postdigital era as one in which the implemented standard would be the case of disruptive technologies such as Artificial Intelligence (AI), social, mobile, cloud, among others. Suffice to state that the views of people differ with regards to what the postdigital era holds as well as the representation of AI in schools especially in African nations where the level of preparation for the digital or postdigital era remains a challenge (The World Bank, 2021; Zyl & Haffejee, 2021; Accenture, 2019). Meanwhile, schools are considered as having crucial role(s) in preparing people for the digital and postdigital era (Korteling, et al 2021). However, this cannot be achievable without due support and alignment of teachers (Örtegren, 2022). For instance, Örtegren (2022) posit that "… in this case digitalization – school has to address the changing conditions, the new demands, and so does teacher education, too (p. 479)." However, the question remains: How true and realistic is this in the context of Africa as well as other developing and underdeveloped countries across the globe? This suggests some forms of limitations especially with the global quest for sustainable development and sustainability.

In addition, Thiam (2024) reporting for the United Nations Educational, Scientific and Cultural Organization (UNESCO) as well as the International Bureau of Education (IBE), there is a need to transform education for all Africans through the use of the curricula. Moreover, according to Filho et al (2018), "transformation process offers an opportunity for rethinking educational practices", also, "transformation and learning on matters related to sustainable development should be integrated" (p. 286). This suggests that for education to be transformed in the African society, there is need to rethink the current practices and explore opportunities to integrate relevant subject matters such as issues revolving around sustainable development and sustainability into it. This can be done through the revision of the curricula. In congruence, the work of Tikly (2019) calls for the need for the transformation of the curricula adopted in the provision of education in the African society. The need for curricula re-design is reflected by Tikly (2019) who posits that:

The elitist nature of education has persisted in the postcolonial period. Indeed, it has been a defining characteristic of the path dependency adopted by *African education systems that until relatively recently they have been characterised* by low levels of access for the poorest, *outmoded, content-driven curricula* and assessment systems that are both cognitively and linguistically demanding and that have played a strong filtering role in *limiting access to higher levels of education* (p. 228, italics added for emphasis).

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In other words, the curricula adopted in many African countries is limiting and demands overhauling for the education system to begin to proffer the required and relevant education needed. This is in agreement with the work of Idahosa, Belluigi and Dhawan (2024) who using the context of South Africa state that there is "*insufficient* engagement with the *sustainability of transformation* efforts…" (p. 1). Nonetheless, the sustainable development and sustainability agenda remain pivotal in the African continent and its nations. From another perspective, review of the work of Basu, Isabelle and Pineau (2024) shows that issues revolving around sustainable development and sustainability especially in relation to the specific context of agriculture in the continent which is "a critical factor of employment and socioeconomic development in Africa, is *plagued by low productivity and lack of technical expertise* (p. 2. italics added for emphasis)". By extension, this indicates the need for curricula review and redesign to enable the production of relevant experts capable of contributing to the desired sustainable development and sustainability (Sibiya, 2026). Similarly, with regards to Artificial Intelligence (AI) which is considered pivotal, Sanusi, Olaleye, Oyelere and Dixon (2022) report that AI curricula in development is lagging in Africa. This indicates that lack of access to and use of AI in education may be contributory to the non-attainment of the desired sustainable development and sustainability.

Also, Perkins (2022) reporting the words of President Nelson Mandela states that "education is the most powerful weapon for change". The World Bank Group (2024) adds that education is "a *powerful driver of development*, and one of the strongest instruments for reducing poverty and improving health, gender equality, peace, and stability. It delivers large, consistent returns in terms of income, and is the most important factor to ensure equity and inclusion" (Par. 1. Italics added for emphasis). Moreover, Commey (2015) had earlier explained and presented education as a means and tool to winning the future. In other words, for Africa to get the desired future, education is a major tool. The foregoing indicates the importance of education to transformation and the pursuit of sustainable development as well as sustainability. However, it is the provision of the relevant education that is capable of providing the desired changes and sustainable development.

Conversely, according to Mogaji and Newton (2020), school leaders vaguely understand sustainable development, thus perceive Education for Sustainable Development (ESD) as a phenomenon that concerns and should focus more on environment and society. This suggests that school leaders' perception of sustainable development and sustainability seems questionable, yet their roles for

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the attainment of such is pivotal. It is against this backdrop that this study is conducted to explore the perception(s) of scholars in a scholarly discourse on the possible roles of leadership in empowering teachers and transforming the subject of teaching in Africa through the use of Artificial Intelligence (AI) to ensure and promote sustainable development as well as sustainability. In order to accomplish the focus of this study, attempt is made to proffer answers to the research question guiding the study which is: What are the perceptions of scholars about AI and its use in African schools? The study is scoped as conceptualization of terms, the protocol which presents and explains the method and steps employed in the study, discussion of findings, conclusion and recommendations.

2. Conceptualization of terms

It is also known as Sub-Saharan Africa and houses over one 1 billion people (The World Bank, 2022). Review of the Global Policy Forum (2021) and Kutor (2014) shows that nations in the African continent can be categorised as being predominantly underdeveloped and developing. In the context of this study, Africa is used to represent nations in the African continent and by extension underdeveloped and developing countries in other parts of the world.

Artificial Intelligence (AI)

AI is problem-solving by programmed machines through the imitation of human intelligence (Frankenfield, 2022). Thus, machines are programmed to think and act like humans in order to proffer solution(s) to identified problem(s) (Burns, 2022; Frankenfield, 2022; IBM Cloud Education). In this study, AI is used to mean machines or robots being programmed to think and function like humans.

Leadership

It is a process of influencing and guiding people to perform certain tasks targeted towards the attainment of set goal(s) and objectives (Emeritus, 2022; Kruse, 2013). According to Twin (2022), it is the process of establishments "… to set and achieve challenging goals, take fast and decisive action when needed, outperform the competition, and inspire others to perform at the highest level they can (par. 1)." In the context of this study, leadership is the process of respective responsible education stakeholders to set goals, guide and influence people towards the achievement of such.

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3. The Protocol

Scoping review as explained by two of its foremost proponents Arksey and O'Malley (2005) and as adopted by Sucharew and Macaluso (2019), was considered useful for this study, thus, was employed. The adoption of scoping review for this study was based on the submission of Peters, Godfrey, Khalil, McInerney, Parker and Soares (2015) that it aids mapping of major concepts underpinning an identified research area. Also, scoping reviews are targeted at aiding the provision of an overview existing evidence(s) not taking cognisance of the quality (Peters et al 2015). This accounts for the reason why no formal assessment of methodological quality of the included studies is accounted for generally (Peters et al 2015). The foregoing on why scoping reviews are performed as identified by Peters et al (2015) accounts for the reason for the adoption of scoping review method in this study.

Furthermore, according to the two identified foremost proponents - Arksey and O'Malley (2005), scoping review consists of six steps. this is supported by Sucharew and Macaluso (2019). The steps include: identifying the research question; identifying relevant studies, selecting study; charting the data; collating, summarising and reporting of the results and consulting of experts. However, the step six which is consultation exercise is described as being optional, hence, can be overlooked in a study. For this study, only the first five steps which are considered as mandatory were followed. The application of each if the steps as followed in the study is as presented and explained below.

Step 1: Identifying the research question: The research question which serves as guide for the study was first identified by the researcher following the steps outlined by Arksey and O'Malley (2005) as well as Sucharew and Macaluso (2019). The research question which is What are the perceptions of scholars about AI and its use in African schools? was first identified in order to ensure that the focus of the study is achieved.

Step 2: **Identifying relevant studies:** After identifying the research question which served as guide for the study, the researcher identified previously conducted and published studies which were considered relevant for this research following the procedure outlined by Arksey and O'Malley (2005) and Sucharew and Macaluso (2019). The relevant studies were identified using electronic databases: DOAJ, Sabinet, and Scopus, on an identified search engine known as Google. DOAJ which stands for Directory of Open Access Journals was adopted in this

study because is described by Paperpile (2022) as being a special academic database as all the articles hosted by it are open access, thus can be freely accessed. Sabinet was included as one of the databases used in this study based on the nation by inference from its name as Sabinet African Journals which implies being liable to hosting more African journals from various disciplines. Thus, since the study was centred in the context of Africa, it was imperative to adopt Sabinet as one of the databases. Scopus on the other hand, was adopted based on the submission of Chadegani (2013) that it is one of the major databases for academic literature collections. Also, Scopus database is described as having the biggest searchable citation, a wide coverage and it is expanded and updated continuously (Baas, Schotten, Plume, Côté & Karimi, 2020).

Step 3: Study selection: According to Sucharew and Macaluso (2019), this step can involve the generation of hypotheses from previously observed data. It also involves the selection of criteria for inclusion and exclusion, or modification of search terms while identifying literatures for data collection. In this study, considering its focus, the search terms employed were “Leadership Role*” AND “Empower*” AND “Teacher*” AND “Transforming” AND “Teaching” AND “Africa” AND “AI” OR "Artificial Intelligence" The search was done on 12 November 2022 on DOAJ, Sabinet and Scopus databases. Sequel to the search on DOAJ and Scopus respectively using the search terms, no literature was found. This prompted the search on Sabinet where 51 articles were retrieved. Scrutinising the retrieved articles, it was discovered that majority of them were based on health and other fields, only two were in the context of education. Thus, the researcher excluded 49 articles which were in other contexts and included the only articles which were in the specific context of education for analysis. Figure 1 below presents a flow chart from the searched data bases, excluded and included number of articles, to the final corpus used for analysis in the study.

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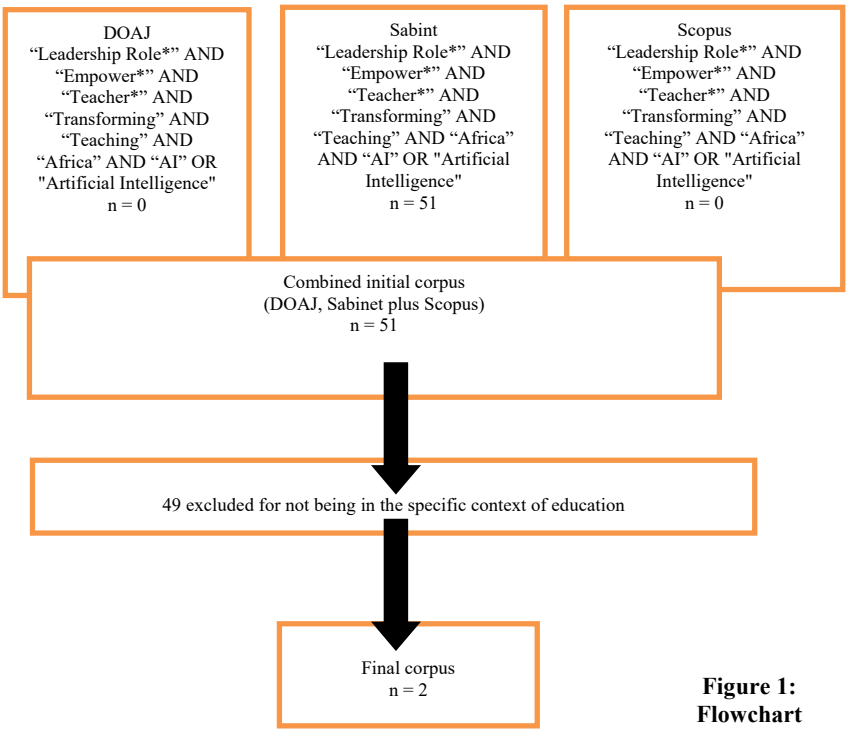


Figure 1: Flowchart

Step 4: **Charting the data**: Sucharew and Macaluso (2019) hold the view that this step entails the use of a data charting form to extract information that are considered necessary, significant and pertinent to the study of focus from the retrieved and reviewed relevant literature. In this study, a data charting form was used to extract significant information that were considered relevant to the study from the two retrieved articles which formed the final corpus of literature used for the study. The retrieved extracts stated in the data charting contributed to the coding, categorising and generation of themes which are eventually presented in the discussion section following the guideline of Saldana (2016). The data charting form is presented using table 1 below.

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Table 1 Data charting form used to extract information from reviewed relevant literature

Authors	Year of Publication	Key findings
Oyedeji	2022	Intense progress is being experienced in Artificial Intelligence (AI). This is expected to have impact on the economy. Education promotes AI, vice versa AI aids education.
Batchelor and Petersen	2019	The role of Robots (AI) is crucial, however, teachers cannot replace human teachers.

Step 5: Collating, summarising and reporting results: This step according to Arksey and O'Malley (2005) presents an account of the reviewed relevant literature. In this study, following codes. categories and generated themes which were used to proffer answer to the research question guiding the study: What are the perceptions of scholars about AI and its use in African schools? Following this, extracts were used to support the discussion. The themes are as presented in the discussion section below.

4. Discussions

One of the findings of the study show that while the subject matter seems more pronounced in other fields, it is limited in education considering the paucity of literature in the specific context of education. Further findings of the study from the relevant reviewed literature from which data was extracted and analysed are presented using identified themes and excerpts below guided by the identified research question of the study.

Research question 1: What are the perceptions of scholars about AI and its use in African schools?

Theme 1: Education promoting Artificial Intelligence (AI)

Theme 1 suggests that education has the capability to promote Artificial Intelligence (AI). This is tantamount to 'no education, little or no AI'. For instance, Oyedeji (2022) following a study conducted on 'harnessing of Artificial Intelligence for educational creativity' states that "The field of Artificial Intelligence (AI) is experiencing a period of intense progress thanks to the

consolidation of several key technological enablers in Education (p. 103).” This suggests the role of education in promoting AI. Similarly, İçen (2022) from a finding of a study conducted on ‘the future of education utilizing artificial intelligence’ using the case study of Turkey states that “….AI growth include a strong private education industry… (p. 1).” This finding of the study is converse to the common submission of various scholars such as European Commission (2022), GetSmarter (2022), Zhou (2021), and Plitnichenko (2020) which indicates that AI impacts education. This finding thus, indicates that as much as AI impacts education, the field of education also aids the promotion of AI. Suffice to state that the two are able to work pari passu though education is considered to benefit more from AI in different ways.

Theme 2: AI promoting Education

The study shows that Artificial Intelligence is capable of promoting education as well as inclusivity in the sector. For instance, Batchelor and Petersen (2019) posit that “… artificial intelligence and robots … influence the work of teachers of the future (p. 71).” Thus, AI and robots have the potency of influencing and promoting education. However, review of the work of Batchelor and Petersen (2019) shows that for AI to promote education, “… the teacher will need to bear in mind what is in the best interests of the young persons and how best to promote their learning (p. 72).” Additionally, Batchelor and Petersen (2019) state that “… with robots ‘there wouldn’t be cases of favouritism, which would mean that all students are assessed fairly and on the same scale’ and that *robot teachers will treat all the students fairly and equally without discriminating against gender, race, disability, class and religion … promote inclusion* (p. 82).” This suggests that AI has the capacity to promote inclusivity in education. This finding of the study is in congruence with the submissions of European Commission (2022), GetSmarter (2022), Zhou (2021), Plitnichenko (2020) as well as Popenici and Kerr (2017) who hold the view that AI impacts and promotes education in various ways. This is supported by Tang (2024) and Korteling, et al (2021) who advocate for the need to develop the educational curricula type that is characterised by different, easily configurable and targeted training forms of learning environments for human-AI systems. This is envisaged to promote AI through education.

Theme 3: AI in the promotion of economy

Results from the reviewed relevant analysed literature shows that scholars perceive AI has having the potential of promoting the economies of societies. Oyedeji (2022) states that the continuation of AI “… process in education will

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likely *contribute to deep economic and social changes* … while mitigating undesirable…. (103).” Furthermore, Elsevier (2018) holds the view that AI is envisaged to change the jobs of people as well as economies of different societies. This indicates that AI has the potency to promote economies. However, Batchelor and Petersen (2019) add that there is need for changes brought about by AI to be ethical. Thus, the need to determine the ethics of changes in jobs and economies brought by AI becomes critical. The question there remains, what is the role of leaders in ensuring that AI is embraced and adopted in promoting their economies especially through the use of education? Moreover, reviews of the works of İçen (2022), OECD (2022), Bansal (2020), and Patrinos (2016) show that education is fundamental to the growth of diverse sectors as well as different societies at large.

Theme 4: AI versus creativity

The finding from analysed relevant literature shows that one of the short comings of AI which makes its use and acceptability limited is its inability to be creative, especially in the field of education which is the focus of this study. For instance, Batchelor and Petersen (2019) from the findings of their study state that “…when the benefits of AI and robot teachers were acknowledged in the classroom situation, it was with the idea that programming of teacher robots is restricted to ‘only provid[ing] correct answers *therefore limiting learners’ creative thinking abilities* because rote learning will be encouraged and learners in schools will be confined to low levels of Blooms taxonomy (p. 78, italics added for emphasis).’ Similarly, it is stated that “Other deficits of teacher robots mentioned in the data are that *they are unable to display authentic human expression, voice and movement* – aspects students regard as irreplaceable in a teacher (Batchelor and Petersen, 2019, 78). This finding coincides with the work of Marrone, Taddeo and Hill (2022) who conducted a study on creativity and Artificial Intelligence from perspectives of students taking cognisance of four different key concepts identified as: affective, social, learning, and technological factors, and submitted saying “… students with a low understanding of AI tended to be fearful of AI. Most … indicated a thorough understanding of creativity and reported that *AI could never match human creativity* (p. 1, italics added for emphasis). This indicates that AI as potent as it may be, still remains limited in terms of having a mind of its own in being creative. Suffice to state that the submissions of Hodgson (2021) who posits that “… postdigital lens quickly reveals the damage done by simple oppositions: framing the world as digital or material, virtual or real, online or face-to-face, artificial or natural, technical or human (p. 318)” is worth being upheld as technology or AI is incomplete and imperfect without human effort considering

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their limitation in terms of creativity. Thus, the reason for the next identified theme which is AI versus human which in the context of this study is the teacher.

Theme 5: AI versus human (teacher)

Theme 5 shows that AI are envisaged to replace humans however, are incapable of doing so to some extent and for certain reasons. Batchelor and Petersen (2019) from the analysed relevant reviewed literature when comparing robot teachers to real human teachers state that "Robot teachers are … said to have 'access to information on a much greater scale than any human whose knowledge is ultimately restricted at a certain point and whose memory could never match up to a programmed robot (p. 80)." This shows the extent of efficiency of robot teachers. The finding is in congruence with the work of Darling-Hammond (2006a) who hold the view that robots possess infinite content knowledge. On the contrary, Darling-Hammond (2006a) further adds that collaboration between human and robot teachers hold huge values for learners to the benefit and advantage of learners. Similarly, reporting the views of students from their conducted study in support of the importance of human teachers, Batchelor and Petersen (2019) express that "Students feel robot teachers are ill-equipped to understand human reasoning because pupils are 'complex creatures and sometimes fail to understand reason.' It seems that students believe that AI and teacher robots are ancillary to human teachers in the classroom, with clear roles ascribed to both. They argue that 'human teachers and robot teachers should not be set off as binary opposites that cannot exist alongside each other,' albeit with the human teacher occupying a superior position in this collaboration (p. 79)." Batchelor and Petersen (2019) further buttress saying "… even though students concede that robots are programmed to 'show emotion in their artificial facial expressions, these expressions are not enough and not real enough to teach a human child the necessary skills to be able to express themselves (p. 79)." Batchelor and Petersen (2019) emphasise that "Student teachers acknowledge that there is a *certain emotional aspect that is required when teaching in order to make it effective* and *fear that even simulated emotion from advanced or sophisticated teacher robots would easily lead to disaffection and emotional sterility* (p. 84, italics added for emphasis)." Thus, human teachers are considered "… as the only entities capable of 'assisting the learners with their social and emotional wellbeing.' Students' recognition of these elements of teacher judgement, most often associated with normative professionalism (Batchelor & Petersen, 80)." This is however attributed to some identified factors such as:

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- Frameworks in the coursework of their institutions of learning (Kumashiro, Pinar & Ladson-Billings, 2009; McDonald & Zeichner, 2009; Darling-Hammond, French & Garcia-Lopez, 2002).
- Systematically integrating a central organising framework that is targeted at the development of learners, especially their social and emotional aspects (Darling-Hammond, 2006b).

This finding of the study corroborates the work of Marrone, Taddeo and Hill (2022) who hold the view that "… AI can be effectively *integrated into classrooms* (p. 1, italics added for emphasis)." This suggests that a blend between human teachers and robot teachers is needed for efficiency and effectiveness towards harnessing success.

Theme 6: Role(s) of leaders

Following review of the work of Batchelor and Petersen (2019), it can be deduced that leaders are to envision, promote and support "… complementary roles for human and robot teachers … (p. 85)." On the other hand, Oyedeji (2022) emphasises that "…leaders … find people that can cause new ideas to unravel pressing issues, a growing number of schools (p. 112). This implies that leaders are to support and promote creativity which is one of the limitations of AI. This therefore, calls for the blend of humans and AI as put forward by scholars like Hodgson (2021), Batchelor and Petersen (2019). This Wilson and Daugherty (2018) reporting for Harvard Business Review describes as collaborative intelligence. In support, Hybrid Intelligence (2021) express that this should be "Because the brain and AI use fundamentally different algorithms, each shines in tasks the other utterly fails. This is why they need to work together (par. 1)." This implies suggests the need for blend between humans and AI.

5. Conclusion and recommendations

Artificial Intelligence (AI) enhances education, vis-à-vis, education promotes AI. Thus, the transformation of education in Africa through the empowerment of teachers and use of AI is perceived by scholars as a possible venture. However, for such to be achieved leaders have various roles to perform. Sequel to the findings of the study, it is submitted that while AI is important, yet it is incapable of replacing humans totally. Hence, a blend of the two (human and robots) is to be desired. In this regard, postdigitalization is to be preferred and embraced for efficiency and effectiveness. Consequently, based on the findings of the study, the following recommendations which are considered as the roles of leaders in the education sector are made:

- Facilities capable of promoting the use of AI in schools should be made available considering its importance.
- Adequate awareness on AI as well as its use and benefits in education should be made. This can be done through periodic orientation programmes in institutions of learning, workshops, seminars, conferences, symposia, among others.
- Institutional training programmes on AI for teachers in African schools should be made available at national and possibly continental levels. This would help promote teachers' skills in the use of AI in class. Meanwhile, the roles of teachers in the use of AI in classrooms are to be stated during such programmes. This will enable teachers not to rely on AI to perform their roles, regardless of the huge benefits expected from AI.
- Postdigitalization which supports and promotes blend between humans and AI should be promoted and considered as advantageous.

Limitation and suggestion for further study

The study was limited to a scoping review using qualitative method. Thus, it is suggested that similar study be conducted using quantitative or mixed method approach. More so, considering the paucity of literature in the identified field, study in this field is thus crucial.

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DATA PRIVACY, REGULATORY COMPLIANCE, AND REHABILITANT TRUST IN ELECTRONIC HEALTH RECORD SYSTEMS

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Abstract

Electronic Health Records (EHR) and Electronic Medical Records (EMR) are pivotal in modernising healthcare delivery in Nigeria, enhancing patient data accessibility, care continuity, and evidence based clinical decision making. However, systemic challenges including insufficient data privacy safeguards, inconsistent adherence to regulatory frameworks, and limited patient trust threaten their effectiveness and long-term adoption. This study investigates the relationships among data privacy, regulatory compliance under the Nigeria Data Protection Regulation (NDPR), and patient trust within EHR/EMR platforms. Leveraging socio-technical theory and trust-based frameworks, a conceptual model was developed and tested using a cross-sectional survey of 372 healthcare providers and users. Reliability and validity were confirmed with Cronbach's α and composite reliability above

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0.80 and AVE between 0.64 and 0.71. Structural equation modeling results reveal that data privacy positively affects patient trust (β = 0.36, p < 0.001) and regulatory compliance (β = 0.52, p < 0.001), with compliance significantly enhancing trust (β = 0.41, p < 0.001). Mediation analysis demonstrates that regulatory compliance partially mediates the privacy to trust relationship, accounting for 38 percent of the total effect. Findings highlight that robust privacy by design practices, aligned compliance, staff training, and user-centered system design are critical to building patient confidence and supporting sustainable digital health adoption in Nigeria.

Keywords: *Electronic Health Records (EHR), Electronic Medical Records (EMR), Nigeria Data Protection Regulation (NDPR), data privacy, health information systems regulatory compliance, patient trust, Nigeria*.

JEL Classification: Q54; I18.

1. Introduction

The digitalisation of healthcare delivery in Nigeria has accelerated significantly over the past decade, driven by increasing adoption of Electronic Health Records (EHR) and Electronic Medical Records (EMR) across public and private health facilities. These systems are central to improving clinical efficiency, continuity of care, and health system accountability in a context characterised by high rehabilitant/patient volumes, fragmented records, and resource constraints. Recent national initiatives aimed at strengthening health information systems underscore the strategic importance of EHR/EMR platforms for achieving universal health coverage and quality healthcare delivery (Quadri, Ujuwa & Ukpere, 2025). Rehabilitant and patient will be used in interchangeably this study.

Despite these benefits, the Nigerian health sector continues to grapple with critical challenges related to data privacy, regulatory compliance of the rehabilitant. Healthcare data breaches, unauthorised access, weak enforcement of privacy policies, and limited cybersecurity capacity raise concerns about the safety of electronic health information. Given the sensitivity of medical data, patient trust has emerged as a pivotal factor influencing acceptance, disclosure behaviour, and sustained use of EHR/EMR systems.

While Nigeria has data protection frameworks such as the Nigeria Data Protection Regulation (NDPR), compliance levels vary widely across healthcare

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institutions. Moreover, existing evidence suggests that regulatory compliance alone does not automatically translate into rehabilitant trust, particularly in environments where system usability, transparency, and staff behaviour are inconsistent. This study therefore examines the interrelationships among data privacy practices, regulatory compliance, and patient trust in EHR/EMR systems within the Nigerian healthcare context.

Anchored in Socio-Technical Theory and Classic Trust Theories this study regards the EHR/EMR ecosystem in Nigeria as interplay between human actors and technical artefacts. Socio-Technical Theory posits that optimal system performance is achieved only when social subsystems are aligned with technical subsystems. Similarly, Trust Theories extend such alignment by arguing that a healthcare institution's perceived benevolence, integrity, and ability directly influence a patient's willingness to disclose sensitive data and to accept algorithm-generated recommendations. These lenses are confirmed by the empirical results: data privacy-that is, the technical safeguard-predicts regulatory compliance, which is a process of social-institutional settings and, in turn, predicts patient trust, which is a social outcome. This therefore implies that strong socio-technical coupling is a sine qua non for sustainable digital-health adoption in Nigeria.

1.1 Problem Statement

Although Nigerian healthcare providers increasingly deploy EHR/EMR platforms, patient trust in digital health records remains fragile. Cases of internal misuse of patient records, inadequate access controls, and limited awareness of data protection obligations among healthcare workers persist. Empirical studies in comparable to African contexts indicates that employee non-compliance with privacy policies significantly undermines data protection outcomes (Wallace-Bruce, 2021). Furthermore, regulatory compliance in Nigeria is often compliance-driven rather than trust-driven, emphasising legal adherence over ethical data stewardship and patient engagement. Emerging technologies such as blockchain and distributed ledger systems offer enhanced security and auditability, yet their adoption remains limited due to cost, regulatory ambiguity, and usability concerns. The core problem addressed in this study is therefore focus on how data privacy and regulatory compliance mechanisms influence patient trust in Nigerian EHR/EMR platforms.

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1.2 Research Objectives

The main objective of this study is to examine the interrelationships among data privacy practices, regulatory compliance, and patient trust in EHR/EMR systems within the Nigerian healthcare context. The specific objectives are as follows:

i. to examine the effect of data privacy practices in EHR/EMR systems on rehabilitant trust;

ii. to investigate the impact of regulatory compliance effectiveness on rehabilitant trust in EHR/EMR systems.

iii. to assess the mediating role of regulatory compliance in the relationship between data privacy practices and rehabilitant trust.

1.3 Research Hypotheses

$H_0$1: Data privacy practices in EHR/EMR systems positively influence rehabilitant trust.

$H_0$2: Regulatory compliance effectiveness positively influences rehabilitant trust.

$H_0$3: Regulatory compliance mediates the relationship between data privacy practices and rehabilitant trust.

2. Literature Review

2.1 The Evolving Conceptualization of Data Privacy

Contemporary scholarly discourse has reconceptualised data privacy beyond traditional notions of secrecy and confidentiality toward frameworks emphasizing individual agency, contextual integrity, and informational autonomy. Nissenbaum's (2010) seminal theory of contextual integrity which posits that privacy norms depend on appropriate information flows within specific social contexts has gained renewed traction as scholars apply it to algorithmic systems and digital platforms (Dubov & Shiffman, 2023). Recent theoretical advances distinguish between privacy as control (individual mastery over personal data) and privacy as access (restricting others' ability to view or use information), with emerging syntheses arguing that effective protection requires both dimensions operating in tandem (Mulligan et al., 2023). The European Union's General Data Protection Regulation (GDPR) and similar frameworks globally have institutionalized these principles through data subject

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rights including access, erasure, and portability yet critics note persistent gaps between legal formalism and lived experiences of privacy, particularly for marginalized communities whose data practices may not align with regulatory assumptions (Dubov & Shiffman, 2023; Taylor, 2023). This tension has prompted calls for participatory and anticipatory governance models that embed privacy protections into system design rather than relying solely on retrospective compliance mechanisms (Mulligan et al., 2023).

2.2 Privacy in the Age of Artificial Intelligence and Ubiquitous Computing

The proliferation of artificial intelligence, machine learning, and Internet of Things ecosystems has generated novel privacy challenges that strain existing conceptual and regulatory frameworks. Scholars now identify emergent privacy harms including algorithmic inference, predictive profiling, and behavioral manipulation that operate even when traditional identifiers are anonymized, suggesting that current notice-and-consent paradigms are structurally inadequate (Mulligan et al., 2023). The concept of privacy as contextual integrity has been extended to address these dynamics, with researchers emphasizing that context collapse across digital platforms disrupts the normative information flows necessary for privacy preservation (Dubov & Shiffman, 2023). Concurrently, privacy-enhancing technologies (PETs) such as differential privacy, federated learning, and homomorphic encryption are being theorized as technical mechanisms for reconciling data utility with protection, though their implementation raises questions about transparency, accountability, and power asymmetries between data subjects and controllers (Taylor, 2023). Looking forward, the literature anticipates a shift toward ecosystem-level privacy governance, where responsibility is distributed across technical architectures, organizational practices, and regulatory oversight rather than burdening individual users with impossible informational self-management (Mulligan et al., 2023; Taylor, 2023).

2.3 Digital Transformation, Algorithmic Regulation, and Compliance Innovation

The proliferation of regulatory technology (RegTech) and artificial intelligence in compliance monitoring has fundamentally altered how organizations achieve and demonstrate regulatory adherence. Scholars now distinguish between compliance-by-design embedding regulatory requirements into automated systems and workflows and compliance-as- reporting, where

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algorithmic tools generate real-time transparency for regulators (Yeung, 2023). This technological shift raises conceptual questions about accountability distribution: when machine learning systems detect violations or prescribe corrective actions, responsibility becomes diffused across software developers, data scientists, compliance officers, and senior management (Huisman & van Erp, 2023). Concurrently, data-driven regulation enables predictive compliance analytics, allowing both firms and regulators to anticipate risks before materialization, though critics caution against surveillance creep and the erosion of procedural safeguards (Yeung, 2023; Gunningham, 2020). Emerging frameworks propose meta-regulatory approaches where regulators oversee organizational compliance systems rather than substantive outcomes, necessitating new conceptualizations of trust, verification, and regulatory craftsmanship in an era of algorithmic governance (Coglianese, 2023; Parker, 2022).

2.4 EHR/EMR Adoption and Privacy Challenges in Nigeria

The transition from paper-based records to electronic systems in Nigeria has improved data accessibility but has simultaneously increased exposure to cyber risks. Elsangidy, Farag, and Ibrahim (2025) observe that expanding interoperability and remote access amplify vulnerabilities in centralised health information systems, particularly where legacy infrastructure struggles to accommodate modern security protocols. In Nigeria, these risks are compounded by unstable power supply, which disrupts continuous system monitoring and backup protocols; limited cybersecurity expertise, creating acute shortages of personnel capable of threat detection and incident response; and weak institutional controls, where fragmented oversight across federal and state health agencies obscures accountability for data protection. Adane et al. (2019) emphasize that while digital medical data enhance clinical efficiency through streamlined information sharing and decision support, inadequate safeguards can result in unauthorised secondary use, where patient data is repurposed for commercial or research activities without informed consent; data leakage via unsecured networks and portable storage devices; and erosion of confidentiality undermining patient trust in formal healthcare systems. Such challenges are particularly pronounced in low- and middle-income countries where governance structures are still evolving, regulatory frameworks remain underdeveloped, and resource constraints force trade-offs between system functionality and security investment. Mulligan et al. (2023) further argue that these contexts often import

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technical solutions designed for high-resource settings without adapting privacy architectures to local institutional capacities, resulting in contextual misalignment between protective technologies and operational realities. In Nigeria specifically, the National Health Information System Strategy has prioritised connectivity over security infrastructure, reflecting broader patterns where digital health acceleration outpaces risk governance leaving facilities exposed to ransomware, insider threats, and state-sponsored surveillance that remain poorly documented in the scholarly literature.

2.5 Regulatory Compliance and Data Protection

Nigeria's data protection environment is shaped primarily by the Nigeria Data Protection Regulation (NDPR) issued in 2019 by the National Information Technology Development Agency (NITDA), supplemented by sector-specific guidelines from regulatory bodies such as the Federal Ministry of Health and the Health Facility Regulatory Agency (HEFRA). However, enforcement remains uneven across healthcare institutions, with private urban hospitals demonstrating greater compliance capacity than public facilities and rural clinics where regulatory oversight is attenuated. Wallace-Bruce (2021) demonstrates that compliance with Electronic Medical Record (EMR) privacy policies is strongly influenced by staff awareness of data handling obligations, training intensity in confidentiality protocols, and monitoring mechanisms that detect and remediate violations factors that coalesce into what the author terms "compliance culture" rather than mere policy adherence. In the Nigerian context, these cultural prerequisites are undermined by high staff turnover, irregular training budgets, and absence of dedicated data protection officers in most public health institutions. Garbagnati and Wu (2021) further argue that embedding privacy and security by design integrating protective measures into system architecture from inception is more effective than post hoc regulatory enforcement, which often confronts technical debt, organizational resistance, and retrofitting costs. This architectural approach demands data minimization protocols, purpose limitation controls, and automated access logging built into EMR platforms rather than layered atop existing workflows. In Nigeria, however, procurement practices frequently prioritize functionality and cost over security specifications, while vendor contracts rarely mandate privacy-by-design compliance or post-implementation security audits. The resultant implementation gap between regulatory aspiration and institutional reality suggests that Nigeria's data protection framework, while normatively comprehensive, lacks operational

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infrastructure including skilled enforcement personnel, sector-specific guidance for health data, and incentives for proactive compliance that would translate legal standards into embedded practice.

2.6 Patient Trust in Digital Health Systems

Patient trust is a multidimensional construct encompassing perceived system competence the belief that healthcare technologies function reliably and accurately; integrity confidence that institutions adhere to moral principles and professional standards even when unobserved; and benevolence assurance that providers genuinely prioritize patient welfare over self-interest or external pressures (Mayer et al., 1995; Kinney et al., 2024). In digital health contexts, these foundational dimensions extend to technology-mediated beliefs about data confidentiality, specifically whether personal health information remains accessible only to authorized parties; ethical use, concerning the purposes for which data is analyzed, shared, or monetized; and institutional accountability, reflecting confidence that mechanisms exist to redress breaches, compensate harms, and sanction violations (Kinney et al., 2024; Pool et al., 2025). Kinney et al. (2024) further distinguish between interpersonal trust in individual clinicians and systemic trust in technological infrastructures, noting that digital health ecosystems require both forms to function effectively patients must trust their doctor and the algorithms, databases, and third-party vendors that mediate care. Studies demonstrate that perceived misuse of health records whether through unauthorized access, commercial exploitation, or state surveillance significantly reduces patients' willingness to share accurate information during clinical encounters, leading to deliberate omission of sensitive symptoms or histories, and to engage with electronic systems more broadly, including patient portals, remote monitoring devices, and preventive screening programs (Pool et al., 2025). Pool et al. (2025) identify this as "privacy-protective non-disclosure" a rational adaptive behavior where patients withhold clinically relevant data to prevent anticipated privacy harms, thereby degrading care quality and population health surveillance accuracy. In low-trust healthcare environments, such as those characterized by historical discrimination, weak regulatory enforcement, or frequent institutional breaches, patients may opt entirely out of digital systems, reverting to cash payments, informal providers, or geographic displacement to avoid electronic documentation phenomena documented in marginalized communities globally (Mulligan et al., 2023). The feedback loop between trust erosion and system disengagement poses particular challenges for public health

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digitalization agendas, which depend upon comprehensive population coverage to achieve epidemiological and economic returns on technology investment.

2.7 Technological Innovations for Privacy Enhancement

Blockchain and distributed ledger technologies have been proposed as transformative solutions to Electronic Health Record (EHR) and Electronic Medical Record (EMR) security and interoperability challenges, offering architectures that depart fundamentally from centralized database models. Ferreira et al. (2024) highlight their potential to enhance auditability through immutable, timestamped transaction logs that create tamper-evident records of every data access, modification, or transmission enabling post-hoc forensic analysis and accountability attribution that conventional systems struggle to provide. Simultaneously, smart contract-based access control allows granular, programmable permissions where patient consent is cryptographically enforced and automatically revoked when conditions expire, reducing reliance on institutional gatekeepers. Tokenisation approaches extend these capabilities by enabling secure data sharing without exposing raw patient data substituting sensitive identifiers with non-sensitive equivalents that retain referential integrity while severing direct linkability (Ferreira et al., 2025). These privacy-preserving computation techniques, including zero-knowledge proofs and homomorphic encryption, allow analytics and research to proceed on encrypted or obfuscated datasets without decryption, addressing the tension between data utility and confidentiality protection. However, Abbas et al. (2025) caution that technological solutions must be complemented by governance frameworks that define liability allocation across distributed network participants, regulatory clarity that reconciles blockchain immutability with data protection rights such as erasure and rectification, and user education that builds health literacy around cryptographic key management, consent mechanisms, and risk comprehension to gain sustained trust. In resource-constrained contexts such as Nigeria, these socio-technical requirements present formidable barriers: intermittent electricity undermines node participation and consensus mechanisms; limited technical workforce constrains deployment and maintenance; regulatory ambiguity surrounding health data on blockchain creates legal risk for early adopters; and low baseline digital literacy complicates patient engagement with self-sovereign identity models. The resultant implementation gap suggests that while blockchain architectures offer normatively attractive properties for health data governance, their contextual appropriateness depends upon parallel investments

in institutional capacity, legal harmonization, and inclusive design that are frequently underemphasized in technical advocacy.

2.8 Theoretical Foundations and Evolving Conceptions of Regulatory Compliance

Recent scholarly discourse has fundamentally reconceptualised regulatory compliance, transcending conventional deterrence-oriented paradigms in favor of integrative theoretical frameworks that foreground organizational capability, regulatory legitimacy, and adaptive responsiveness. The classical economic perspective grounded in Becker's (1968) rational choice theory posits that firms calculate compliance costs against expected penalties, leading to enforcement-centric regulatory designs (Coglianese, 2023). However, recent theoretical advances, notably responsive regulation theory (Ayres & Braithwaite, 1992) and regulatory pluralism, demonstrate that compliance emerges from complex interactions between formal rules, informal norms, and organizational culture rather than sanction threats alone (Gunningham, 2020; Parker, 2022). The compliance management system approach, increasingly institutionalized through ISO 37301 standards, conceptualizes compliance as a continuous governance process involving risk identification, control implementation, performance monitoring, and corrective action shifting focus from binary legal adherence to ethical organizational conduct (Huisman & van Erp, 2023). This evolution reflects broader recognition that regulatory complexity, characterized by overlapping jurisdictional requirements and rapid rule changes, demands adaptive capabilities that transcend checkbox compliance (Coglianese, 2023; Parker, 2022).

3. Methodology

Research Design

A cross-sectional survey design was adopted to examine relationships among data privacy, regulatory compliance, and patient trust in Nigerian healthcare facilities.

Population and Sampling

The study population comprised patients and healthcare professionals in public and private hospitals in Lagos and Oyo States where EHR/EMR systems are operational. A stratified random sampling technique yielded 420 respondents, ensuring representation across clinical and administrative units.

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Method of Data Collection

A structured questionnaire was developed using validated scales from health informatics and trust literature. All constructs were measured on a five-point Likert scale.

Data Analysis

Data were analysed using Structural Equation Modeling (SEM-PLS) due to its suitability for latent constructs and predictive analysis.

Reliability and Validity

Table 1: Reliability and Convergent Validity

Construct	Cronbach's α	Composite Reliability	AVE
Data Privacy	0.88	0.91	0.67
Regulatory Compliance	0.85	0.89	0.64
Patient Trust	0.90	0.93	0.71

However, prior to undertaking testing of the structural model, the initial evaluation of the measurement model described its reliability and convergent validity. Table 1 below shows alpha values, composite reliabilities, as well as average values of variance extracted, measured on each of the three constructs. On applying the recommended criteria of alpha values >0.70, AVE >0.50, it is ascertained that the scale has high levels of reliability, while each of the constructs is measured satisfactorily. Specifically, alpha =0.88, AVE =0.67 for Data Privacy, alpha=0.85, AVE=0.64 for Regulatory Compliance, while alpha=0.90, AVE=0.71, in the case of Patient Trust.

4. Results

The present study presented the result following the research hypothesis formulated.

H_{01}: Data privacy practices in EHR/EMR systems positively influence patient trust.

Table 2: Data privacy practices in HER/EMR systems of patient trust

Path	β	t-value	p-value
Data Privacy → Patient Trust	0.36	6.21	<0.001

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The direct effect of Data Privacy on Patient Trust: As shown in Table 2, the standardized path coefficient (β = 0.36) is positive and statistically significant (t = 6.21, p < 0.001), thus supporting H_1. This suggests that within a Nigerian healthcare environment, effective privacy mechanisms, such as access controls, encryption, and privacy-by-design system features, will enhance patients' trust directly in EHR/EMR systems. Patients are able to view organisations with substantial data protection policies as more reliable, which has been able to validate the important role technical privacy mechanisms play in the adoption of digital health.

H_{02}: Regulatory compliance effectiveness positively influences patient trust.

Table 3: Regulatory compliance effectiveness of patient trust

Path	β	t-value	p-value	Decision
Regulatory Compliance → Patient Trust	0.41	7.08	<0.001	Supported

Table 3 examines the impact of Regulatory Compliance on Patient Trust. In support of H_2, the results show there is a significant positive relationship between the variable and the construct of interest (β = 0.41, t = 7.08, p < 0.001). The implication of this finding is that the compliance mechanisms with regulatory frameworks, such as NDPR, strengthen patient trust in facilities. Even while strong technical privacy measures are in place, trust increases considerably when these are integrated into binding policies and compliance monitoring. Thus, compliance mechanisms serve as an organizational enabler that translates privacy efforts into concrete patient confidence.

H_{03}: Regulatory compliance mediates the relationship between data privacy practices and patient trust.

Table 4: Regulatory compliance mediates relationship of patient trust

Path	β	t-value	p-value	Decision
Data Privacy → Regulatory Compliance	0.52	9.14	<0.001	Supported

Table 4 Test of Mediation Effect of Regulatory Compliance on Data Privacy & Patient Trust. Data Privacy has a significant predictive effect on Regulatory Compliance (β=0.52, t=9.14, p<0.001), creating a strong link. This indicates that

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privacy efforts work better when they are structured into law conformity. On the other hand, law conformity partially mediates Data Privacy & Patient Trust, which means that while patient privacy boosts trust, it works better when supported by uniform law conformity. This proves hypothesis H_3, suggesting that patient trust in Nigerian healthcare settings depends on both technical & organisational aspects.

5. Discussion of results

The findings support H_1, showing that data privacy practices in EHR and EMR systems significantly enhance patient trust in Nigeria. Precisely, the technical safeguards, such as encryption, access control, and privacy by design architectures, have a direct positive impact on patients' confidence in the protection of their sensitive health information from misuse or unauthorized disclosure. This agrees with international evidence that notes that technological controls are an important ingredient for building trust; however, they are not adequate in their own right (Elsangidy, Farag, & Ibrahim, 2025; Wallace-Bruce, 2021). In the Nigerian context, where both public and private health facilities are rapidly embracing EHR/EMR systems, robust privacy measures blunt anxieties about cyber threats and data breaches, which have traditionally hindered the adoption of digital health technologies (Abbas, Talib, & Moufti, 2025). These findings pinpoint the focus of effectively implemented privacy protocols as a core constitutive element in patient trust.

As far as H_2 is concerned, being compliant with regulations was discovered to positively affect patient trust. Even though privacy technologies are in place, their efficiency depends on strict compliance with enforceable legislation like the Nigeria Data Protection Regulation (NDPR) and guidelines on healthcare information. This not only promotes systematic compliance with patient data protection but also helps avoid random patient behavior with regard to healthcare services. As Ferreira et al. (2024) and Garbagnati and Wu (2021) support, trustworthy healthcare environments cannot be established even with highly efficient patient data protection technology unless healthcare providers adhere to established protocols. This brings this point to its conclusion.

Finally, H_3 is supported because this research would like to place vital emphasis on the mediating role of compliance with regards to the socio-technical characteristics that affect patient trust. Patient trust is dependent on more than the deployment of technology or the implementation of policies because there are organizational practices involved such as staff training or awareness

programs, among others. A socio-technical approach would go on to add that patient trust in online healthcare systems is dependent on the interplay between the effectiveness of technology, compliance with regulations, and the culture of the organization (Kinney et al., 2024; Daigrepont, 2020). In the context of current developments surrounding the healthcare information sector of the country, a context where best practices that include privacy are factored into healthcare training, awareness, or governance would permit patients to believe the EHR/EMR systems because they would be viewed as trustworthy.

6. Conclusion

This paper shows that patient trust in Nigerian EHR/EMR systems arises from both technology-based trust mechanisms as well as the social setting within which these systems are deployed, as asserted by Socio-Technical Theory. Encryption, access controls, privacy by design, among others, are key enablers of secure electronic healthcare, as these technologies are deemed to directly improve patient trust in those mechanisms that guarantee confidentiality of personal health data. But as argued by socio-technical theory, these mechanisms are not sufficient by themselves. Suffice it to state that in Nigerian healthcare, currently undergoing rapid adoption of both EHRs and EMR solutions within public as well as private health facilities, patient-perceived trust levels are dependent not only on technically engineered mechanisms of healthcare delivery but also on how these are aligned with social values of sound data handling processes, among others (Elsangidy et al., 2025; Wallace-Bruce, 2021).

Trust Theories provide insights into the specific mechanisms whereby privacy and regulatory compliance affect patient trust. By acting as a regulatory compliance mediator, privacy is converted into concrete, enforceable behaviors that patients can trust. This is consistent with trust theories whereby trust in a system depends upon the synergy of expertise (system effectiveness), fairness (compliance with system standards and laws), and benevolent intention (concern for patient welfare) (Ferreira et al., 2024; Garbagnati & Wu, 2021). The observed partial mediation effect indicates that while there is a direct link between data privacy and patient trust, data privacy works much better when institutionalized through laws such as the Nigeria Data Protection Regulation and upheld by healthcare practitioners.

Finally, the findings underscore that trust in digital health is a socio-technical construct, dependent on both technological performance and the social system in which it is embedded. Organizational factors such as staff training, awareness

initiatives, and transparent patient engagement shape how patients perceive and accept EHR and EMR systems. In Nigeria, sustainable adoption of digital health platforms requires integrated strategies that align advanced technological safeguards with organizational governance and ethical culture. Grounding this research in "Socio-Technical Theory" explains the interdependence of technology and social context, while "Trust Theories" provide the framework for understanding how these factors collectively foster patient confidence, system acceptance, and long-term sustainability of EHR and EMR systems (Kinney et al., 2024; Daigrepont, 2020).

7. Recommendations

On the basis of findings from this study, the following recommendations are made in order to strengthen patient trust in Nigerian EHR/EMR solutions:

1. Enforce Regulatory Compliance: The Nigerian Ministry of Health, in partnership with NITDA, must ensure strong enforcement of the Nigeria Data Protection Regulation (NDPR) in all medical facilities. Compliance checks need to be carried out to ensure facilities are in adherence.

2. Staff Training and Capacity Building: The hospital and healthcare organizations need to work on staff training programs for awareness and education related to patient data privacy and handling.

3. Use Privacy by Design Architecture: It is important to incorporate privacy measures in the design of digital healthcare platforms to ensure patient privacy when using healthcare services and programs offered by various institutions.

4. Promote Transparency and Patient Involvement: Healthcare facilities must communicate with patients the information regarding data collection, storage, and usage. Transparency while communicating helps with patient awareness and encourages trust.

5. Make Use of Latest Technologies for Compliance & Security:

They should make use of technologies such as blockchain technology or distributed ledger technology or AI-based monitoring for ease of privacy preservation for patients.

6. Promote Research Relevant to the Context as well as Continuous Evaluation: To grasp the dynamic trust-inducing factors over the years, longitudinal studies will play a significant role, along with regional evaluations.

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INFLUENCE OF HUMAN RESOURCE MANAGEMENT PRACTICES ON EMPLOYEE ENGAGEMENT IN MANUFACTURING ORGANISATIONS OF LAGOS METROPOLIS

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Abstract

The focus of the study was to examine the influence of human resource management practices on employee engagement wherein manufacturing organisations in the Lagos Metropolis were used as the unit of analysis. The study identified the human resource management activities that drives employee engagement; examined the relationship between human resource management practices and employee engagement as well as the influence human resource management practices on employee engagement. Questionnaire was used as the research instrument and the results identified communication, recruitment and selection, training and development, rewards and recognition, career development as the major human resource

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management practices commonly used in the manufacturing organisations. It was found that human resource management practices have a positive linear relationship with employee engagement especially, career development and recruitment and selection. It was concluded that human resource management practices can be used as strategies to drive genuine employee engagement at any time as it exerts enormous influence on employee engagement and recommended that management should provide enabling environment that would facilitate operationalization of the human resource management practices in order to drive employee engagement.

Keywords: *employee training and development, employee communication, rewards system, employee involvement, employee engagement, career development*

JEL Code: O15, M12, M52, M53

1. Introduction

The sporadic development in the business world on account of rapid transformation and advancement in the modus operandi of activities in the business organisations heralded introduction of new techniques, systems, technologies, standards, and procedures as well as focus on man who will interact and implement changes in the modus operandi of business activities. The implication of this development is instability in the world of work, especially in the manufacturing sector where the changes are more obvious and rampant, thus, placing bigger challenges on employees as the expectations of employers are increasing in order to keep up with evolving trend which is slowly but steadily affecting employee connection to their organisation and their job with direct effect on performance or productivity of the organisation. The way out of the wood is to devise a means to mitigate the consequences of the global crisis so that employees can be connected to their organisation and their job, which is building a robust labour force i.e. placing high premium on their employees considered as valuable assets without negative effect on the workforce (Mushonga & Ukpere, 2022).

The trend has compelled organisations to perceive people as an asset whose skills, abilities, knowledge, and experience can be utilised to sustain the competitiveness and relevance in the industry. It also expects employees to be proactive as against reactiveness, take responsibility for their professional development as against institution sponsorship, collaborative and team work as against individualism, and show commitment to high performance (Alzyoud, 2018). The implies that organisations need engaged people who will go extra miles

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to perform assigned task, and not people that are merely doing the job. This is entrenched in the position of Gotal et al. (2023) that employees who are engaged in their work are usually committed to their organisations to give economic and competitive advantage leading to higher productivity and lower attrition rate.

The work of Gallup (2006) indicated that only 29% of the U.S. working population is engaged (loyal and productive), 55% are not engaged (just putting in time), and 15% are actively disengaged (unhappy and spreading their discontent) while Alrai (2015) reported that the level of employee engagement in Japan is very low especially in the manufacturing sector and Nkansah et al. (2023) in their work situated in Ghana found that workers were not totally absorbed in their respective work, rather, found most of them doing their job for earning thus, concluded that employee engagement is also low in Ghana. This confirms the earlier position of Amoako-Asiedu and Obuobisa-Darko (2017) who posited that employee engagement in Ghana, especially in the public sector was low. It is therefore evident that employee engagement relativity is not peculiar to service or manufacturing industries but rather to the two industries because is the essential nutrient that modern business organizations require in order to survive, thrive, and grow. Beri and Gulati (2021) posited that employee engagement is antidote needed to combat the recent crisis in the corporate business setting as it has assisted organizations to transform their employees from strategic tools to strategic partners by repositioning employee beyond motivational strategies and wellness initiatives.

Since employee engagement revolve around the people in the organisation, it implies adopting a practice that would enable organisations to manage their employees in such a way that these employees would be connected to their work and the organisation. For practice to be operational and effective, it must derive its strength from the organisational policy and in this case, organisation should endeavour to incorporate engagement strategies into the overall organisational policies with a focus on the management of people in the workplace in order to drive employee performance to the highest levels which is evident in human resource management (Mushonga & Ukpere, 2022). Therefore, employee engagement strategies must be inserted in the human resource management policies for effective practices as human resource management practice is that part of management concerned with people at work and their relationship within the organisation and as a result, the concept of employee engagement has become one of the most extensively explored field in human resource management for practitioners and academics alike seeking to improve employee retention,

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performance, productivity, morale, job satisfaction, competitive and economic advantage etc.,

Within the context of human resource management practices, there had been many activities such as human resource planning, recruitment and selection, training and development, compensation management, performance appraisal, industrial relations, health and safety, career development, employment relationship, integration and socialisation, counselling and discipline, personnel audit, etc., and the implication is that the practice of these diverse human resource management activities would have effect on the degree of employee engagement among the workers. Alzyoud (2018) asserted that the choice of the right practice in human resource management may result in better employee engagement among the employees, especially in the manufacturing organisations while other scholars identified series of human resource management activities that serves as drivers of employee engagement. Saks (2022) explained that human resource practices such as work-life balance, job design, employee health and safety, career development opportunities lead to employee engagement while Xiayan *et al.* (2021) found that hiring procedure, compensation, and performance feedback as well as training and development practices have a significant effect on the employee engagement in IT organisation and many more.

There had been consensus among scholars with respect to the place of human resource management practices in employee engagement however, most the studies on employee engagement and few aspects of the human resource management activities such as training and development. recruitment, compensation packages etc., In this study the authors seeks to magnify research on human resource management practices and employee engagement with a focus on the organizational performance and employee morale towards job satisfaction, commitment, and retention. Therefore, the study seeks to identify the human resource management activities that drives employee engagement in the manufacturing organisations and examine the relationship between human resource management practices and employee engagement as well as the influence human resource management practices on employee engagement.

2. Literature Review

2.1 Employee Engagement

Employee engagement as a term in business world, especially as a concept in the management of people in the workplace gained momentum around 1990, but 1999 marked the watershed in the history of employee engagement based on

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Gallup's major work which was published in a book titled "First, Break All the Rules" by Marcus Buckingham and Curt Coffman in 1999 (Schaufeli, 2021; Tripathy & Vidyapeeth, 2018). The term has however been described in many ways on account of immense interest in the last two decades because its relationship with job satisfaction, organizational commitment, psychological empowerment, and job involvement thus leading to varying multi-faceted description although all can be categorised into two i.e. unitary and cognitive descriptions (Sun & Bunchapattanasakda, 2019). The unitary definition has focus on positive state of mind, a dedicated willingness, and the opposite of burnout while cognitive has its focus on vigour, dedication, and absorption. In a nutshell, engagement is the extent to which employees put discretionary effort into their work beyond the minimum to get the job done, in the form of extra time, positive attitude, brain power or energy, and dedication to their organisation in order to secure future organizational success (Adeyeye et al., 2025).

According to Tripathy and Vidyapeeth (2018) engagement is driven by an employee's immediate experience of the organization. The factors that build or destroy engagement are driven by the unique situation of each organization and the combinations of factors needed to boost engagement are therefore different between organizations such as recognition and feedback, growth opportunities, supportive management, clear expectations, work-life balance, autonomy and empowerment, collaborative culture, fair compensation and benefits, sense of purpose, and alignment with company values etc., (Adeyeye et al., 2025). These factors will determine the levels of engagement as adduced forward by Pandita and Bedarkar (2015) which has three (3) levels namely engaged (employees who work with passion and feel a profound connection to their organization. They drive innovation and move the organization forward), not engaged (employees who attend and participate at work but are timeserving and put no passion or energy into their work), and disengaged (employees who are unhappy at work and who act out their unhappiness at work). This explains why Alzyoud (2018) posited that highly engaged employees are more likely to please in terms of their needs and desires that ultimately lead to their satisfaction and retention (Goyal, Nigam & Goyal, 2023).

Given the significance of employee engagement concept in the literature, more studies need to be conducted to further examine this particular construct and understand factors attributed to it. A number of studies have shown similar positive relationships between HR practices and various measures of firm performance. MacDuffie (1996) found that HR practices were related to productivity and

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engagement in how manager strategies to develop their workers become engage in work given. In sum, engaged workers possess an energetic and effective drive towards accomplishing their tasks. They also act with confidence and see themselves capable of dealing competently with the challenges that follow from their work.

2.2 Human Resource Management Practices

The only policy for practice in the world of work that concern employee adoption, adaptation, or adjustment to organisational life is human resource management which has been described as that part of management concerned with people at work and their relationship within the organisation. According to Guest (2001) there were many human resource management activities/functions but concluded that these numerous activities represent unitary system of management because it is all about eliciting employee commitment and involvement in line with the purpose and goals of the organization. Therefore, considering the significance of the role of human resource management, it is imperative to develop that human resource management practice that would develop employee's ability and engagement (Goyal et al., 2023). In this study, five (5) dimensions of human resource management activities were made used to include communication, recruitment and selection, training and development, reward and recognition, and career development.

2.2.1 Relationship Between Communication and Employee Engagement.

In the expression of Follett while explaining the concept of management, manager does nothing on their own except through other and the medium used is communication. This explains why Drucker posited that the only weapon in the hand of any manager is communication and result in organisation revolved around its usage. Good employee communication will help an employee to understand their roles and degree of their involvement in management prerogative with respect to decision making hence contribute to the organizational success (Clack, 2021). In the view of Clampitt (2005) where an employee is given opportunity to participate in decision making and enabling environment to be heard by the superior, engagement levels would be high and vice versa. Oginni, Akpor-Robaro, and Oghenetega (2020) asserted that clear communication is a panacea for organisational success because it removes any form of ambiguity, especially in the area of role conflict and misconception of facts thereby laying foundation for engagement. Alzyoud (2018) earlier work corroborated this when it was stated that engagement begin with good communication because it heralds employee clear

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understanding of activities in the work environment while Tripathy and Vidyapeeth (2018) believe that the use of appropriate communication channels in the organisation will make employee to be well informed about their work schedule, limitation, and abreast with changes that might affect them as an individual or their job. Hence the formulation of objective 1, which is stated below,

H_1: Communication does not influence employee engagement.

2.2.2 Relationship Between Recruitment and Selection and Employee Engagement.

Recruitment and selection activities are part human resource management activities and the two remain as the viable option through which people are brought into the organisation. Recruitment is the art of arousing interest from many people who may willing to join the organisation. It is about generating a pool of qualify candidates from where selection is made. Selection is about sifting to ensure chosen of the most suitable candidate for the job and it is done in line with certain criteria such as qualification, knowledge, experience, age, ability, skills, and other personal characteristics. However, these criteria rely heavily on interview to ascertain the aspiration and career goal of candidates if in line with that of the organisation. Lanre-Babalola et al (2023) posited that high attrition in organisation came as a result of inability to match individual goals with the organisational goal at the interview stage and asserted that abusive supervision has not made daily task interesting thereby constantly look for a way out of the organisation. Oginni et al (2022) posited that where the goals of individual employees can be domiciled in that of the organisation, there is high commitment on the part of the employee, reduction in attrition rate, improved productivity, and image. Recruitment and selection activities creates a positive environment on industrial outcome if properly conducted without bias. Hence, objective 2 is formulated for the study.

H_2: Recruitment and selection does not influence employee engagement.

2.2.3 Relationship Between Training and Development and Employee Engagement.

Training has its focus on acquisition of new skills that enhance job performance in such a way that would made the employee incredible while performing his tasks and development is about acquisition of knowledge over a dependable number of years along different facets of activities within and outside the organisation. Training and development have been seen as Siamese Twins which helps organisation to improve knowledge, attitude of individual, and skill in order to maximise employee performance with corresponding increase in productivity. It is

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one of the activities in the human resource management and an instrument needed to change or improve skills, knowledge, and attitude (Pattanayak, 2021). For example, training prepares employee for a new job challenge while development equips employee with generic knowledge in a given context with the right ability, skills, and attitude for acceptable behaviour. In view of Aremu, Oginni, and Awobona (2021) training and development have positive impact on job satisfaction, commitment, and labour turnover which are by product of work engagement and also believe that these outcomes heighten employee interest in their work thus seeing their work as more meaningful and fulfilling. Therefore, the postulation of object 2 which is;

H_3: Training and development does not influence employee engagement.

2.2.4 Relationship Between Reward and Recognition and Employee Engagement

Compensation package remains an integral part of compensation management of which reward and recognition were elements and important activity in human resource management. Usually, the main objective of compensation package is to attract, motivate and retain competent employee (Odusanya, 2025). This imply exchange relationship whereby employee must give something to be qualified for reward and recognition and to achieve this, employee must understand what is expected from them and sees it as a feedback on their performances. For example, the degree of reward and recognition shown to an employee can inform how the employee is performing i.e. an assessment of employee performance over certain period of time although in views of London and Higgott (1997), the reward and recognition for individual employee in the workplace has become subjective and remain as one of the most controversial area in human resource management. Nevertheless, if properly designed, it is a method of motivating employees to get desirable behaviour that is favourable to organisational success. There had been many research work linking reward and recognition to job satisfaction, commitment, retention, attrition, and productivity. Hence, the need to examine the objective 4

H_4: Reward and recognition does not influence employee engagement.

2.2.5 Relationship Between Career Development and Employee Engagement

Career development is among the activities in the human resource management and its focus is on employee progression. It is about professional life advancement contingent upon setting goals, acquiring new skills, strategic planning to attain

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goals, identifying strengths and weaknesses, building networks, and seeking mentorship. How these are met has implication on the degree of employee motivation and the connection to the organisation. According to Pattanayak (2021) employees in the workplace are motivated to work by certain factors, which include aspiration to advance, progress, and grow in their chosen profession as well as desire to achieve higher and more satisfying performances. Inability to create a roadmap through one's professional journey leads to career tension which is not beneficial to the parties in the world of work or career plateauing i.e. inability or slim probability to advance in one's career path which is associated with stress and dissatisfaction. In today's world of work, career development has moved from paternalistic approach to supporting individualistic approach where individual employees have taken over the responsibility to keep their skills, abilities, and knowledge current in order to remain relevant and prepare for tomorrow's new task Boyede and Omotoye (2021). However, the prevailing economic situation has brought drastic reorganisation resulting into flattened hierarchies thereby reducing promotion opportunities becomes a point of concern. Therefore, objective 5 is formulated as

H_5: Career development does not influence employee engagement.

Methodology

This study used a survey research method and quantitative approach n nature to examine the relationship between human resource practices and employee engagement using the manufacturing organisation as the unit of analysis. The research instrument used was questionnaire which was developed in line with Likert's five-point rating scale and a set of 210 copies of questionnaires were distributed to the sample size and after four months a total of 156 copies of the questionnaires were collected for analysis purposes but 151 copies were found useful. The measurement scales developed by Schaufeli, et al. (2002) was adopted as the measurement scales for employee engagement while that of Uen and Chien (2004) was adopted for human resource management practices. The reliability results indicate 0.74 for employee engagement, communication has 0.76, recruitment and selection has 0.79, training and development has 0.83, reward and recognition has 0.78, while career development has 0.80, which is satisfactory for this type of study.

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Results

The results of the study were divided into three segment along the focus of the study. The first segment was on identifying human resource management activities/practices that drives employee engagement in the manufacturing organisations, which was followed by the relationship between human resource management activities/practices and employee engagement as well as their influence.

Table 1: Descriptive statistics on identification of human resource management activities driving employee engagement in the manufacturing organisations.

Variables	*Mean*	*Std. Dev*	*Rank*	*Remarks*
Communication	3.782	0.532	4	A
Recruitment & Selection	3.974	1.342	2	A
Training & Development	3.482	0.478	5	A
Reward & Recognition	3.715	0.495	3	A
Career Development	4.416	0.693	1	A

Source: field study, 2025

Table 1 shows that out of numerous human resource management activities were in practice within the manufacturing organisation, only five activities were found to have connection with employee engagement. Career development was ranked higher than the rest of the activities in human resource management with a mean score of 4.416 and standard deviation of 0.963, followed by recruitment and selection with a mean score of 3.974 and standard deviation of 0.342. reward and recognition was ranked third a mean score of 3.715 and standard deviation of 0.495, and communication came in the number four position a mean score of 4.782 and standard deviation of 0.532 while training and development was ranked as the fifth a mean score of 3.483 and standard deviation of 0.478. it was evident that these human resources management practices were in practice. However, career development received more attention more that the rest of the activities. Therefore, the objective that seek to identify the human resource management activities driving employee engagement in the manufacturing organisations is hereby achieved.

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Table 2: Correlational Matrix for Human Resource Management Practices

Variables	*C*	*RS*	*TD*	*RR*	*CD*	*EE*
Communication (C)	1					
Recruitment and Selection (RS)	0.653	1				
Training and Development (TD)	0.551	0.533	1			
Reward and Recognition (RR)	0.611	0.424	0.531	1		
Career Development (CD)	0.535	0.631	0.643	0.562	1	
Employee Engagement (EE)	0.563	`0.645	0.765	0.634	0.752	1

Correlation is Significant at 0.01 level. (p < 0.01); weak relationship: $|r| < 0.5$ moderate relationship: $0.5 \leq |r| < 0.6$ strong relationship: $0.6 \leq |r| \leq 1$

Table 2 shows that all the variables of human resource management practices have relationship with employee engagement wherein communication and employee engagement have positive when r = 0.563, recruitment and selection and employee engagement have positive relationship when r = 0. 645, there exists also a positive relationship between training and development and employee engagement when r = 0.765, while the relationship between reward and recognition is positive relationship when r = 0.634 and relationship between career development and employee engagement is positive when r = 0.752. However, the relationship between communication and employee engagement is the only one that is moderate while the rest (recruitment and selection, training and development, reward and recognition, career development) have strong relationship with employee engagement. Therefore, the objective that seek to examine the relationship between human resource management practices and employee engagement is achieved.

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Table 3: Regression Analysis of Independent and Dependent Variables of the Study

Variables Path	*R*	*R^2*	*Adjusted R^2*	*F value*	*Beta(β) value*	*Sig. p value*
Communication	*0.552*	*0.305*	*0.302*	*52.675*	*0.280*	*0.001*
Recruitment and Selection	*0.679*	*0.461*	*0.455*	*61.441*	*0.322*	*0.000*
Training and Development	*0.559*	*0.312*	*0.309*	*82.124*	*0.291*	*0.001*
Reward and Recognition	*0.657*	*0.432*	*0.427*	*57.413*	*0.315*	*0.000*
Career Development)	*0.740*	*0.548*	*0.544*	*83.321*	*0.387*	*0.000*

Source: Field Survey, (2026); Researchers' Computation

Table 3 indicated that the model was a good fit based on the F – values of the analysis. It shows a positive linear relationship for all the human resource management practices with employee engagement while the beta values for all the variables of human resource management practices also shows positive relationship and strong predictive power for employee engagement in the manufacturing organisation. The value of R^2 adjusted for communication = 0.302 while beta value is 0.260 to imply that there is a 30% variation in the employee engagement on account of communication and the beta value of 0.260 indicates that 26% of positive change occurs in employee engagement due to the art of communication. This result shows that communication has influence on employee engagement thus, achieving hypothesis one by accepting alternative hypothesis that communication has influence on employee engagement. The adjusted R^2 = 0.455 and β = 0.322 values for recruitment and selection practices to imply that 46% of the variation in employee engagement is as a result of recruitment and selection practices while the beta value signifies that for 1unit increase in recruitment and selection practices at the workplace, there is an increase of 0.322 units in employee engagement. This result also confirms that recruitment and selection practices has influence on employee engagement. Therefore, achieving hypothesis two by accepting the alternate hypothesis that recruitment and selection practices has influence on employee engagement.

The adjusted R^2 value = 0.309 while beta value β = 0.291 imply that training and development can be used to explain 31% variation in employee engagement and beta value any unit increate in training and development will represent corresponding increase of 29% in employee engagement. The implication of this

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result is that training and development has influence on employee engagement, therefore hypothesis three alternate hypothesis is accepted i.e. training and development has influence on employee engagement. For reward and recognition practice value, the adjusted $R^2 = 0.427$ and $\beta = 0.315$ to imply that 43% of variation in employee engagement is explainable by reward and recognition as a practice while beta value of 0.315 represents quantum of increase in reward and recognition practice with corresponding the effect on employee engagement. The result supports the alternate hypothesis for hypothesis four where it was stated that reward and recognition practice has influence on employee engagement. Career development has adjusted R^2 value = 0.544 and $\beta = 0.387$ to imply that 54% of the variation in employee engagement is as a result of career development practices while the beta value signifies that for 1unit increase in career development practices at the workplace, there would be a corresponding increase of 0.389 units in employee engagement. This result shows that career development has influence on employee engagement thus, supporting alternate hypothesis that career development has influence on career development.

The results of this study were in tandem with the findings of others researchers that have conducted similar studies human resource management practices and work engagement such as (Odusanya, 2025); Amoako-Asiedu and Obuobisa-Darko (2017); Nkansah et al. (2023); (Adeyeye et al., 2025).; Oginni et al. (2022); Oginni et al. (2020); Aremu et al. (20121); Clack (2021); Alzyoud (2018); ((Pattanayak, 2021)) when it was posited that human resource management practices have greater propensity to determine the degree of commitment of employees to their work. This study identified major human resource management practices that influences employee engagement, which was consistent with the earlier position of Goyal (2023) while the outcome of study also supported Tripathy and Vidyapeeth (2018) where training and development were believed to be a potent force in the human resource management practices that could influence employee engagement while also in agreement with the positions of Elsawy (2022), Boyede and Omotoye,(2021) that human resource management practices improves productivity when connected with work engagement (Odusanya, 2025). Pattanayak (2021) singled out career development derived from recruitment and selection practices to be one of the chief determinants of employee engagement to reduce attrition, enhance image, and herald job satisfaction (Beri & Gulati, 2021).

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Conclusion

In this study, the researchers set out to examine the influence of human resource management practices on employee engagement using manufacturing organisations as the unit of analysis. The study identified five human resource management practices such as communication, recruitment and selection practice, training and development, rewards and recognition, and career development to have strong influence on employee engagement. It was concluded that human resource management practices can be used as strategies to drive genuine employee engagement at any time. Therefore, for management of any organisation to secure genuine employee engagement, strong attention should be paid to human resource management practices without any prejudice most especially, communication, recruitment and selection practice, training and development practice, rewards and recognition practice, and career development practice. However, management should provide enabling environment that would facilitate operationalization of the human resource management practices.

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OPERATIONAL TRENDS AND GROWTH ANALYSIS OF OFFSHORE SERVICE VESSELS IN -OIL AND GAS SECTOR

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Abstract

The efficient deployment of Offshore Service Vessels (OSVs) is critical for the productivity of Nigeria's offshore oil and gas sector. However, a lack of empirical, long-term data on vessel operational trends has hindered strategic planning and fleet optimization. This study analyzes the trend of operation and quantifies the average rate of change in the deployment of key OSV types—Platform Supply Vessels (PSVs), Anchor Handling Tug Supply (AHTS) vessels, Crew Boats (CBs), Line Handling Tugs (LHTs), and Security Escort Vessels (SEVs)—in Nigeria's Niger Delta region from 2009 to 2023. Using quantitative research design, secondary data were collected from regulatory agencies and analyzed using trend analysis and linear regression. The results

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reveal a significant upward trajectory in overall OSV deployment, driven predominantly by deepwater exploration. PSVs and AHTS vessels exhibited the strongest growth, with average annual rates of change of +5.2% and +4.7%, respectively, and highly significant positive regression trends ($R^2 > 0.89$). Security Escort Vessels (SEVs) also showed moderate growth (+3.1%), linked to enhanced maritime security initiatives, while CBs and LHTs demonstrated only mild increases. The study concludes that Nigeria's offshore logistics system is undergoing a structural shift towards specialized vessel utilization. It recommends strengthening indigenous fleet capacity through the Cabotage Vessel Financing Fund (CVFF), enhancing policy coordination, and investing in modern port infrastructure to sustain this growth and improve local content in the maritime logistics value chain.

Keywords: *Offshore Service Vessels (OSVs); Nigeria; maritime logistics; trend analysis; oil and gas; vessel deployment; rate of change; Niger Delta*

JEL Classification: R40; R41.

1. Introduction

The offshore oil and gas (O&G) industry is one of the most logistics-intensive sectors globally, characterized by complex, capital-intensive, and high-risk operations that rely heavily on specialized marine support. Within this industrial framework, Offshore Service Vessels (OSVs)—including Platform Supply Vessels (PSVs), Anchor Handling Tug Supply (AHTS) vessels, Crew Boats (CBs), and Line Handling Tugs (LHTs)—serve as the logistical backbone that sustains offshore exploration, drilling, and production activities (Victor et al., 2024; Berle & Asbjørnslett, 2011). These vessels perform crucial functions, such as towing, anchor handling, material supply, crew transfer, subsea support, and emergency response operations, all of which are indispensable to the productivity and safety of offshore oilfield development.

In Nigeria, offshore industrial vessel operations are central to the hydrocarbon value chain, particularly in the Niger Delta region, where extensive offshore and deepwater projects dominate the nation's energy landscape. The region's maritime logistics framework underpins exploration and production operations of multinational oil companies and indigenous producers alike. The deployment of offshore industrial vessels in Nigeria is primarily influenced by several interacting factors, including crude oil production volume, the number of active wells, vessel charter rates, and global oil prices (Aaset et al., 2008; Jurcevic et al., 2010; Paolo et al., 2014). These parameters determine both the

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magnitude and temporal variation of vessel demand and supply, shaping the dynamics of offshore logistics.

Globally, demand for OSVs fluctuates with crude oil prices and energy sector investment cycles. During periods of high oil prices and exploration expansion, the charter market for PSVs and AHTS vessels typically experiences strong growth; conversely, price downturns and reduced offshore activity result in market contraction (Furset & Hordnes, 2013). Nigeria's O&G industry mirrors this cyclical trend but is further complicated by local operational conditions, including regulatory constraints, security challenges, and infrastructure deficits. Despite being one of Africa's most significant offshore producers, the country continues to rely heavily on foreign-flagged tonnage, with indigenous fleet participation still limited (Nwokedi et al., 2024).

The Nigerian Maritime Administration and Safety Agency (NIMASA), alongside the Nigerian Upstream Petroleum Regulatory Commission (NUPRC), regulates various dimensions of offshore operations. These agencies play critical roles in implementing the Cabotage Act and the Petroleum Industry Act (PIA, 2021), respectively—two landmark frameworks that seek to enhance local content participation and ensure operational safety. However, policy misalignments and institutional overlaps often constrain the efficiency of vessel operations and limit the ability to plan for long-term fleet capacity.

A review of empirical literature reveals that, although several studies have identified general factors influencing OSV demand, few have quantified or modelled the operational trends of individual vessel types in Nigeria’s offshore sector (Victor et al., 2024; Onyemaechi & Nwokedi, 2014). This scarcity of localized empirical data has hindered accurate forecasting, resulting in inefficiencies in vessel deployment, contract scheduling, and asset utilization. In practice, this leads to operational mismatches, cost overruns, and underutilization of existing fleets—factors that collectively reduce the competitiveness of Nigeria’s offshore logistics industry.

Understanding the trend in operational performance and the rate of change in the deployment of offshore industrial vessel types is therefore critical for both strategic and operational decision-making. It provides a foundation for assessing the temporal dynamics of vessel utilization, forecasting future demand, and aligning capacity development initiatives with evolving offshore activities. Such insights can guide investment in fleet expansion, crew training, and port infrastructure to meet the growing needs of deepwater exploration and production.

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In view of the foregoing, this study focuses on analyzing the trends in the operation of offshore industrial vessel types and quantifying the average rate of change in their deployment in Nigeria's offshore O&G sector between 2009 and 2023. By employing statistical trend analysis and regression modeling, the study contributes to an empirical understanding of the Niger Delta's offshore logistics economy, offering evidence-based insights that support fleet optimization and sustainable maritime policy formulation.

2. Literature Review

Offshore Service Vessels (OSVs) play an indispensable role in the global oil and gas (O&G) supply chain, providing specialized marine support for exploration, drilling, production, and maintenance operations in offshore fields. These vessels enable the transfer of equipment, personnel, and supplies between onshore bases and offshore installations. They also perform vital services such as anchor handling, towing, subsea construction support, and emergency response (Berle & Asbjørnslett, 2011). The main categories of OSVs include Platform Supply Vessels (PSVs), Anchor Handling Tug Supply (AHTS) vessels, Crew Boats (CBs), Line Handling Tugs (LHTs), and Security Escort Vessels (SEVs), each designed for specific functions within the offshore value chain.

In the Nigerian context, OSV operations are fundamental to sustaining offshore oilfield productivity, particularly within the Niger Delta and Gulf of Guinea. These regions host the majority of Nigeria's offshore oil and gas activities, which generate the bulk of national revenue and foreign exchange earnings. The operational demand for OSVs in Nigeria is influenced by factors such as oil production levels, the number of active offshore fields, crude oil prices, vessel charter rates, and local regulatory frameworks (Aaset et al., 2008; Jurcevic et al., 2010; Paolo et al., 2014). During expansion phases in exploration and production, the demand for PSVs and AHTS vessels typically rises sharply, whereas economic downturns or oil price collapses reduce fleet utilization and charter activity (Furset & Hordnes, 2013).

Globally, offshore logistics systems are shaped by cyclical fluctuations in oil prices and investment flows, which create corresponding oscillations in vessel demand. Furset and Hordnes (2013) identified a strong positive correlation between crude oil price movements and charter rates for AHTS vessels, indicating the sector's exposure to market volatility. Victor et al. (2024) similarly observed that rising offshore production intensity leads to proportional increases in PSV and AHTS utilization. However, in Nigeria, operational

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patterns are further conditioned by localized constraints such as maritime security challenges, infrastructure limitations, and access to vessel financing (Okorocha & Ikeogu, 2022; Onwuegbuchunam et al., 2023).

Nigeria's offshore logistics industry has evolved under the dual influence of global market dynamics and domestic regulatory frameworks. The Nigerian Maritime Administration and Safety Agency (NIMASA) and the Nigerian Upstream Petroleum Regulatory Commission (NUPRC) oversee safety, cabotage, and offshore operational standards. The enactment of the Petroleum Industry Act (PIA, 2021**)** and implementation of the Cabotage Act have sought to enhance indigenous participation and streamline operations. However, policy inconsistencies and financing gaps persist (NIMASA, 2023). The Cabotage Vessel Financing Fund (CVFF) was designed to empower local shipowners to acquire and maintain vessels, but delayed disbursement and administrative bottlenecks have limited its effectiveness (Okorocha & Ikeogu, 2022). Consequently, Nigeria continues to rely heavily on foreign-flagged tonnage for offshore operations, constraining local content development.

The operational characteristics of OSVs in Nigeria mirror the systemic interdependence between vessels, operators, regulators, and oil companies. Drawing on Systems Theory (Von Bertalanffy, 1950; Montuori, 2011), offshore logistics can be viewed as a complex, integrated system in which inefficiencies in one component—such as vessel shortage, regulatory delays, or poor port infrastructure—can disrupt the entire production chain. The theory underscores the importance of coordination, adaptability, and continuous data feedback to maintain system equilibrium. This systems perspective provides a theoretical foundation for understanding how the Nigerian offshore vessel ecosystem evolves and responds to both market and regulatory forces.

From an economic geography standpoint, Spatial Economics Theory (Krugman, 1991) highlights the influence of distance, transportation cost, and spatial clustering on industrial activity. Offshore operations in Nigeria inherently involve significant spatial dynamics since the location of offshore fields relative to supply bases determines voyage frequency, vessel utilization rates, and operational costs. For instance, deepwater installations located more than 100 kilometers offshore require more powerful, longer-range vessels such as PSVs and AHTS, which explains their dominant growth trend in Nigeria's offshore market (Wolfgang, 2018). Similarly, Industrial District Theory (Marshall, 1890; Amin & Pyke, 1994) explains how clusters of specialized firms, such as offshore vessel operators in Port Harcourt and Warri, benefit from shared infrastructure,

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labor pools, and technological diffusion. In the Nigerian maritime sector, this clustering effect has gradually strengthened local operational capacity, though it remains constrained by limited capital and challenges with fleet renewal.

Empirical studies have further illuminated the structure and performance of the OSV market. Paolo et al. (2014) found that AHTS and PSVs dominate the global offshore fleet due to their multifunctional design and high demand in deepwater operations. Their study, however, did not disaggregate data by region or quantify deployment trends over time. In a related analysis, Onyemaechi and Nwokedi (2014) identified inefficiencies in Nigeria's OSV market, attributing poor operational performance to maintenance deficiencies and financing barriers. More recent studies by Victor et al. (2024) and Nwokedi et al. (2024) demonstrated that Nigeria's offshore logistics sector contributes significantly to West Africa's maritime economy. However, the indigenous participation rate remains below 25%, highlighting persistent structural dependence on foreign operators. Security considerations have also shaped OSV operations in the Gulf of Guinea. Piracy and maritime crime once posed severe threats to crew safety and operational continuity, leading to high insurance premiums and reduced foreign investor confidence. However, the implementation of the Deep Blue Project by NIMASA and the Nigerian Navy has substantially mitigated security risks, leading to renewed investment in offshore logistics and increased demand for SEVs (Onwuegbuchunam et al., 2023). This security-driven shift further supports the upward trend in specialized vessel deployment observed in recent years.

Despite this growing body of literature, empirical analyses that quantify long-term operational trends and rates of change in OSV deployment within Nigeria remain limited. Most prior studies have focused on qualitative descriptions of market challenges or short-term fluctuations in vessel demand. Few have systematically measured temporal growth patterns across vessel types, leaving a knowledge gap in understanding the dynamics of offshore logistics capacity. This study addresses that gap by employing statistical trend and regression analyses to evaluate the operational trajectory and rate of change of different offshore vessel types from 2009 to 2023.

In summary, existing literature underscores the pivotal role of offshore service vessels in sustaining Nigeria’s oil and gas economy, the sensitivity of their operations to global and domestic factors, and the gradual evolution of indigenous maritime capacity. However, the absence of longitudinal empirical assessments of vessel deployment has constrained strategic forecasting and

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policy formulation. This study thus contributes to filling that gap by providing an evidence-based understanding of the temporal dynamics of OSV operations in the Niger Delta region, thereby offering insights for both academic and policy discourse on maritime logistics development in Nigeria.

3. Methodology

3.1 Research Design

This study adopted a quantitative research design to analyze the *trend in operation*s and the *average rate of change in the deployment* of offshore service vessels (OSVs) in the Niger Delta region of Nigeria. Quantitative analysis was appropriate because the study relied on measurable time-series data to detect systematic patterns, growth rates, and directional changes in the use of industrial vessel types over time. The design enabled the application of trend analysis and regression modeling to determine the operational trajectory of offshore industrial vessels within the offshore oil and gas (O&G) sector.

3.2 Description of the Study Area

The study area covers Nigeria's offshore oil-producing zones, primarily located in the Niger Delta and the Gulf of Guinea. The Niger Delta region is the operational base of Nigeria's offshore logistics system, encompassing shallow-water and deepwater fields that support both multinational and indigenous oil producers. Major offshore fields such as Bonga, Agbami**,** Egina, and Erha lie within this area. The region's offshore support services are coordinated from logistics bases in Port Harcourt, Warri, Onne, Bonny, and Brass, where most offshore service vessels are stationed or chartered for operations. This spatial concentration of activities makes the Niger Delta a representative case for analyzing OSV deployment and operational trends in Nigeria's maritime oil economy.

3.3 Sources of Data

The study utilized secondary data obtained from official records and institutional reports. Data sources included the Department of Petroleum Resources (DPR), Nigerian Maritime Administration and Safety Agency (NIMASA), Nigerian National Petroleum Corporation (NNPC), and oil and gas service companies operating in Nigeria's offshore sector. The dataset covered 15 years (2009–2023) and consisted of the annual number of offshore industrial vessel types deployed in offshore O&G operations. Vessel classes captured

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included:

1. **Platform Supply Vessels (PSVs)**
2. **Anchor Handling Tug Supply (AHTS) vessels**
3. **Crew Boats (CBs)**
4. **Line Handling Tugs (LHTs)**
5. **Security Escort Vessels (SEVs)**

3.4 Population and Sampling Technique

The study population comprised all industrial vessels engaged in offshore O&G operations in Nigeria during the study period. Given the difficulty in tracking every individual vessel, a purposive sampling technique was used to select representative vessel types that dominate offshore logistics operations. The selection was guided by their frequency of engagement in oilfield support services and their critical operational functions. Data were aggregated annually for each vessel type to facilitate statistical trend estimation and comparison.

3.5 Method of Data Analysis

Data analysis was conducted using descriptive statistics, trend analysis, and simple regression models. The analytical process followed three stages:

1. **Trend Analysis:**
2. Time-series plots were generated to visualize the deployment trajectories of each vessel type from 2009 to 2023. This provided insights into whether utilization increased, decreased, or fluctuated over time.
3. **Rate of Change Estimation:**
4. The average annual rate of change (AARC) was computed to quantify the speed and direction of deployment variation. This was calculated as:

$$AARC = \frac{(Y_t - Y_{t-1})}{Y_{t-1}} \times 100$$

Where Y_t is the value in the current year and Y_{t-1} is the value in the preceding year.

5. **Regression Analysis:**
6. Linear regression models were applied to measure the relationship between time (independent variable) and the number of vessels deployed

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(dependent variable) for each vessel type. The general regression form used was:

$$Y = a + bt + e$$

Where:
The number of vessels deployed,
t time (in years),
a= intercept,
b slope coefficient (average annual change), and
e random error term.
A positive value indicates a rising trend in vessel deployment, while a negative value indicates a decline.

3.6 Model Specification

The analytical model was specified to estimate the trend and rate of change in vessel deployment as follows:

$$Y_i = \alpha_i + \beta_i T + \epsilon_i$$

Where:
Y_i= number of vessels of type *i* deployed in year *T*,
α_i= intercept for vessel type *i*,
β_i= slope representing the rate of change in deployment,
T= time variable (2009–2023), and
ϵ_i= error term.

Each vessel type (PSV, AHTS, CB, LHT, SEV) was modeled separately to derive its operational trend line and growth rate.

3.7 Data Presentation and Analytical Tools

The processed data were presented in tables, charts, and graphs to illustrate deployment patterns and rates of change. Statistical analyses were conducted using Microsoft Excel and SPSS version 26 for regression analysis and trend line visualization. Results were interpreted in line with observed market and policy developments in Nigeria's offshore O&G sector.

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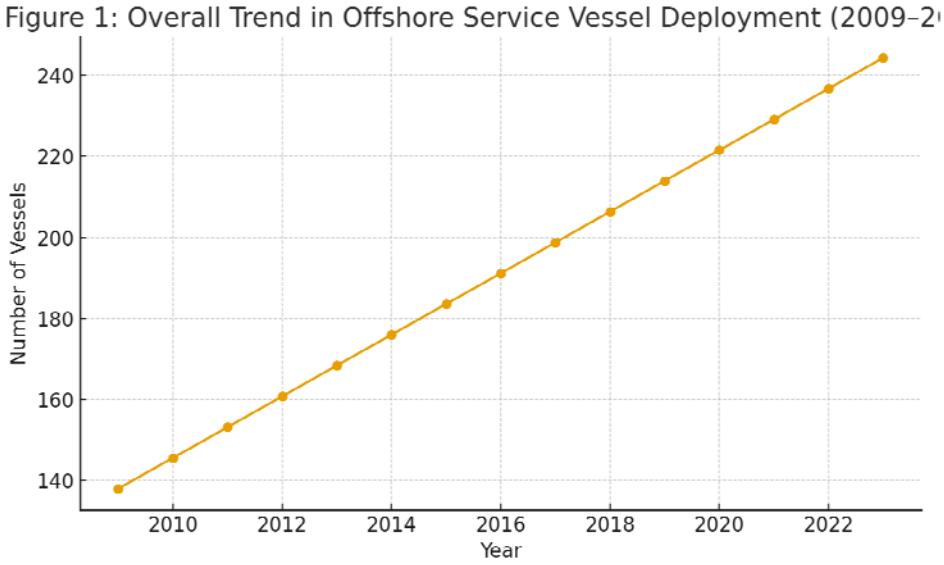
3.8 Limitations of the Study

The study relied on secondary data, which may have minor reporting gaps or time lags due to differences in data collection methods across agencies. Additionally, the lack of disaggregated monthly deployment data constrained the analysis to annual observations. Despite these limitations, the 15-year dataset provided a sufficiently robust basis for detecting long-term operational trends and growth trajectories.

4. Results and Discussion

4.1 Trends in Offshore Industrial Vessel Operations (2009–2023)

Figure 1 presents the overall trend of offshore industrial vessel deployment in Nigeria's offshore oil and gas (O&G) sector from 2009 to 2023. The results show a steady upward trend in total vessel utilization, reflecting the expansion of offshore logistics activity in the Niger Delta.



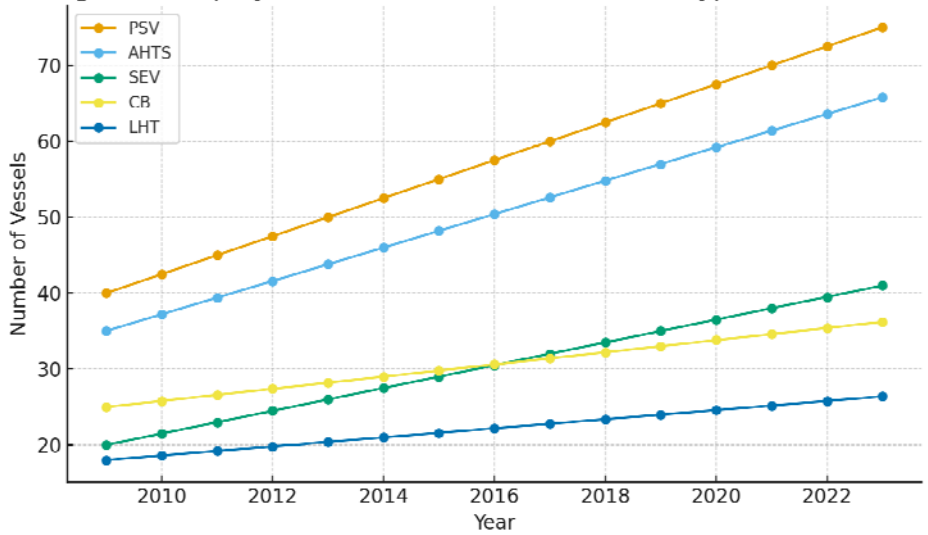
(Graph description: A line graph with years 2009–2023 on the x-axis and number of vessels on the y-axis. The curve shows a steady upward slope, rising from baseline levels in 2009 to significantly higher deployment levels by 2023.)

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The figure shows a sustained increase in operational demand coinciding with the commissioning of deepwater projects, including *Egina*, *Agbami Phase II*, and *Bonga Southwest*. These developments have intensified logistics needs, particularly for high-capacity vessels.

A breakdown of vessel-specific trends is presented in Figure 2, which illustrates the deployment trajectories of the five major vessel types.

Figure 2: Deployment Trends of Offshore Vessel Types (2009–2023)



(Graph description: Five color-coded trend lines showing deployment growth of PSVs, AHTS, SEVs, CBs, and LHTs. The PSV and AHTS lines rise sharply, SEV shows moderate growth, while CB and LHT remain relatively flat.)

The figure reveals that Platform Supply Vessels (PSVs) and Anchor Handling Tug Supply (AHTS) vessels exhibited the steepest growth curves, underscoring their dominant role in Nigeria's offshore supply chain. This pattern aligns with global OSV market behavior, where PSVs and AHTS vessels are indispensable for deepwater operations (Paolo et al., 2014).

Crew Boats (CBs) and Line Handling Tugs (LHTs) show relatively stable patterns, consistent with their limited function in shallow-water logistics. Security Escort Vessels (SEVs), however, show accelerated deployment between 2019 and 2023, reflecting increased attention to offshore security following the introduction of the Deep Blue Project.

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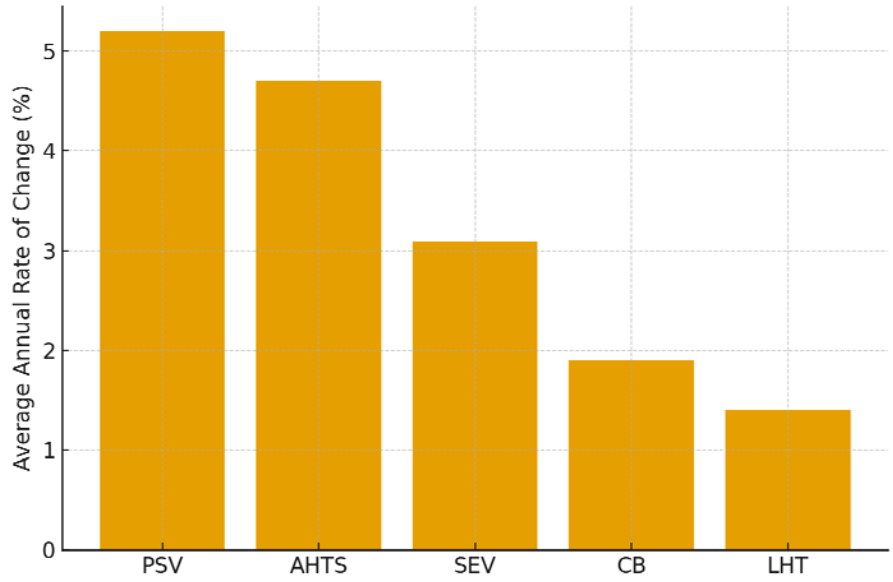
4.2 Quantitative Analysis of Average Rate of Change

The Average Annual Rate of Change (AARC) was computed to quantify operational growth. Table 1 presents the percentage change in vessel deployment for each type.

Table 1: Average Annual Rate of Change (AARC) in Vessel Deployment (2009–2023)

Vessel Type	Average Annual Rate of Change (%)	Trend Interpretation
Platform Supply Vessels (PSV)	+5.2	Strong upward trend
Anchor Handling Tug Supply (AHTS)	+4.7	Strong upward trend
Security Escort Vessels (SEV)	+3.1	Moderate upward trend
Crew Boats (CB)	+1.9	Mild increase
Line Handling Tugs (LHT)	+1.4	Stable trend

Figure 3: Comparative Growth Rates of Offshore Vessel Types (2009–2023)



(Graph description: A clustered bar chart showing AARC% for each vessel type — PSV and AHTS bars highest, SEV moderate, CB and LHT lower.)

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The results show that PSVs and AHTS vessels experienced the most significant growth, confirming their crucial roles in offshore production and logistics. The increase in SEV deployments further underscores the growing emphasis on maritime security and asset protection in Nigerian waters.

These results corroborate those of Nwokedi et al. (2024), who reported increased specialization in vessel utilization in response to deepwater expansion and improved regulatory coordination.

4.3 Regression Results and Trend Modeling

To examine the statistical relationship between time and vessel deployment, a linear regression analysis was performed. The regression coefficient (β) represents the average annual change in deployment, while R^2 indicates the strength of the relationship between time and vessel deployment frequency.

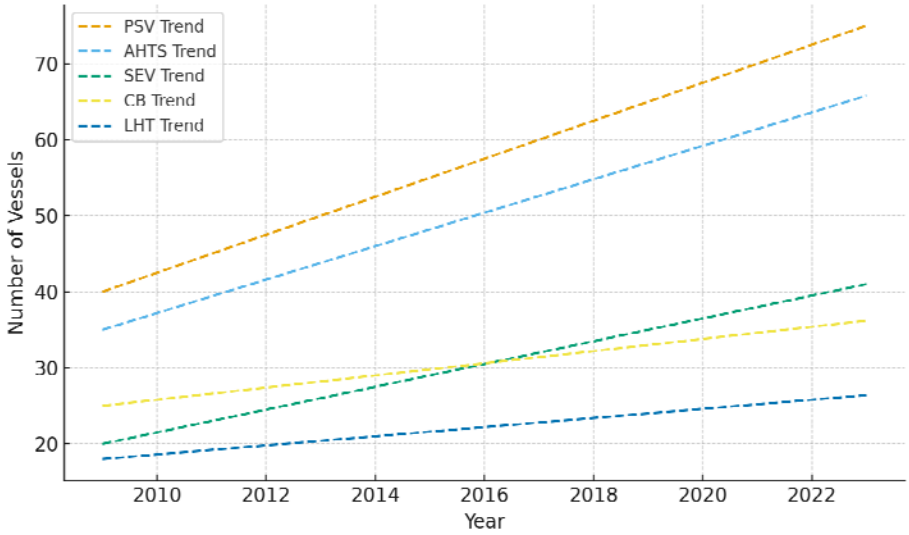
Table 2: Regression Model Summary for Vessel Deployment (2009–2023)

Vessel Type	Regression Coefficient (β)	R^2	Significance ($p < 0.05$)	Interpretation
Platform Supply Vessels (PSV)	0.062	0.91	Significant	Strong positive trend
Anchor Handling Tug Supply (AHTS)	0.057	0.89	Significant	Strong positive trend
Security Escort Vessels (SEV)	0.035	0.72	Significant	Moderate positive trend
Crew Boats (CB)	0.018	0.63	Significant	Weak positive trend
Line Handling Tugs (LHT)	0.011	0.59	Not significant	Stable trend

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Figure 4: Regression Trend Lines of Offshore Vessel Deployment (2009–2023)



(Graph description: Multiple regression lines for each vessel type, showing PSVs and AHTS with steep upward slopes; SEVs moderate; CBs and LHTs nearly flat.)

The regression results confirm that PSVs and AHTS vessels exhibit statistically significant upward trends, with R^2 values above 0.85, implying that over 85% of the variation in deployment is explained by time. The slower but consistent rise in SEV deployment also indicates growing operational importance in security operations. CBs and LHTs, on the other hand, show minimal slope coefficients, suggesting operational stagnation linked to limited shallow-water exploration.

5. Discussion of Findings

The findings demonstrate that Nigeria's offshore logistics industry has experienced steady and structural growth over the last decade and a half. The upward trajectory of OSV deployment aligns with Nigeria's continued investment in deepwater fields and increasing local content in offshore operations.

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The rapid growth of PSVs and AHTS vessels confirms the nation's transition from shallow-water to deep-water production systems, which require specialized, high-capacity tonnage. This finding reinforces the Systems Theory of Offshore Operations (Von Bertalanffy, 1950), which posits that efficiency within a complex operational network depends on the performance of interrelated subsystems. The significant growth in PSVs and AHTS deployment reflects greater operational coordination and system maturity.

The increased use of SEVs underscores the role of security in enabling maritime logistics performance. As reported by Onwuegbuchunam et al. (2023), the success of Nigeria's Deep Blue Project has improved investor confidence and vessel activity.

From an Industrial District Theory perspective (Marshall, 1890; Amin & Pyke, 1994), the growing concentration of fleets around Port Harcourt, Onne, and Warri indicates a strengthening of Nigeria's offshore logistics cluster. These regions function as industrial districts where shipowners, service firms, and regulators interact to enhance operational resilience.

Lastly, applying Spatial Economics Theory (Krugman, 1991) highlights the spatial implications of offshore production. As oil extraction moves further offshore, logistical distances increase, necessitating larger, more versatile vessels like PSVs and AHTS units. This spatial shift directly influences deployment patterns and the evolution of vessel types within Nigeria's offshore maritime economy.

In summary, the results confirm that Nigeria's offshore vessel deployment is on a positive growth trajectory, dominated by high-specification vessels aligned with deepwater logistics demands. However, sustained growth requires addressing constraints such as vessel financing, infrastructure deficits, and gaps in local ownership that limit indigenous participation in the expanding offshore logistics market.

5.1 Future Research Directions

Future studies should extend this analysis by incorporating economic indicators (e.g., oil price volatility, exchange rates, and global shipping indices) to explore their influence on vessel deployment. Comparative studies between Nigeria and other offshore-producing economies, such as Angola and Brazil, would further deepen understanding of OSV market dynamics.

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5.2 Contribution to Knowledge

This study contributes to the existing body of knowledge by:

- Providing the first long-term empirical assessment (2009–2023) of offshore vessel deployment trends in Nigeria's O&G sector.
- Establishing the quantitative rate of change in OSV operations, enabling predictive modeling for future fleet requirements.
- Demonstrating the applicability of systems and spatial theories in analyzing offshore logistics performance in emerging economies.
- Offering policy-relevant insights for indigenous fleet development and regulatory optimization in Nigeria's maritime industry.

6. Conclusion

This study analyzed trends and rates of change in the deployment of offshore industrial vessel types in Nigeria's offshore oil and gas (O&G) sector between 2009 and 2023. The analysis focused on key vessel categories—Platform Supply Vessels (PSVs), Anchor Handling Tug Supply (AHTS) vessels, Crew Boats (CBs), Line Handling Tugs (LHTs), and Security Escort Vessels (SEVs)—that constitute the operational core of Nigeria's offshore logistics system.

Findings revealed a consistent upward trajectory in OSV deployment over the 15 years, with PSVs and AHTS vessels showing the largest increases. These trends reflect the expanding scale and complexity of offshore oilfield development, particularly in deepwater environments that demand specialized logistics capacity. The study also found that SEVs have experienced moderate but sustained growth, corresponding with heightened maritime security awareness and the implementation of the Deep Blue Project.

In contrast, CBs and LHTs demonstrated slower growth rates, mainly due to limited new investments in shallow-water production and to the increasing efficiency of integrated offshore platforms, which require fewer support vessels. Regression analysis confirmed that time is a statistically significant predictor of vessel deployment growth, implying that offshore logistics demand has progressively intensified alongside Nigeria's production expansion and policy reforms under the Petroleum Industry Act (PIA, 2021).

The study concludes that Nigeria's offshore maritime logistics system is undergoing a structural transformation toward specialized vessel utilization, driven by deepwater developments, technological innovation, and incremental

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local content participation. However, sustainable progress remains constrained by financing limitations, regulatory inconsistencies, and infrastructural inadequacies affecting indigenous operators. By empirically quantifying the operational trajectory of OSVs, this research fills a critical gap in maritime economics and logistics literature in Africa, offering an analytical baseline for forecasting vessel demand and optimizing offshore supply-chain planning in emerging oil economies.

6.1 Recommendations

Based on the findings, the following recommendations are proposed for policy, industry, and academic practice:

1. **Strengthen Indigenous Fleet Capacity**

   The Federal Government, through the **Cabotage Vessel Financing Fund (CVFF)** and commercial lending institutions, should prioritize transparent and timely disbursement of financial support to indigenous operators. This will enhance local ownership of OSVs and reduce dependence on foreign-flagged vessels.

2. **Promote Fleet Diversification and Modernization**

   Shipowners should strategically invest in multipurpose, technologically advanced **vessels**, particularly PSVs and AHTS, which dominate offshore operations in Nigeria. Modernization will improve operational efficiency and compliance with international environmental and safety standards.

3. **Enhance Policy Coordination and Implementation**

   Regulatory agencies such as NIMASA and NUPRC should harmonize operational frameworks under the PIA (2021) and the Coastal and Inland Shipping (Cabotage**)** Act to eliminate overlaps and inconsistencies that impede vessel operations and market entry for indigenous firms.

4. **Improve Maritime Infrastructure and Logistics Support**

   The development of modern offshore support bases, dry docks, and maintenance **facilities** in Port Harcourt, Warri, and Onne will enhance the operational readiness of OSVs and reduce downtime associated with

reliance on foreign repair facilities.

5. **Invest in Human Capital Development**

   To sustain operational growth, training institutions should expand programs in **offshore logistics management, marine engineering, and vessel operations**. Strengthened human capacity will ensure that Nigeria's workforce can effectively manage the evolving complexities of offshore logistics.

6. **Institutionalize Data Management and Research Collaboration**
   A national Offshore Vessel Operations Database (OVOD) should be developed under NIMASA to provide real-time data for research, forecasting, and policymaking. Collaborative efforts with universities and research institutes will improve data reliability and enhance strategic decision-making.

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DOES PUBLIC FINANCE STABILITY AFFECT ECONOMIC GROWTH? EMPIRICAL EVIDENCE FROM THE EURO AREA FOUNDING COUNTRIES

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Abstract: *The objective of this paper is to estimate the impact of public finance stability on economic growth in the eleven founding countries of the Euro area – Austria, Belgium, Germany, Finland, France, Ireland, Italy, Luxembourg, the Netherlands, Portugal and Spain, which are referred to as the EA-11. An autoregression with distributed lag (ARDL) and annual Eurostat data for the period 1999-2024 are employed to identify the determinants of economic growth in the eleven founding members of the Economic and Monetary Union (EMU). The results from the empirical analysis indicate that in the long term economic growth in the founding states of the EMU separately and as a whole is positively related to the changes in the money supply and producer prices and negatively related to the changes in public debt, the price level and consumer prices. In the short run for the EA-11 as a group, real output growth rate is in a positive nexus with fiscal balance and consumer prices and in a negative nexus with government debt and the money supply. The short-term effects of the different factors on growth in the individual states are so diverse that their grouping by countries is impossible.*

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Introduction

The nexus between public debt, budget deficits, and interest rates on long-term government bonds and their effects on economic growth in the Euro area founding states has garnered significant academic attention over the years. The literature reflects a complex interplay of fiscal policies and economic outcomes, with various studies providing empirical evidence and theoretical insights into this multifaceted issue.

The relationship between public finance stability and economic growth is a nuanced and critical area of study. Particularly, the European context offers empirical evidence showcasing how public finance, characterized by aspects such as governance, fiscal balance, and structural expenditures, intricately interacts with economic outcomes. A significant body of research indicates that the governance framework substantially shapes the effects of public finance on economic growth. For instance, Lien highlights that governance acts as a modifier, influencing how public finance stability translates into economic performance across different countries. The study emphasizes that anti-corruption efforts and the enhancement of governance structures play vital roles in harnessing the economic benefits of stable public finance in diverse national contexts (Lien, 2018). This suggests that while public finance stability sets the foundation, the effectiveness of governance mechanisms determines the extent of its impact on economic growth.

The stability of public finance significantly impacts economic growth within the context of Euro area founding countries, shaped by the roles of governance, public debt levels, expenditure structures, and financing mechanisms. Effective governance enhances the positive impacts of stable public finance, while unsustainable debt levels and inefficient expenditure can severely hinder growth prospects. The intricate balance of these factors demands nuanced policy responses tailored to stabilize public finance while fostering sustainable economic growth.

The purpose of this research is to estimate the effects of government debt, fiscal balance and the interest rate on the ten-year government bonds on economic growth in the Euro area founding states. An ARDL with annual data for the period

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1999 - 2024 is employed to explore the impact of public finance stability on the real output growth rate in EA-11.

The goal of the study has been achieved by the fulfillment of the following tasks:

- Systematize theoretical and empirical research on the nexus between public finance stability and economic growth in the EA-11 (section one);
- Analyze empirically the influence of government debt, fiscal balance and the interest rate on the ten-year government bonds on economic growth in the Euro area founding states (section two);
- Make recommendations on fiscal and monetary policies for encouraging economic growth in the Euro area founding countries individually and as a whole on the basis of empirical results from this research (conclusion section).

Literature review

The interaction between public debt and budget deficits is critical, given the Eurozone's history of economic fluctuations and overall inflationary pressures, which have sometimes devastated its member states, particularly in the wake of the 2008 global financial crisis. The relationship between public debt and economic growth is complex and often debated among economists. Some argue that rising public debt can lead to negative growth outcomes due to increased borrowing costs and potential crowding-out effects. According to Erdem et al. (Erdem et al., 2017), the implications of government debt in Eurozone countries, especially in the post-crisis context, showed a significant negative correlation between government expenditure financed through debt and private sector investment. Similarly, findings by Misztal (2021) noted that public debt and budget deficits are perceived negatively from a neoclassical perspective, positing that these financial burdens may detract from economic growth by shifting resources away from productive investments.

Conversely, proponents of the Keynesian perspective argue that budget deficits can stimulate growth under specific economic conditions, particularly in times of low interest rates. They assert that when governments borrow to finance deficits, they can inject necessary capital into the economy, thus promoting growth. This is particularly relevant in a low-interest-rate environment, where expansionary fiscal policies can potentially become self-financing by nurturing growth that offsets debt through increased revenues. Budget deficits could enhance economic performance by increasing public investments in social welfare and infrastructure, thereby potentially spurring economic growth (Van et al., 2020).

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Critical to understanding the impact of public debt on growth is the concept of debt thresholds. Topal (2014) examined how varying levels of public debt can have divergent effects on growth rates within Eurozone economies. The research posited that up to a certain threshold, increases in public debt may not hinder growth; however, beyond this point, the adverse effects tend to outweigh benefits. The contradictions in findings across different studies highlight the need for context-specific analyses when scrutinizing the impacts of public debt. Moreover, public debt levels are critical metrics that directly influence growth trajectories. Stawska cites studies indicating that a public debt exceeding 90% of GDP correlates with decreased GDP growth levels (Stawska, 2017). This finding is echoed by Akram, who discusses how high levels of public debt can significantly impede economic growth unless managed through productive investment channels (Akram, 2015). Thus, the sustainability of public debt levels appears pivotal in determining whether public finance stability contributes positively or negatively to economic growth in countries like those within the Euro area.

Another dimension of public finance's impact on economic growth is the structure of government expenditure itself. Szarowská's exploration into the Czech Republic reveals that the quality of public finance, measured by the efficiency and sustainability of fiscal policies, directly affects long-term growth outcomes (Szarowská, 2016). Effective targeting of government expenditure, as discussed by Haque, indicates that merely increasing fiscal spending does not guarantee economic growth; rather, the nature of expenditure, including its sectors and intended outcomes, proves essential (Haque, 2019). Hence, a structured and well-governed approach to managing public finances can yield significant economic dividends.

The source of financing public expenditures is another crucial aspect that influences the effectiveness of fiscal policy on economic growth. Husnain points to differentiated impacts based on whether public expenditure is financed through taxes, bonds, or monetary growth, implying that government choices in funding strategies can lead to varying economic outcomes (Husnain, 2022). This highlights the importance of fiscal policy frameworks that adapt to changing economic conditions, as argued by Makohon and Adamenko, emphasizing institutional transformation in public finance management to respond effectively to macroeconomic instability (Makohon & Adamenko, 2023).

Understanding the Eurozone's unique economic landscape post the 2008 financial crisis is vital. In the case of PIIGS countries (Portugal, Italy, Ireland, Greece, and Spain), Djaballah (2024) identified a clear trend wherein rising public

debt directly correlated with diminished growth rates, exacerbating already critical situations. This observation is bolstered by critiques of previous studies, such as those by Reinhart and Rogoff, which have suggested that there may be limits to the amount of sovereign debt countries can sustain before growth becomes negatively impacted (Nersisyan & Wray, 2010).

Moreover, structural determinants of public debt also play a crucial role. Misztal (2021) indicated that the debate surrounding Ricardian equivalence closely aligns with broader discussions on how budget deficits influence long-term economic health. It has been suggested by researchers that fiscal actions grounded in budget deficits might not inherently damage growth potential but rather depend on the nature and composition of public expenditures and overall fiscal responsibilities (Çınar et al., 2014).

Additionally, findings by Chugunov et al. (2019) highlight the increasing importance of external factors and exogenous shocks as globalization accelerates, further complicating the relationship between public debt and economic growth. With higher global integration, Eurozone economies face significant challenges with national debts and budget deficits that can spill over from other economies, intensifying pressure on local fiscal policies, which in turn can destabilize domestic economic growth patterns.

An extensive review by Rahman et al. Rahman et al. (2019) emphasized the nuanced effects of public debt on growth trajectories, synthesizing existing literature to posit that while excessive public debt is generally perceived to hinder growth, in certain scenarios—especially through targeted public spending—debt might foster economic development. This sentiment echoes the findings of Gupta et al., which indicates a strong link between the efficient utilization of public finances and enhanced economic performance (Van et al., 2020; Greiner, 2015).

Concerns regarding the sustainability of high public debt levels have surfaced in various studies. Nersisyan and Wray Nersisyan & Wray (2010) reinforce the theoretical notion that sovereign debt is not inherently damaging, provided it is well-managed and used efficiently for public investments that foster growth. They argue for a paradigm shift in how debt is understood—suggesting that if debt is managed prudently, it need not constrain future economic performance.

An integral aspect to consider is the role of monetary policy interactions with fiscal policies. Research conducted by Daly (2022) explored the implications of coordinating monetary policies and fiscal responses within the Eurozone, revealing that how central banks respond to debt and deficits can significantly impact economic resilience. By adjusting interest rates and engaging in quantitative

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easing, central banks could mitigate the risks posed by high public debt and budget deficits, advocating for a more harmonious balance between growth objectives and fiscal sustainability.

As the European Union continues to grapple with diverging economic conditions among its member states, it is essential to navigate the relationship between public debt, budget deficits, and growth with precision. Each nation possesses unique structural characteristics that influence how fiscal policies impact their economic trajectories. A multi-faceted approach that understands the interdependencies between these factors will be crucial as policymakers seek sustainable strategies for economic recovery and growth.

Different economic theories provide various perspectives on how public debt and budget deficits can influence economic growth. The Keynesian view suggests that fiscal deficits, particularly during times of economic downturn, can stimulate growth by increasing aggregate demand through government spending on infrastructure and social services (Biplob, 2019). This is contrasted by the neoclassical perspective, which posits that excessive public debt can lead to crowding out of private investment, resulting in lower economic growth (Erdem et al., 2017; Nauman & Ahmad, 2024).

A substantial body of research indicates a nonlinear relationship between public debt and economic growth. The work of Mavodyo (Mavodyo, 2022), investigating the South African context, highlights that while budget deficits can stimulate growth, their impact is contingent upon how the resulting debt is utilized. In a Eurozone context, a similar nuance is found; studies suggest that servicing debt takes precedence over productive investments, thereby hindering growth. Hence, the composition and purpose of public expenditure become crucial factors (Misztal, 2021; Topal, 2014). Moreover, research confirms that higher levels of public debt often correlate with reduced fiscal space, leading to lower growth rates. For instance, Nkrumah et al. Nkrumah et al. (2018) established a bidirectional relationship between budget deficits and economic growth, emphasizing that while deficits can spur growth in the short term, they may ultimately impose a long-term burden if not managed prudently. A similar conclusion was reached by Misztal (Van et al., 2020), who provides an empirical investigation within the European Union context, showcasing how rising debt levels can negatively impact economic growth across member states.

Budget deficits play a critical role in shaping economic outcomes. As highlighted by Akamobi and Unachukwu (Akamobi & Unachukwu, 2021), the impact of budget deficits on growth depends significantly on whether the funds are

used for developmental projects or non-productive spending. A targeted approach—in which deficits finance capital projects that enhance productivity—yields positive economic returns. Conversely, indiscriminate spending can lead to inefficiencies and a stifled economy (Van et al., 2020). Investigating the characteristics of budget deficits across the Eurozone, studies report considerable heterogeneity among member states, where the economic context can drastically alter the effects of fiscal deficits on growth. For example, evidence from Djaballah suggests that in nations like Greece, where public debt has soared, the fiscal space for growth-enhancing investments has decreased, resulting in prolonged economic stagnation.

A significant area of research centers on identifying optimal debt levels that facilitate growth without causing fiscal distress. Research by Topal (2014) suggests that a certain threshold exists beyond which the marginal impact of debt on growth becomes negative. This notion is echoed in the works of Çınar et al. (Van et al., 2020), reinforcing that while some debt can be beneficial — particularly if invested wisely—overburdening economies can lead to stagnation and recessionary pressures.

The dynamic interaction between public debt, budget deficits, and economic growth often reflects broader macroeconomic conditions. For instance, studies such as those by Nkemgha and Moumié (2020) found that in scenarios where deficits financed productive investments, countries experienced growth. However, during periods of economic downturn or uncertainty, the same deficits, when perceived as unsustainable, can lead to investment detachment and diminished growth prospects. Furthermore, empirical results from recent studies reveal that the nuances of national fiscal policies and the economic environment significantly affect how deficits interact with growth. As highlighted in the findings by Nkemgha and Moumié, government spending during economic contractions can stimulate growth, but excessive reliance on debt can result in inflationary pressures and long-term sustainability issues.

The Eurozone context poses unique challenges related to the common currency, where individual member states' fiscal policies can have repercussions beyond their borders. The imposition of fiscal discipline across the Eurozone, particularly in countries under strict austerity measures, has led researchers like Nauman and Ahmad (2024) to argue that these constraints often exacerbate economic stagnation, rather than fostering recovery. The concept of the "twin deficits" hypothesis, where fiscal deficits correspond to trade deficits, has also been explored in the Eurozone context. Studies suggest that countries with concurrent

budget and trade deficits face compounded challenges in achieving economic growth, as both deficits can lead to a lack of investor confidence (Ncanywa & Letsoalo, 2019).

Afonso & Tovar Jalles (2013) explored the implications of government debt on output growth and productivity across advanced and developing nations. Their research highlighted the detrimental effects of increased public debt on economic growth, particularly in light of financial crises. They noted that while advanced countries may not exhibit a clear, robust link between debt and growth, developing nations consistently faced negative impacts. This foundational work set the stage for subsequent analyses by establishing a critical perspective on the relationship between fiscal policy and economic performance.

Daly & Smida (2014) examined the causal relationships between public debt, budget deficits, interest rates, and inflation within the Euro area from 1999 to 2013. Their findings underscored the lack of political coordination in fiscal and monetary policies, suggesting that ineffective policy stances could lead to suboptimal economic outcomes. They emphasized that monetary policy played a more stabilizing role compared to budgetary measures, particularly during the Eurozone debt crisis that began in 2010. This study added a temporal dimension to the understanding of public debt's impact, linking it directly to economic activity and policy responses.

Ewaida (2017) provided a comparative analysis of the effects of sovereign debt on growth between GIIPS (Greece, Italy, Ireland, Portugal, Spain) and JUUSD (Japan, United States) countries. He argued that while expansionary fiscal policies could stimulate growth, they often led to higher public debt and deficits. Contrarily, the neo-classical growth theory posited a crowding-out effect, suggesting that rising debt and deficits could ultimately hinder economic growth due to increased interest rates and reduced investment. This dichotomy in perspectives highlighted the ongoing debate regarding the efficacy of fiscal stimulus in the context of rising public debt.

Jokinen (2016) focused on the implications of fiscal constraints within the Eurozone, emphasizing the challenges faced by member states with varying fiscal health. He noted that the austerity measures imposed by the Fiscal Compact could exacerbate growth issues, particularly in peripheral countries. Jokinen's analysis pointed to the necessity of sustainable growth strategies and the potential need for debt restructuring, as seen in Greece. This work contributed to the understanding of how fiscal policies interact with macroeconomic stability within a monetary union.

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Attard (2019) utilized a Dynamic Panel ARDL approach to investigate the nexus between public debt and economic growth. He highlighted the inconsistencies in previous research regarding the threshold levels of debt and their effects on growth. While many studies concurred that public debt generally hinders growth, some indicated a positive relationship under certain conditions. This nuanced perspective on causality and the search for a definitive debt threshold added depth to the ongoing discourse surrounding public debt and economic performance.

Overall, the literature indicates that while excessive public debt and budget deficits can pose significant threats to economic growth, the outcomes are heavily contingent upon the specific economic context and the effectiveness of fiscal management. The necessity for targeted and judicious fiscal policies that prioritize productive investments over mere consumption emerges as a common theme across studies, indicating a pathway forward for Eurozone economies navigating the complexities of public debt and budgetary challenges.

The reviewed literary sources reveal a dynamic and evolving understanding of how public debt, budget deficits, and interest rates on long-term government bonds influence economic growth in the Euro area. The critical evaluations presented in these studies highlight the complexities of fiscal policy and its implications for economic stability and growth, necessitating further exploration and analysis.

Theoretical Background

The determinants of real GDP growth rate in the EA-11 are identified via a pooled mean group (PMG) ARDL, which includes the following variables:

GDPGRij – annual rate of change (in percent) of the real gross domestic product of country i in year j;

FBij – fiscal balance (percent of nominal GDP) of country i in year j;

GDij – government debt (percent of nominal GDP) of country i in year j;

INFLij - annual rate of change (in percent) of the harmonized index of consumer prices of country i in year j;

INT_LONGij – annual interest rate on the ten-year government bonds of country i in year j;

INT_SHORTj – annual base interest rate of the ECB in year j;

M3j – annual rate of change (in percent) of the monetary aggregate M3 in the Euro area in year j;

PPIij – annual rate of change (in percent) of the PPI of country i in year j;

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PR_LEVij – price level of country i in year j (in percent of the price level of EU-27).

The target (dependent) variable is GDPGR. The independent variables of interest to this research are FB, GD and INT_LONG as indicators of national fiscal policies and public finance stability of the EA-11 countries. The other regressors are control variables, which reflect the impact of non-fiscal and non-public-finance factors on economic growth in the EA-11 (M3 and INT_SHORT as instruments of the common monetary policy of the ECB, PPI is a measure of supply-side shocks, INFL is an indicator of demand-side shocks and PR_LEV is a proxy for structural changes in the economy).

The Hausman tests indicate probabilities above 5 percent (0.85 and 0.15), which means that the pooled mean group (PMG) estimator should be preferred to the mean group (MG) or dynamic fixed effects (DFE) estimators. The optimum number of lags for each variable in the PMG ARDL is selected automatically by EViews based on the Akaike Information Criterion.

Annual Eurostat and ECB data for the period 1999-2024 are used in the empirical analysis. The data for M3 and INT_SHORT are obtained from the website of the ECB, while the data for the other variables are taken from the Eurostat website.

Empirical analysis of the effects of government debt and fiscal balance on real economic growth in the EA-11

The stationarity tests (see Table 1) imply that GDPGR, FB, INFL, INT_LONG, M3 and PPI are integrated of order zero, whereas GD, INT_SHORT and PR_LEV are integrated of order one. The different order of integration of the variables requires the implementation of an ARDL. A PMG ARDL is chosen to model the variables since it assumes that the long-run conditions (coefficients) are identical for all countries in the sample but the short-term conditions (coefficients) differ. The common institutional and regulative framework of the EU represents the long-run conditions, whereas the country-specific factors reflect the short-run conditions.

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Table 1: Stationarity tests on the level values and the first differences

Variable	Probability
GDPGR	0.0000
FB	0.0003
GD	0.2530
INFL	0.0000
INT_LONG	0.0041
INT_SHORT	0.8486
M3	0.0000
PPI	0.0000
PR_LEV	0.3886
D(GD)	0.0000
D(INT_SHORT)	0.0000
D(PR_LEV)	0.0000

Source: Own processing

Table 2: Results from the econometric estimation of the ARDL for the EA-11 as a group

Variable	Coefficient	Standard Error	t-Statistic	Probability
Long Run Equation				
FB	-0.049036	0.041735	-1.174946	0.2422
GD	-0.031198	0.006591	-4.733342	0.0000
INFL	-0.344734	0.079050	-4.360988	0.0000
INT_LONG	0.064485	0.066577	0.968582	0.3346
INT_SHORT	-0.055939	0.073210	-0.764093	0.4462
M3	0.001600	0.000762	2.099634	0.0377
PPI	0.087100	0.026262	3.316575	0.0012
PR_LEV	-0.122689	0.031238	-3.927545	0.0001
Short Run Equation				
COINTEQ01	-1.191602	0.055230	-21.57533	0.0000
D(FB)	0.312158	0.074805	4.172975	0.0001
D(GD)	-0.299686	0.044126	-6.791635	0.0000
D(INFL)	0.320613	0.175408	1.827810	0.0699
D(INT_LONG)	0.177029	0.195644	0.904853	0.3672
D(INT_SHORT)	0.233374	0.241242	0.967384	0.3352
D(M3)	-0.001774	0.000822	-2.158422	0.0327
D(PPI)	-0.026655	0.055836	-0.477371	0.6339
D(PR_LEV)	0.031122	0.134533	0.231337	0.8174
C	21.37044	1.333886	16.02120	0.0000

Source: Own processing

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The results from the econometric estimation of the ARDL for the group of the EA-11 are displayed in Table 2. In the long term, there are five statistically significant regressors with different signs (positive for M3 and PPI and negative for GD, INFL and PR_LEV. This implies that in the long term the percentage change in the real GDP in the EA-11 separately and as whole is positively related to the percentage changes in the money supply and the producer price index and negatively related to the share of government debt in GDP, the HICP inflation and the comparative price level. In short-term for the EA-11 as a group, there are four significant explanatory variables with different absolute values (positive for FB and INFL and negative for GD and M3). This suggest that in the short run the real economic growth in the EA-11 as a whole is in a positive nexus with the fiscal balance and the HIPC inflation and in a negative nexus with the government debt and the money supply.

The short-term coefficients for the individual countries are different (see Appendix 1). The short-run effects of the independent variables in the ARDL on the real output growth rate in the separate EA founding states are shown in Table 3. The short-run effects of the regressors on the explained variable in the individual states are extremely diverse, which makes the grouping of the countries by these effects very difficult.

Table 3: Short-term impacts of the regressors in the ARDL on the real economic growth in the different EA founding countries

	FB	GD	INFL	INT_LONG	INT_SHORT	M3	PPI	PR_LEV
Belgium	Positive significant	Negative significant	Positive significant	Positive significant	Positive significant	Negative significant	Negative significant	Positive significant
Germany	Positive significant	Negative significant	Positive significant	Negative significant	Positive significant	Negative significant	Negative significant	Positive significant
Ireland	Positive significant	Negative significant	Positive significant	Positive significant	Insignificant	Negative significant	Negative significant	Negative significant
Spain	Positive significant	Negative significant	Positive significant	Insignificant	Negative significant	Negative significant	Negative significant	Negative significant
France	Positive significant	Negative significant	Insignificant	Positive significant	Negative significant	Negative significant	Negative significant	Positive significant
Italy	Negative significant	Negative significant	Negative significant	Positive significant	Positive significant	Negative significant	Positive significant	Negative significant
Luxembourg	Positive significant	Negative significant	Insignificant	Insignificant	Positive significant	Negative significant	Positive significant	Positive significant
Netherlands	Positive significant	Negative significant	Positive significant	Positive significant	Positive significant	Negative significant	Negative significant	Positive significant
Austria	Positive significant	Negative significant	Positive significant	Positive significant	Insignificant	Negative significant	Positive significant	Insignificant
Portugal	Positive significant	Negative significant	Positive significant	Insignificant	Negative significant	Positive significant	Positive significant	Positive significant
Finland	Insignificant	Negative significant	Negative significant	Negative significant	Positive significant	Negative significant	Positive significant	Positive significant

Source: Own processing

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Consclusion

Collectively, the literature reveals a complex interplay between public debt, budget deficits, and economic growth in the Eurozone. While there is recognition that certain levels of debt are necessary for growth through strategic investments, persistent and poorly managed deficits pose significant risks. Policymakers are thus tasked with ensuring that government spending is effectively channeled into growth-enhancing projects while maintaining debt at levels that avoid compromising future economic stability. As Eurozone economies continue to navigate post-crisis recovery trajectories, future research should explore the long-term impacts of varying public debt and budget deficit policies while considering the structural, institutional, and socio-economic factors that govern economic responses across member states.

The empirical results from this research show that in the long run economic growth in the founding countries of the EA individually and as a group is positively dependent on the changes in the money supply and producer prices and negatively dependent on the changes in government debt, the price level and consumer prices. In the short term for the EA-11 as a whole, real economic growth is in a positive relationship with fiscal balance and consumer prices and in a negative relationship with public debt and the money supply. The short-run influences of the regressors on the explained variable in the separate states vary a lot and their arrangement by countries is not feasible.

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THE EFFICIENCY OF THE PERICULUM: RISK ALLOCATION AND INCENTIVES FOR CUSTODY IN THE ROMAN EMPTIO VENDITIO

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Abstract

This paper investigates the economic rationale underlying the contractual risk regime in classical Roman sales (emptio venditio). Starting from the apparent aporia of the principle periculum est emptoris, which burdens the buyer with the risk of fortuitous events before delivery (traditio), the analysis adopts the methodological categories of Law and Economics to demonstrate the allocative efficiency of the jurisprudential system. Through the exegesis of the sources of the Digest — with particular reference to the fragments of Paul and Ulpian — it is evident how the dogmatic opposition between vis maior and custody responds to a precise logic of minimizing social costs: the seller is identified as the Cheapest Cost Avoider for preventable risks (theft, negligence), while the allocation of the residual "catastrophic" risk to the buyer incentivizes the fluidity of exchanges and prevents opportunistic behavior. Finally, the investigation extends to the exceptions provided for gender and ad mensuram sales (e.g. emptio vini), interpreted as functional tools for the management of information asymmetries on the quality of the asset.

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Keywords: *Roman Law, Emptio Venditio, Periculum, Economic Analysis of Law, Custody, Allocative Efficiency.*

JEL Classification: K00;K12;K11;D23; D81

I. Introduction: The Critical Range Problem

The purchase and sale (*emptio venditio*) constitutes, in the Gaian and Justinian systematics, the archetype of consensual contracts (*obligationes consensu contractae*), acting as the primary engine for the circulation of wealth in the Roman world. Unlike the archaic *mancipatio*, a formal and instantaneous act, the classical *emptio* is perfected with the mere exchange of consents on the price and the commodity (*convenit de pretio*), regardless of the contextual delivery of the good (*traditio*) or payment (*numeratio pecuniae*).

This temporal split between the moment of perfection of the bond (*emptio perfecta*) and the moment of translation of possession generates a "critical interval". It is in this period of time — which can last hours, days or months, think of maritime transport or the sale of future crops — that the fundamental problem of risk allocation (*periculum*) lurks.

The solution adopted by classical jurisprudence, crystallized in the well-known brocardo *periculum est emptoris*, appears to a superficial analysis counterintuitive, if not unfair. Why should the buyer, who has not yet become *dominus* (owner) through the *traditio*, bear the risk of fortuitous destruction of the thing, remaining obliged to pay the price? This rule seems to contradict the principle *res perit domino* (the thing perishes to the owner), dominant in real rights.

This paper aims to go beyond purely exegetical readings to embrace the perspective of **Law and Economics**. The hypothesis that we intend to demonstrate is that the Roman rule, far from being a dogmatic fossil, responds to refined criteria of allocative efficiency. Through the analysis of transaction costs and incentives, we will see how the Roman system distributed risks in an optimal way: assigning the seller responsibility for preventable events (through *custody*) and the buyer the risk of inevitable events (*vis maior*).

II. The Dogmatic Framework: Dichotomy Between *Vis Maior* and *Custody*

To understand the economic logic, it is necessary to first establish the dogmatic stakes drawn by the *prudentes*. The cornerstone of the entire building lies in a famous fragment by Paolo, which defines with surgical precision the boundary between the buyer's risk and the seller's responsibility.

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2.1. The Golden Rule in D. 18.6.8

In book 33 *ad Sabinum*, Paul writes:

"Necesse est, ut periculum ad emptorem pertineat, dummodo custodiam venditor ante traditionem praestet: si quid enim vi maiore acciderit, veluti inundatione aquarum [...] aut incendio aut latrocino hostium, emptoris est periculum."

The text sets a necessary condition (*necesse est*) but not sufficient: the risk passes to the buyer, **provided that** (*dummodo*) the seller has fulfilled his obligation of *custody*. We are faced with a binary system of liability that distinguishes between the area of *Custody* (theft, damage) and the area of *Periculum* (force majeure).

2.2. The perimeter of the *Vis Maior*: the inevitability of the event

The Roman sources do not give us an abstract definition, but a phenomenological casuistry that Gaius and Ulpian trace back to the category of *cui resisti non potest* (a force that cannot be resisted). Not every harmful event frees the seller. The jurisprudence draws a clear *limes*:

- **Catastrophic natural events:** Inundatio *(flood),* earthquake*, and* shipwreck.
- **Overwhelming human violence:** Actions such as *latrocinium hostium* (the assault of armed gangs) or factum *principis*.

In these scenarios, the causal link between the seller's conduct and the damage is broken. The event is, by its nature, not preventable. This is where the rule of *periculum est emptoris is triggered*.

2.3. The necessary corrective: the obligation of *Technical Custody*

If the *vis maior* is the exception, the daily operating rule is governed by the *Custody*. When Paul says *"dummodo custodiam venditor... praestet'*, refers to a technical liability regime. The test bench is **Theft (*Furtum*).** If goods are stolen from the seller's warehouse, he is always liable. The legal reasoning is that theft is an event that can be prevented with more accurate surveillance (*exactissima diligentia*). This legal distinction creates the premises for efficiency: the law burdens the only subject who, by physically controlling the space, has the de facto power to prevent the event.

III. Economic Analysis: The *Incentive Ratio*

Having cleared the field of dogmatic uncertainties, we can reread the Pauline rule through the prism of allocative efficiency.

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3.1. The Seller as *the Cheapest Cost Avoider*

The imposition of liability for *custody on the seller* responds perfectly to the criterion of the **"Cheapest Cost Avoider"** (or *Least Cost Avoider*) theorized by Guido Calabresi. Efficiency requires that risk be allocated to the party that can avoid it at the least cost. In the period between sale and delivery, the seller has physical and exclusive control of the goods in their *horrea*.

- **Cost of prevention for the Seller:** It is marginal (maintaining existing security standards).
- **Cost of prevention for the Buyer:** It would be prohibitively expensive (remote monitoring).

If the risk of theft weighed on the buyer, the seller would reduce surveillance (saving costs), generating social inefficiency (*Moral Hazard*). The *custody rule* internalizes the cost of negligence on those who have the de facto power to prevent it.

3.2. The Buyer as *a Residual Risk Bearer*

If the logic of prevention explains *custody*, it cannot explain the *danger* due to force majeure (earthquakes, wars). Here the economic logic changes: it is a matter of allocating the risk. The answer lies in the symmetry between risk and profit. From the moment of *emptio perfecta*, the buyer is the **Residual Claimant**: if the value of the asset rises, he benefits. Therefore, for economic symmetry (*cuius commoda, eius incommoda*), it must also bear the risk of accidental loss. In addition, this rule fulfills a vital function for the fluidity of traffic: it discourages delays in the collection of goods. Knowing that the risk is on the buyer's shoulders, there will be a strong incentive to pick up the asset quickly, freeing up inventories and speeding up the rate of exchange.

IV. Case Studies and Variables: Information Management

The monolithic nature of the rule of *periculum* finds practical articulations necessary when the object of sale requires specific qualitative or quantitative verifications.

4.1. Body Selling vs. Made-to-measure sales

In the sale of foodstuffs (*genus*), the risk does not pass until the **measurement** (*admensuratio*) takes place, as Gaius notes (D. 18.1.35.5). **Economic Ratio:** Until the measurement, the good is generic. Transferring the risk before measurement would create a *Moral Hazard*: the seller could blame the buyer for the loss of the worst part of his stock. Measurement serves as a specification act necessary to allocate risk to a defined physical asset.

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4.2. The *Emptio Vini paradigm*: Information asymmetry and *Degustatio*

The case of wine introduces the qualitative element. Ulpian (D. 18.6.1) clarifies that if the **tasting clause** (*degustatio*) is provided, the risk does not pass until it has taken place.

Economic analysis explains this derogation as the management of **information asymmetry**. The seller knows the state of conservation of his barrels; The buyer does not. The *degustatio* acts as a *Quality Assurance* mechanism. By postponing the transfer of risk, the law incentivizes the seller to store the wine well and eliminates the risk for the buyer to buy spoiled goods ("bins"), reducing future transaction costs.

4.3. The time factor: the *Mora Emptoris*

If the buyer delays in collecting the goods (*mora emptoris*), the seller's liability collapses to **the sole intention**. This rule is a masterpiece of dynamic efficiency. Delay imposes unforeseen storage costs on the seller. The law "sanctions" the buyer with a total reallocation of risk: "Since you are late, I the seller stop guarding. If they steal the goods, it's your problem." This creates a powerful incentive to meet deadlines.

V. Conclusions. Beyond efficiency: the ethical architecture of risk

5.1. Immanent rationality: an economy based on responsibility

The exegesis conducted on the division of risk in *emptio venditio* allows us to transcend the purely antiquarian vision of Roman law. The dialectic between *vis maior* and *custody*, analyzed through the lens of *Law and Economics*, reveals not only a surprising technical modernity, but a profound **anthropological wisdom**. Roman jurists, although lacking modern mathematical formalization, built a system in which economic efficiency is never separated from **individual responsibility**. The rule of *periculum*, far from being a blind sanctioning dogma, is configured as a pedagogical tool of the market: it educates the contracting parties to take care of the thing (*cura rei*) and to loyalty in exchange, postulating a rational economic operator but, above all, ethically responsible for his own spheres of control(1).

5.2. Static and dynamic efficiency: Synallagma as cooperation

The structure of Roman contractual liability pursues a macro-economic balance that harmonizes two apparently divergent instances, achieving what we could call a "contractual sustainability":

1. **Static Efficiency:** By attributing responsibility for theft and negligence to the seller, Roman law anticipates Coase's theorem in a context of high

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transaction costs(2). By identifying the seller as the **Cheapest Cost Avoider**, the legal system not only reduces costs, but prevents social conflict. Technical *custody* acts as a *bonding mechanism*: by forcing the seller to "stand guard", the right transforms material possession into a duty of protection towards the interlocutor, reducing power asymmetries and transforming the counterparty from a potential adversary to a protected partner.

2. **Efficiency in the circulation of wealth (Dynamic Efficiency):** The allocation of "catastrophic" risk (*vis maior*) to the buyer responds to a logic aimed at maximizing the speed of circulation of goods. In an economy where time is a scarce and risky resource, the immediate transfer of risk to the moment of *emptio perfecta* discourages inertia and parasitic behavior (*hold-up problems*). The buyer is pushed to close the logistics operation, favoring a rapid economic metabolism that frees up resources for new production cycles(3).

5.3. Towards a new *Lex Mercatoria*: the humanism of commerce

In the final analysis, this study requires us to reconsider the very nature of the Roman contract as an **ethical infrastructure**. The exceptions analyzed — from *the degustatio* in *emptio vini* to the measurement in gender sales — show that the system of *prudentes* was not a bureaucratic monolith, but a living organism, sensitive to the "truth" of the product. Where quality was uncertain, the law suspended the risk, imposing total *disclosure*. This approach prefigures a conception of the market where transparency is not a bureaucratic burden, but the precondition for legal validity.

Roman law thus gives us a "beacon" for contemporary business practices. In an age dominated by impersonal algorithms and *automatically executed smart* contracts , the lesson of Paul and Ulpian reminds us that trade is, first and foremost, **a human relationship**. A truly evolved contract law is not one that maximizes short-term profit by offloading externalities onto the weaker party, but one that aligns incentives so that care, diligence, and good faith (*bona fides*) become economically advantageous. The greatness of Rome does not lie in its legions, but in having conceived private law as a technology of civil coexistence, capable of transforming risk — the eternal enemy of man — into a calculable, manageable and, ultimately, human factor (4).

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Notes

1: See the notion of **"contractual self-regulation"** in L. Mengoni, *Dogmatica giuridiche*, Milan, 1996. The idea that Roman law uses liability as a behavioral incentive anticipates modern theories of *Behavioral Law and Economics*, suggesting that efficient *default* rules shape not only the contract, but the very ethics of the market.

2: R.H. Coase, *The Problem of Social Cost*, in *J. Law & Econ.*, 1960. In the Roman context, where the costs of remote monitoring were prohibitive (think of a buyer in Rome for goods stored in Alexandria), allocating the risk of theft to the buyer would have generated unsustainable transaction costs, paralyzing traffic. The Roman solution is, therefore, the only socially optimal one.

3: This acceleration is vital in an agrarian and commodity economy. See D.P. Kehoe, *Investment, Profit, and Tenancy*, 1997, who points out that certainty of risk allocation rules was the prerequisite for long-term capital investment by the senatorial and equestrian elite.

4: Roman *Bona Fides* should not be understood as simple moral honesty, but as an objective standard of commercial conduct that integrates the content of the contract. From a comparative perspective, it represents the antidote to the "dehumanization" of the contract in the digital age, reminding the parties of a duty of contractual solidarity that goes beyond the letter of the transaction. V. Zimmermann, *The Law of Obligations*, cit., p. 665 ff.

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FAIR VALUE MEASUREMENT UNDER IFRS 13 AND EARNINGS VOLATILITY: EMPIRICAL EVIDENCE FROM LISTED MINING FIRMS IN EMERGING MARKETS

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Abstract

This study examines how Earnings Volatility (EV) of listed mining firms in emerging markets was influenced by fair value measurement under IFRS 13. EV proxies by standard deviation of earnings per share for the prior three years, while fair value measurement includes level 1, level 2 and level 3. The study uses balanced panel data for eleven years, from 2014 to 2024, while panel least squares regression was employed to analyse obtained data. The results reveal that level 1 fair value has a negative and significant influence on EV, while level 2 and level 3 fair values have a positive and significant effect on EV. The research offers new empirical data in the new market situation, which is relevant to the current policy discussions in the area of the IFRS 13 disclosure requirements and prudential financial reporting. The study contributes to the literature to the extent of providing empirical outcomes of an African capital market environment, especially within the mining sector, that demonstrates how applicable and dependable the fair value measurement can be to the trade-off.

Keywords: *fair value measurement, IFRS 13, earnings volatility, emerging markets, mining firms*

JEL Classification*:* M41; G32; G15

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1. Introduction

The implementation of the International Financial Reporting Standards (IFRS) in emerging market economies has intensified scrutiny of fair value measurement practices, particularly under IFRS 13. IFRS provides a globally accepted framework for financial reporting, aiming to ensure transparency, consistency, and comparability of financial statements. Among the key IFRS standards, IFRS 13 "Fair Value (FV) measurement" plays a crucial role in how entities measure and report the FV of assets and liabilities in their financial statements (Jasim, 2025). Introduced in 2011, IFRS 13 established a comprehensive framework for FV measurement, focusing on defining FV, providing guidance on valuation techniques, and emphasising the use of market-based inputs over entity-specific factors. The standard requires a range from level 1 to level 3 and has attracted considerable academic and regulatory attention regarding its implications for financial reporting quality and earnings volatility. According to Lin (2021), level 1 inputs of fair value measurement are unadjusted prices quoted in active markets for identical assets or liabilities while level 2 and level 3 inputs refer to adjusted observable market inputs and unobservable inputs in active markets. The South African extractive industry is a context of analytical richness. Listed mining companies have significant assets at fair value, such as financial instruments, exploration and evaluation assets, and investment properties (Mohamed, et al., 2025). This subjectivity of fair value specifically creates a concern regarding earnings management and volatility amplification, which are problematic in terms of direct relevance to investors, analysts, and regulators in new markets. As earnings volatility is often seen as an indicator of financial instability, understanding the relationship between fair value measurement and earnings volatility is vital for investors, regulators, and financial analysts. This relationship is especially important for companies in industries with significant holdings of financial instruments, where fair value accounting may contribute to significant earnings swings.

Fair Value (FV) gives a more current and relevant depiction of the value of an asset, it creates subjectivity, especially in markets whose market data is not so reliable. While fair value provides a more timely and relevant measure of assets and liabilities, its reliance on market-based inputs means that it can introduce significant volatility into reported earnings, particularly in volatile markets. This volatility can obscure a company's underlying performance, leading to difficulties

in financial analysis and decision-making (Migliavacca et al., 2021). Previous studies have suggested that fair value accounting, by reflecting market fluctuations in the financial statements, may lead to earnings volatility, which can affect stock prices, investor confidence, and financial stability. However, there is limited empirical evidence on the specific effects of IFRS 13 fair value measurement on earnings volatility in African continents, especially considering level 1, level 2, and level 3 together in a study. Moreover, the extent to which fair value measurement contributes to or mitigates earnings volatility has not been fully explored, particularly in the context of emerging markets. Many studies conducted on FV accounting were based on level 3 (Lin, 2021; Mehnaz et al., 2022; Sangchan et al., 2022; Ma & Wells, 2024). While some focus on FV history (Barker & Schulte, 2017; Haswell & Evans, 2018; Palea, 2019), some based their studies on financial sectors (Al-Yaseen & Al-Khadash, 2011; Fiechter, 2011; Kasyan et al., 2018; Etim et al., 2023). Moreover, most of these studies did not focus on earnings volatility like the current study.

Hence, the objectives of this study include assessing the association between level 1 FV assets and earnings volatilities and determining the effect of level 2 FV assets on earnings volatility; the role of observable inputs in FV measurement should be taken into consideration. Also, to ascertain level 3 FV assets, which are based on unobservable inputs, affect earnings volatility in the case of emerging market firms. The study has its merits and value, as it has contributed to the knowledge on the role of fair value measurement in volatility of earnings, especially in emerging markets such as South Africa. This study provides an insight into the impact of subjective and uncertain valuation of assets, especially level 1, level 2, and level 3, on the financial stability of non-financial listed companies through the analysis of the relationship between the various levels of fair value assets and the volatility of earnings. This is especially relevant to South Africa, whereby firms tend to operate within an environment that does not have as reliable market data as their more developed counterparts. This study also adds to the body of knowledge in that fair value accounting research that is poorly represented by African capital markets. Its results can be of importance to investors since they reveal the risks that may come about as a result of fair valuation measurements that are focused on unobservable inputs, including level 3 assets. The knowledge will aid in improving investment choices by investors, as they are better informed about the earnings volatility, thus minimising risks of misinterpreting specific financial results and improving investment planning. The study offers valuable insights to regulators, standard-setters, and practitioners on

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the trade-offs associated with FV measurement in the context of global financial reporting. To regulators and standard-setters, the study highlights the stronger disclosure measures, especially for the companies that operate on level 3 FV, to enhance transparency and reduce the risks of volatility of excessive earnings. Furthermore, the findings of the study might be used in policy discussions of the relevance versus reliability trade-offs in financial reporting, and they may become the basis of future changes in the accounting standards. Finally, the research fits the existing discussion on the ways to maximise fair value measurement to guarantee more reliable and consistent financial reporting in the economy of the emerging markets.

2. Literature Review and Hypotheses Development

2.1. Fair Value (FV) Measurement

IFRS 13 defines FV as "the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date" (an exit price). The key features of this conceptualization include a market-based measurement rather than entity-specific, use of market participant assumptions, and reliance on observable market data wherever possible. In addition, the standard emphasises that when active markets do not exist, valuation techniques (Elkamali, 2025). An important part of the FV measurement concept is the input hierarchy: level 1 (quoted prices in active markets for identical assets/liabilities), level 2 (observable inputs other than quoted prices), and level 3 (unobservable inputs). The hierarchy conceptually suggests that the lower the level (i.e., more unobservable inputs), the greater the subjectivity and estimation uncertainty embedded in measurement. This has conceptual implications for earnings volatility, because fair value changes flow into earnings (or other comprehensive income) and less reliable measurement may amplify volatility.

2.2. Earnings Volatility

Earnings volatility refers to the fluctuations in reported earnings (net income) over time. From a conceptual viewpoint, high earnings volatility may reflect higher risk and lower predictability and may affect users' perception of earnings quality. When FV measurement is invoked (especially for financial instruments or certain non-financial assets/liabilities), the measurement gains or losses associated with FV changes may contribute to swings in earnings (Plantin et al., 2022). Putting the above together: when entities use FV measurement (in accordance with IFRS 13) for assets or liabilities that are measured or disclosed at fair value, these fair value changes pass through the financial statements, and particularly through earnings (or

comprehensive income). Ghio et al. (2018) disclosed multiple factors that influence the impact of FV estimates, such as type of underlying assets, managerial intent, market conditions, and institutional environment. Because fair value is sensitive to market conditions and valuation assumptions, changes in market conditions or estimation inputs may cause large swings, hence contributing to earnings volatility. Also, when measurement uses lower-level inputs (Levels 2 & 3), the conceptual risk of estimation error (and managerial discretion) is higher, increasing potential volatility. Some conceptual debates arise over whether fair value improves relevance at the cost of reliability (and thus increases volatility) or whether the increased relevance improves information quality, possibly reducing volatility of surprises. The literature thus establishes the conceptual foundation for studying IFRS 13's fair value measurement and earnings volatility.

2.3. Theoretical Review

Relevance-Reliability Theory: Relevance- Reliability theory is a general theory used in accounting and financial reporting that describes the trade-off of relevance and reliability of financial information. Relevance can be described as how the information can affect the economic decision made by the user as he or she can analyse the past, present, or future occurrence. Reliable information, on the other hand, is information that is devoid of material error and bias and is true to what it claims to represent (Barth et al., 2022). The theory highlights that very relevant information can be less reliable sometimes when it is founded on estimations or fair values, whereas very relevant information, like information about historical costs, cannot be relevant in a fast-changing economic environment. The relevancy-reliability trade-off is significant when it comes to having financial statements with information that is useful to the investors, creditors, and other stakeholders. Moreover, optimal balance in financial reporting aims at balancing between having enough information relevant enough to make decisions and at the same time being reliable and verifiable (Sibiya, 2025). According to this theory, increasing relevance via fair value might lead to higher earnings volatility because less reliable measurements may produce larger fluctuations.

Information Risk Earnings Volatility Theory: Information risk earning volatility theory is a theory of the impact of uncertainty because of imperfect or asymmetric information on the volatility of the prices of assets as players in the market learn about them over time. The theory is founded on the perception that investors lack every piece of information on the true value of a firm, and they have to constantly revise their beliefs as new information is made available (Ojodu et al., 2025). Financial disclosure risk occurs as a result of a situation in which the

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information disclosed to the users is incomplete, biased, or hard to verify. Every time investors update themselves with new information, whether in the form of earnings announcements, macroeconomic news, or changes in policy, they will re-evaluate forecasts of future cash flows and risk. The process of learning may result in an increase of price volatility, particularly where the quality of information is poor or when the news is shocking (Goncharov, 2025).

Agency Theory: Agency theory describes the interaction between the principals (shareholders) and agents (managers) that are employed to represent the principals. This theory is founded on the belief that the agents can act contrary to the interests of the principals; hence, conflicts are referred to as "agency problems." These conflicts are a result of the separation of ownership and control, information asymmetry, and risk preference differences (Lin, 2021; Oginni et al., 2025). The managers can be involved in the acts of perquisite overconsumption, earnings manipulation, or suboptimal investment choices, which will result in diminished firm value. From an agency perspective, the use of fair value measurement (especially with unobservable inputs) gives management discretion to influence measurement outcomes, which may lead to earnings management or smoothing behaviour or amplify earnings volatility depending on choices. The theoretical implication is that greater measurement discretion (via fair value) may be associated with greater earnings volatility and/or lower earnings quality (Onaolapo & Shittu, 2022; Addah, 2025). However, while these theories provide a sound framework, there is a gap: few studies apply them specifically to IFRS 13's fair value measurement and directly to earnings volatility across industries in emerging markets. Hence, this research could contribute by applying these theories (relevance-reliability trade-off; information risk; agency) in the context of IFRS 13's fair value measurement and earnings volatility. Hence, the study hypotheses are as follows:

H_{01} Fair value level 1 measurement has no significant effect on earnings volatility

H_{02} Fair value level 2 measurement has no significant influence on earnings volatility

H_{03} Fair value level 3 measurement has no significant effect on earnings volatility

2.4 Empirical Review

Empirical evidence on FV measurement and earnings quality/volatility includes a recent study by Opuene and Amadiwo (2025) revealed a positive and significant

effect of FV accounting on the financial performance of listed oil and gas companies in Nigeria. Also, Khelil and Khlif (2025) observed that level 3 inputs in FV estimates for investment properties are associated with a high degree of estimation uncertainty for external auditors. Likewise, Jasim (2025) revealed significant accounting data on FV measurement of the assets and liabilities of selected insurance listed firms in Iraq. Similarly, Goncharov (2025) examines how information risk from fair value measurement relates to stock return volatility in UK closed-end funds. While the unit of analysis is return volatility (not earnings volatility) as the current study. Likewise, Elkemali (2025) observed more accurate forecasts and a decline in both optimism and dispersion following IFRS adoption in a study conducted among Saudi Arabian listed firms. In the same vein, González-Sánchez (2018) as well as Nguyen and Nguyen (2025) reviewed research on voluntary IFRS application and future research directions. Neither study was considered earnings volatility. Moreover, Shirah et al. (2023) revealed that accounting services exports are unaffected by whether both trade partners have jointly adopted IFRS. Also, Imhanzenobe (2022) investigated the relationship between value relevance and the adoption of IFRS, as well as Adams and Mueller (2022), who examined the nature of academic engagement with policy and the (lack of) responsiveness by policymakers to the scientific community through the development of the IFRS.

Furthermore, Sangchan et al. (2022) show that unobservable inputs in an active market (level 3 inputs) do not diminish the information content of fair value. The study only considered level 3. In addition, Lin (2021) presents evidence on level 3 FV that financial managers employed level 3 FV to manage earnings. Likewise, Claessen (2021) observed the relevance of level 3 fair value on information value for analysts. Also, Pandya et al. (2021) revealed that South African preparers appear reluctant to change from a conventional cost-based measurement approach to one grounded in FV. In addition, Oyewo (2020) revealed the severest challenge of FV measurement borders on the paucity of information for the valuation of items. Despite a growing body of literature on IFRS 13 in developed economies (Laux & Leuz, 2010; Magnan et al., 2022), empirical evidence from sub-Saharan Africa remains sparse. Those studies that were conducted in Africa were based on corporate risk or used only level 3 FV measurement (Pandya et al., 2021; Opuene & Amadiwo, 2025); none of these studies considered earnings volatility with level 1, level 2, and level 3 FV together as the current study. Specific empirical studies linking IFRS 13 fair value measurement to earnings volatility (rather than earnings quality/discretion or return volatility) are limited, and none clearly provide

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large-scale cross-industry emerging market evidence for the recent years 2014–2024. Thus, this study fills this research gap by considering earnings volatility (e.g., standard deviation of earnings over three years) as the dependent variable while exposure to fair value measurement (e.g., proportion of assets/liabilities measured at fair value or share of level 1, level 2, and level 3 fair value inputs) as independent variables.

3. Methodology

Quantitative research design was employed in this study while population comprises 31 listed mining firms in South Africa. A purposeful sampling technique was used to select companies based on the availability of study variable data. The secondary data were sourced annual reports of chosen mining-listed firms. The data span between 2014 and 2024, which gives a full picture of the impacts of IFRS 13 fair value measurements with time downloaded from the Macheratios database website. Panel least square regression was employed to analyse data gathered for the study. Variables were log-transformed where appropriate to address skewness and scale differences. The adjudication between fixed and random effects is done by using the Hausman (1978) test, wherein all regressions are made using robust standard errors.

Table 1: Measurement of Variables

Variables	Definition	Acronym	Description	References
Dependent	Earnings volatility	EV (STD of EPS)	Standard deviation of earnings per share for prior three years	Elkemali (2025)
Independent	Fair value level 1	FVL1	Quoted market prices level 1 fair value assets	Alkababji, M. (2016)
	Fair value level 2	FVL2	Quoted market prices level 2 FV assets observable inputs	Migliavacca et al. (2021)
	Fair value level 3	FVL3	Quoted market prices Level 3 unobservable inputs fair value assets	Lin (2021)
Control	Investment Property	INVP	Investment property valuation	Etim et al. (2023)

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Variables	Definition	Acronym	Description	References
	Exploratory assets	EXPAS	Exploration and evaluation assets divided by total assets	Elkemali (2025)
	Leverage	LEV	Total liabilities / Total assets	Shittu and Oladipo (2025)
	Firm size	FS	Log of total assets	Shittu et al. (2024)
	Return on Assets	ROA	Net earnings / Total assets	Onaolapo and Shittu 2022

Source: Author's compilation, 2026

Model Specification

The study model was adapted from the work of Elkemali (2025) as follows:

$$EV_{it}= \alpha_0+\beta_1 FVL1_{it}+ \beta_2 FVL2_{it}+ \beta_3 FVL3_{it}+\beta_4 INVP_{it} +\beta_5 EXPAS_{it} + \beta_6 LEV_{it}+\beta_7 FS_{it}+ \beta_9 ROA_{it}+\epsilon it$$

α is the intercept in this study, i is cross-sectional, t is time identifier, ε is a model error term, and β_1, β_2, β_3, β_4,, β_5, β_6, β_7, β_8, β_9=coefficients for the respective determinants

4. Results

4.1 Descriptive Analysis

Table 2 present the descriptive statistics of study variables among the 220 firm-years. The dependent variable, Earnings Volatility (EV), has a mean of 0.3852 and standard deviation of 0.0583, which reflects a moderate level of variation in earnings performance within firms and years, as it is the cyclical and commodity-price-driven nature of mining operations. FVL1 has an average of 12.099, which represents significant assets reported at quoted market prices, and FVL2 and FVL3 have an average of 11.040 and 9.928, respectively, exhibiting the highest variability (σ = 1.441), consistent with their reliance on unobservable, management-estimated inputs. LEV is 52.4% on average, which reflects the capital-intensive character of mining. All the variables have skewness and kurtosis values that are acceptable within acceptable skewness and kurtosis ranges, generally in line with normality assumptions.

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Table 2: Descriptive Statistics

Variable	N	Mean	Std Dev	Min	Max	Skewness	Kurtosis
EV	220	0.3852	0.0583	0.2017	0.5993	0.2330	0.4617
FVL1 (log)	220	12.0983	1.2721	9.0036	15.7128	0.3570	0.0401
FVL2 (log)	220	11.0402	1.3375	6.9621	14.6555	0.2503	-0.0575
FVL3 (log)	220	9.9275	1.4413	6.7721	14.3120	0.3490	-0.0767
INVP (log)	220	9.0405	1.5730	4.4242	13.7828	0.0618	-0.1419
EXPAS	220	0.2103	0.1163	0.0155	0.5664	0.5717	-0.3892
LEV	220	0.5240	0.1822	0.1958	0.9500	0.2202	-0.7506
FS	220	14.0333	0.7555	12.1744	16.1899	0.0636	-0.2677
ROA	220	0.0676	0.0475	-0.0534	0.1962	-0.0330	-0.1239

Source: Author's computation, 2026 (STATA)

4.2 Correlation Analysis

Correlation analysis with the significance levels of study variables are displays in Table 3 above. The FVL1 has a negative and significant correlation with EV ($r = -0.240$, $p = 0.001$), which implies that the more firms are exposed to market-priced assets that are liquid, the lower the earnings volatility. On the other hand, FVL2 ($r = 0.281$, $p < 0.001$) and FVL3 ($r = 0.490$, $p < 0.001$) are both significantly and positively correlated with EV, with the latter having the strongest bivariate correlation with EV in the matrix. Lev is also significantly correlated with EV ($r = 0.388$, $p < 0.001$). Notably, the inter-correlations among the independent variables are always low (all $|r| < 0.15$), which means that there is no multicollinearity, which is confirmed by the VIF diagnostics presented below.

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Table 3: Pearson Correlation Matrix

	EV	FVL1	FVL2	FVL3	INVP	EXPAS	LEV	FS/ROA
EV	1.000							
FVL1	-0.240***	1.000						
FVL2	0.281***	-0.088	1.000					
FVL3	0.490***	-0.072	0.060	1.000				
INVP	0.066	-0.012	-0.027	0.045	1.000			
EXPAS	0.088	-0.061	-0.026	0.031	0.034	1.000		
LEV	0.388***	0.014	0.015	0.030	-0.008	0.055	1.000	
FS	-0.049	0.050	-0.068	0.033	-0.091	0.021	-0.002	1.000
ROA	-0.073	0.035	-0.018	-0.006	0.021	-0.106	0.015	0.137*

Source: Authors' computation, 2026 (STATA), *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$

4.3 Diagnostic Tests

The results of all pre-estimation and post-estimation diagnostic tests are reported in Table 4. The fact that model residuals are normally distributed is confirmed by the Shapiro- Wilk test ($W = 0.9787$, $p = 0.498$). The Breusch-Pagan test ($\chi^2 = 3.669$, $p = 0.886$) finds no evidence of heteroskedasticity. The Wooldridge test ($F = 1.565$, $p = 0.212$) reveals no significant first-order serial correlation in the idiosyncratic errors. Variance Inflation Factors (VIF) are all below 1.04, well below the conventional threshold of 10, confirming the absence of multicollinearity. The Pesaran (2004) CD test ($CD = 0.046$, $p = 0.963$) shows that there is no cross-sectional dependence, and thus the use of standard panel estimators is not subject to the addition of spatial lag corrections. The Im-Pesaran-Shin (IPS) unit root test rejects the null of unit roots of EV ($Z = -3.243$, $p = 0.001$), which is a confirmation of stationarity. Finally, the Hausman test ($\chi^2(8) = 1.872$, $p = 0.985$) fails to reject the null, indicating that the random effects estimator is efficient and consistent and is therefore preferred for inferential analysis.

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Table 4: Diagnostic Tests

Diagnostic Test	Test Statistic	p-value	Decision
Shapiro-Wilk (Normality)	W = 0.9787	0.4982	Residuals approximately normal
Breusch-Pagan (Heteroskedasticity)	χ^2= 3.669	0.8857	Homoskedastic; no violation
Wooldridge (Serial Correlation)	F = 1.565	0.2124	No first-order autocorrelation
VIF – Max (Multicollinearity)	1.031 (ROA)	—	All VIFs < 10; no multicollinearity
Pesaran CD (Cross-Sectional Dep.)	CD = 0.046	0.9630	No cross-sectional dependence
IPS Panel Unit Root (EV)	Z = −3.243	0.0012	Series stationary; no unit root
Hausman Specification Test	$\chi^2(8)$ = 1.872	0.9847	Random Effects preferred

Source: Authors' computation, 2026 (STATA)

4.4 Results of Panel Least Square Regression

Table 4 shows regression findings using pooled OLS, fixed effects, and random effects. Considering the result of the Hausman test, the preferred estimator is the random effects model, and it is used to test hypotheses and interpret the results.

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Table 4: Panel Data Regression Results

Variable	Pooled OLS	Fixed Effects	Random Effects	Hypothesis
FVL1 (log)	-0.00853*** (0.00228) [-3.737]	-0.00802*** (0.00231) [-3.475]	-0.00805*** (0.00231) [-3.493]	H_{01}: Rejected
FVL2 (log)	0.01010*** (0.00217) [4.655]	0.00970*** (0.00212) [4.571]	0.00973*** (0.00213) [4.575]	H_{02}: Rejected
FVL3 (log)	0.01813*** (0.00201) [9.019]	0.01675*** (0.00209) [8.021]	0.01685*** (0.00208) [8.093]	H_{03}: Rejected
INVP (log)	0.00187 (0.00184) [1.014]	0.00196 (0.00190) [1.031]	0.00196 (0.00190) [1.032]	Not significant
EXPAS	0.02049 (0.02502) [0.819]	0.02046 (0.02476) [0.826]	0.02047 (0.02478) [0.826]	Not significant
LEV	0.11921*** (0.01583) [7.529]	0.12629*** (0.01561) [8.092]	0.12580*** (0.01562) [8.052]	Significant
FS	-0.00198 (0.00388) [-0.511]	-0.00108 (0.00400) [-0.270]	-0.00115 (0.00399) [-0.287]	Not significant
ROA	-0.07150 (0.06162) [-1.160]	-0.08713 (0.06127) [-1.422]	-0.08597 (0.06128) [-1.403]	Not significant
Constant	0.14594** (0.07254) [2.012]	0.14161* (0.07497) [1.889]	0.03547* (0.01888) [1.878]	
R^2	**0.4860**	**0.4813**	**0.4815**	
Adj-R^2	**0.4665**	**0.4617**	**0.4619**	
F-stat	**22.168*** **	**21.758*** **	**21.774*** **	
N	**220**	**220**	**220**	
Estimator	**OLS**	**Within**	**GLS**	**Hausman: p=0.9847 → RE preferred**

Source: Authors' computation, 2026 (STATA)*** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Standard errors in parentheses; t-statistics in brackets.

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4.5 Interpretation of Results

As shown in Table 5, all three models (RE: β = -0.00805, p = 0.001) show a negative and significant coefficient on FVL1. This result shows that companies that have higher shares of Level 1 fair value assets, estimated by quoted, active market prices, experience significantly lower earnings volatility. H01 is hence rejected. This finding is consistent with the anticipated characteristic of Level 1 measurements, which anchor them to market prices observable, introduce less estimation uncertainty and discretion in financial reporting, hence stabilizing reported earnings. This observation aligns with Barth et al. (2022), who state that the quality of earnings and reduced risk of restatements are linked to the presence of market-based fair value inputs in IFRS-reporting firms. Also, FVL2 has a positive and statistically significant coefficient (RE: β = 0.00973, p < 0.001), meaning that reliance on the Level 2 observable inputs (dealer quotes and market-corroborated inputs) makes the earnings more volatile. H_{02} is rejected. Although Level 2 inputs are deemed to be more accurate than Level 3, they are still vulnerable to market-driven factors, as well as estimation biases, especially in the setting of commodity-linked financial instruments common to mining. This aligns with Lim et al. (2022), who report that even observable inputs may be volatile when underlying markets are illiquid or cyclic. Likewise, the coefficient on FVL3 is both the highest and most significant in all the specifications (RE: β = 0.01685, p < 0.001), which proves that there is a strong positive correlation between Level 3 fair value measures and earnings volatility. H_{03} is firmly rejected. This finding corroborates the theoretical arguments of Plantin et al. (2022), who assert that mark-to-model valuations introduce substantial discretionary noise into earnings, amplifying volatility. In the mining sector, Level 3 inputs commonly include discounted cash flow valuations of mineral reserves and exploration assets, highly sensitive to commodity price assumptions and discount rate selections. The magnitude of the FVL3 coefficient (more than double that of FVL2) underscores the disproportionate earnings volatility risk posed by unobservable-input fair values. With regards to the control variables, the only control variable that is statistically significant (RE: β = 0.1258, p < 0.001) is LEV, meaning that the higher the leverage of a firm, the higher the earnings volatility is, which, again, is in line with the arguments of agency theory and financial distress (Ohlson & Kim, 2015). The positive and large coefficient on LEV highlights the risk amplification role of debt in the face of unstable commodity revenues. Investment property (INVP), exploration assets (EXPAS), firm size (FS), and return on assets (ROA) are

statistically insignificant, which implies that in the framework of JSE mining companies, these variables are not the drivers of earnings variability with the consideration of fair value hierarchy exposures.

4.6 Discussion of Results

The findings of this study resonate strongly with the emerging literature on IFRS 13 in developing and emerging market contexts. The negative influence of FVL1 on earnings volatility extends the analysis of Laux and Leuz (2020), who argued that mark-to-market accounting for actively traded instruments can stabilise, rather than destabilize, earnings when markets are sufficiently liquid. In the South African mining context, where major producers hold substantial listed equity and derivative positions, FVL1 assets appear to serve as a natural earnings buffer. The positive FVL2 coefficient, although less than FV3, supports the conclusions of Ramanna and Watts (2021), who find that even the seemingly observable inputs have an estimation risk in a thin or illiquid market. In addition, Chircop and Novotny-Farkas (2022) report, with European banking data, that FVL3 measurements increase the cyclical and procyclical valuation adjustments to earnings volatility, a result replicated in the present mining sector context. Equally, Magnan et al. (2022) discover that in emerging markets, companies that have high Level 3 asset concentrations have higher uncertainty in forecasting analyst earnings, which is aligned with the increased volatility that is reported here. Moreover, the significance of leverage as an earnings volatility driver is consistent with capital structure theory and with recent empirical work by Ohlson and Kim (2023), who demonstrate that debt levels mediate the relationship between FV accounting and earnings quality in capital-intensive sectors. The results are also inconsistent with the findings of Al-Shboul et al. (2023), who document a structural shift in IFRS 13 FV effects during global market disruptions.

5. Conclusion and Recommendations

This study provides robust panel data evidence that fair value measurement under IFRS 13 significantly influences earnings volatility among listed mining firms. The study concludes that level 1 fair value measurements have a strong negative association with the volatility of earnings, whereas level 2 and particularly level 3 measurements have a positive association with the volatility of earnings. The three research hypotheses are all rejected at the 5% level of significance. Leverage is confirmed as a significant covariate of earnings volatility, consistent with financial distress theory. These results are consistent with each other and can

be compared with recent international data obtained through similar studies in emerging markets. Based on the results, the study recommended as follows:

i. The IASB and JSE ought to require more quantitative sensitivity reporting of Level 3 fair value assets, especially in the extractive industry, where mark-to-model estimates are not certain.
ii. Auditors and audit committees ought to exercise increased professional skepticism to Level 3 valuation models in particular when there is a decrease in commodity prices.
iii. Mining companies that have high leverage ratios ought to think about active liability management approaches, since the leverage multiplies the fair value uncertainty to create volatility in earnings.

6. Theoretical and Practical Implications of the Study

This study contributes to three theoretical streams. First, it extends the fair value accounting literature by empirically stratifying the earnings volatility effects of each IFRS 13 hierarchy level in a resource-sector emerging market setting, a context previously underexplored. The heterogeneity of effects across FVL1, FVL2, and FVL3 confirms that the hierarchy structure is economically meaningful and not merely a disclosure formality. Second, the study contributes to agency theory by documenting that Level 3 measurements where managerial discretion is greatest are most strongly associated with earnings volatility, consistent with the notion that information asymmetry between managers and investors is amplified under mark-to-model accounting. Third, the stabilising effect of FVL1 assets suggests that transparent, market-corroborated valuation signals reduce uncertainty and earnings volatility, providing a theoretical basis for regulators to incentivise market-based over model-based fair value. With regards to the practical implications, the results remind regulators and standard-setters of the importance of enhancing IFRS 13 disclosure of level 3 assets in emerging markets, where the quality of audit and enforcement could be less than that in developed markets. The disproportionate volatility of earnings impact of level 3 measurements of extractive industries should be a part of the post-implementation review of the IFRS 13 conducted by the IASB. Also, to the stock exchange, the results imply that a proactive portfolio rebalancing to observable-input assets (at least increased sensitivity analysis disclosures to level 3 valuations) would convincingly indicate the quality of earnings to capital markets. To investors and financial analysts, the results imply that the IFRS 13 hierarchy structure of the statement of financial position of a mining firm is a significant earnings risk factor that needs to be

included in valuation models and earnings quality measurements. The implications of the results to corporate governance are that the audit committee should question level 3 valuation assumptions, especially when there are uncertainties with commodity prices.

7. Suggestion for Future Research

Future research could be conducted in the future regarding the moderating effect of the quality of corporate governance, such as board independence and audit committee expertise, on the fair value earnings volatility nexus because the governance mechanisms can partly reduce the earnings variation of Level 3. Also, the generalisability of such findings would be enhanced by cross-country comparative studies with other emerging market mining jurisdictions.

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GOLD-BACKED CRYPTOCURRENCIES: A STABLE DIGITAL SOLUTION FOR MODERN CORPORATE FINANCE

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Abstract

This paper looks at how gold-backed cryptocurrencies are starting to function as relatively stable digital instruments in corporate finance. The study focuses on how these hybrid assets link the long-standing price resilience of gold with the speed and automation of blockchain systems to tackle problems that firms face when markets swing sharply. Its main goals are to assess their ability to dampen price swings, improve day to day liquidity management, and act as a practical hedge against inflation and exchange-rate movements.

Beyond that, the paper analyzes how firms might weave gold-backed cryptocurrencies into broader financial policies, especially for cross-border payments and corporate treasury operations. It also reviews the main obstacles that come with using these instruments, such as uncertain regulation, questions about auditability and data clarity, and the slow pace of wider market trust. By setting gold-backed cryptocurrencies side by side with both standard financial instruments and conventional cryptocurrencies, the study aims to build a clear picture of their real-world usefulness for today's corporations. In the end, the research asks whether these digital instruments can function as a reliable and efficient option for corporate financial management in an economy that keeps moving deeper into digital systems.

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Keywords: *gold-backed cryptocurrencies, corporate finance, blockchain technology, liquidity management, risk management, financial*

JEL Classification: *G32, G15, E42.*

I-Introduction

Gold-backed cryptocurrencies now sit at an odd crossroads between bullion vaults and corporate balance sheets. They mix the long-standing role of gold as a store of value with blockchain-based trading rails that promise faster settlement, clearer audit trails, and programmable features for treasury teams. In a setting where firms wrestle with sharp market swings, rising prices, and pressure to move money across borders quickly and cheaply, that mix looks increasingly attractive. Traditional tools often force a trade-off between stability and easy access to funds, while gold-backed digital tokens appear to offer both liquidity and exposure to a tangible asset that many companies already trust.

This study examines that claim by drawing on recent market data, corporate case examples, and current regulatory approaches to see how far gold-backed cryptocurrencies have moved from theory into day-to-day corporate use. It looks at ways finance departments might fold these assets into liquidity planning, short-term cash parking, and broader risk management, especially when they worry about currency swings or inflation eating into idle reserves. A central question runs through the analysis. Can gold-backed tokens genuinely serve as practical hedging and treasury tools, or do they behave too much like speculative crypto assets once they enter secondary markets?

To answer that, the paper compares gold-backed digital currencies with both well-known cryptocurrencies and long-standing financial instruments such as money market funds, commercial paper, and physical gold positions. It weighs not only the potential benefits in terms of settlement speed, transparency, and automation, but also the limits that arise from custody risks, regulatory uncertainty, and market depth. That comparison highlights where these instruments may fit into existing corporate policies and where they still clash with internal controls or external rules.

The work builds on prior research on cryptocurrency adoption, stablecoins, and corporate financial risk management, but it shifts the spotlight away from Bitcoin- or Ethereum-centered studies toward assets tied directly to physical gold reserves. Earlier work rarely tackles how large firms might treat these tokens as part of a

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structured treasury toolkit rather than as speculative bets, which leaves a clear gap in the discussion. By focusing on that gap, this study aims to show how digital instruments backed by real, measurable assets could support more resilient corporate financial strategies and give decision-makers a clearer set of trade-offs when they weigh new tools for managing cash and risk.

II-Literature Review

The rapid development of digital finance has generated significant academic interest in cryptocurrencies and their implications for corporate finance. The foundational work of Satoshi (Nakamoto 2008) introduced the concept of decentralized digital currencies, emphasizing their ability to operate independently of central financial institutions. Subsequent studies have examined the financial characteristics of cryptocurrencies, particularly Bitcoin, highlighting their high volatility and speculative nature, which limit their effectiveness as stable corporate financial tools (Baur, KiHoon et Lee 2018) (Corbet, et al. 2019). Recent evidence continues to support this perspective, indicating that cryptocurrencies, particularly Bitcoin, exhibit limited hedging effectiveness and remain highly volatile, which restricts their suitability for long-term corporate financial management and risk mitigation strategies (Just and Echaust 2024)

Recent empirical studies have emphasized the critical importance of financial risk management techniques in enhancing business performance, particularly among small and medium-sized enterprises (SMEs). (Ipigansi et Ajemunigbohun 2023) demonstrate that financial risk control mechanisms have a positive and statistically significant effect on SMEs' performance, improving operational capacity and supporting more effective decision-making processes. Their findings further highlight that risk financing strategies, including insurance mechanisms, play a key role in strengthening business resilience and promoting long-term sustainability.

Building on this perspective, the growing interest in innovative financial instruments reflects the need for more advanced and flexible risk management solutions. In this context, gold-backed cryptocurrencies have emerged as a promising alternative that combines the stability of traditional assets with the efficiency of digital technologies. Studies such as (Ajouz, Abdullah et Kasim 2019) emphasize the role of asset-backed digital currencies in reducing volatility and enhancing trust, while (Jalan, Matkovskyy et Yarovaya 2021) provide empirical evidence that these instruments exhibit relatively greater resilience during periods of financial uncertainty. Recent studies further confirm that gold-backed cryptocurrencies may provide effective hedging and safe-haven characteristics

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during periods of market turbulence and financial stress (Hoque, et al. 2024) (Maghyereh, Al-Shboul et Awartani 2025). Additional evidence also highlights the interconnectedness between gold-backed cryptocurrencies and global financial markets during crisis periods, reinforcing their potential role as diversification and risk-management instruments in corporate finance.

To address the limitations associated with highly volatile cryptocurrencies, more recent literature has focused on the development of stablecoins as a more reliable alternative. Research suggests that stablecoins can reduce price volatility while maintaining the efficiency of blockchain-based transactions (Bullmann, Klemm et Pinna, In search for stability in crypto-assets: Are stablecoins the solution? 2019). Recent literature also highlights the growing systemic importance of stablecoins within the cryptocurrency ecosystem and the broader financial system, emphasizing their increasing role in digital financial intermediation and future financial innovation (Dionysopoulos et Urquhart 2024), More recent studies distinguish between different categories of stablecoins and emphasize that asset-backed models tend to demonstrate stronger stability mechanisms and higher investor confidence under stressed market conditions (Hafner, et al. 2024). Within this category, gold-backed cryptocurrencies such as Pax Gold and Tether Gold represent a hybrid model that combines the intrinsic value of gold with digital innovation. These assets are increasingly discussed as potential instruments for enhancing financial stability, improving transparency, and supporting institutional adoption in digital financial markets.

In the context of corporate finance, existing literature has extensively explored risk management and hedging strategies using traditional assets such as gold and fiat currencies. Studies comparing Bitcoin with gold indicate that, although cryptocurrencies share some characteristics with safe-haven assets, they lack the consistent stability required for corporate applications (Dyhrberg 2016), (Klein, Thu et Walther 2018). Consequently, academic interest has increasingly shifted toward asset-backed digital currencies as a possible solution capable of combining blockchain efficiency with more stable value preservation mechanisms.

Recent literature on digital assets has largely concentrated on unbacked cryptocurrencies such as Bitcoin, emphasizing their volatility, speculative nature, and limited suitability for corporate financial operations. In parallel, another stream of studies has explored stablecoins, underlining their potential to reduce price volatility and enhance transactional efficiency. However, this literature often treats stablecoins as a homogeneous category without clearly distinguishing between fiat-backed and asset-backed models. In particular, gold-backed cryptocurrencies

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remain significantly underexplored despite their potential to combine price stability, digital efficiency, and strategic value preservation.

Therefore, a clear research gap exists regarding the practical integration of gold-backed cryptocurrencies into corporate financial management, especially in areas such as treasury operations, liquidity management, and risk mitigation. Furthermore, regulatory uncertainty and concerns related to transparency, reserve verification, and auditing continue to pose major challenges to their broader adoption (Gorton et Zhang 2021).

This paper seeks to address this gap by providing a focused and analytical examination of gold-backed cryptocurrencies and their role in modern corporate finance. It specifically evaluates whether these instruments can provide an effective balance between stability, operational efficiency, and strategic financial value for firms operating in increasingly volatile and digitally integrated financial environments.

III-Conceptual and Theoretical Background of Gold-Backed Cryptocurrencies

Cryptocurrencies, while offering innovative avenues for corporate financing, present several significant shortcomings. Their extreme price volatility exposes firms to unpredictable financial risks, making long-term planning and budgeting challenging. Limited regulatory oversight and inconsistent legal frameworks across countries increase the risk of fraud, money laundering, and compliance violations. Furthermore, cryptocurrencies often face scalability and transaction speed issues, which can hinder their efficiency for large-scale corporate operations. The lack of widespread adoption and integration with traditional financial systems can also restrict liquidity and market access. Additionally, the technical complexity of managing digital wallets and securing private keys creates operational and cybersecurity challenges for companies.These limitations collectively make cryptocurrencies a high-risk and often impractical option for conventional corporate financing needs (Gulyev 2024).

Tie one digital token to a gram of gold, and you get the basic idea of a gold-backed cryptocurrency. Instead of floating freely on market hype, each of these digital coins is linked to a set amount of physical gold held in reserve, so its price tracks that metal and not just sentiment. Because of that link, the asset keeps the flexibility and speed of a cryptocurrency while borrowing some of gold's reputation for stability and downside protection.

Under the hood, it all runs on blockchain systems that record every transfer in a public, tamper-resistant ledger, so investors can check movements and ownership

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at any time. That transparency, combined with clear rules about how much gold backs each token, gives people who are wary of pure digital coins a way to step in without feeling like they're gambling on something completely untethered. For many, it's a bridge between old-school bullion and the fast, borderless world of digital finance.

Various definitions have been proposed regarding gold-backed digital currencies, among which the following can be highlighted:

- "Gold-backed digital currencies are digital assets based on Blockchain technology, supported by a physical reserve of gold to ensure their value stability and protect them from market volatility." (Council 2021)
- "Gold-backed cryptocurrencies are asset-backed stablecoins, where physical gold serves as the underlying asset. Their value is linked to the price of gold, making them a less volatile financial instrument." (Jalan, Matkovskyy et Yarovaya 2021)

Gold-backed digital currency sits inside the broader stablecoin family, built around one simple promise: tie each unit of the currency to a fixed quantity of gold so the price moves less wildly than a typical crypto token. Stablecoins in general have pulled in a lot of attention because they try to mix the speed and relative privacy of cryptocurrencies with the steadier prices that people expect from regular government money.

From the earliest days of crypto, both developers and investors have chased this idea of digital cash anchored to physical gold. In these setups, each token represents a claim on a specific amount of gold, and that gold is held in reserve, much like the backing behind traditional currencies used to be, usually stored by a custodian that users are asked to trust.

One of the first projects that publicly claimed to be fully backed by gold was E-gold, launched by DOUGLAS Jackson and BARRY Downey through their company Gold & Silver Reserve, Inc. It grew quickly, but regulators in the United States shut it down in 2009 because it operated unlicensed money transfer services and became a channel for money laundering and other crimes.

Since then, regulators in different countries have slotted modern gold-backed tokens into legal boxes such as commodity-backed stablecoins or asset-referenced tokens, with the exact label changing from one jurisdiction to the next (NATHAN REIFF 2025).

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IV-Mechanism of Gold-Backed Cryptocurrencies

Gold-backed digital cryptocurrencies operate by linking each unit of the digital currency to a specific quantity of physical gold. This means that for every coin issued, an equivalent amount of gold is held in reserve. This mechanism ensures that the value of the digital currency remains stable and directly tied to the value of gold. Unlike speculative assets such as Bitcoin, these cryptocurrencies provide stability similar to the historical gold standard. In all cases, the issuance of gold-backed digital tokens is based on this process, as illustrated in the following figure

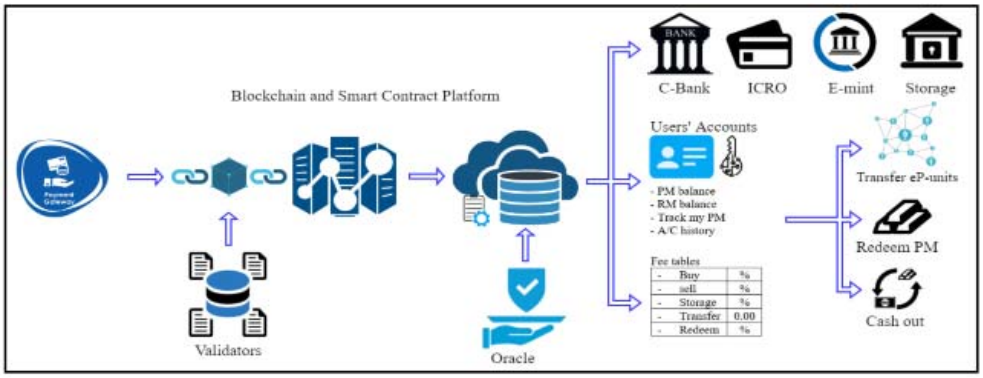


Figure 01: Issuance and Trading Mechanism of Gold-Backed Cryptocurrencies

Source: Moussa Ajouz, Adam Abdullah, Salina Kasim (Ajouz, Abdullah et Kasim 2019), Developing A Shariʿah-Compliant Precious Metal Backed Cryptocurrency, Islamic Econ, Vol 33, p : 10

A gold-backed cryptocurrency operates through a coordinated set of technical and institutional components that tie digital tokens to identified quantities of physical gold. The framework connects blockchain infrastructure and smart contracts with storage facilities, payment gateways, and regulatory bodies to keep the system stable, auditable, and resistant to manipulation, making it attractive for both firms and individual investors (Bullmann, Klemm et Pinna, In search for stability in crypto-assets: Are stablecoins the solution? 2019) (Gorton et Zhang 2021)

1. Payment System

The process usually starts at a digital payment interface where users initiate operations involving gold-backed tokens. Through this gateway, users submit purchase, sale, transfer, or redemption requests that the platform formats correctly,

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signs, and routes to the underlying blockchain network. Because the gateway links directly to the ledger, users see near real-time confirmation and can rely on secure initiation of their transfers (Baur, KiHoon et Lee 2018) Simple for the front end, highly structured in the back end.

2. Blockchain Platform and Smart Contracts

The blockchain records every transaction involving the gold-backed tokens on a distributed ledger that no single party controls and that participants can verify independently. On this ledger, smart contracts define and enforce the system rules: they transfer token ownership (PAUN 2022), verify that each newly created token corresponds to a specific quantity of gold in reserve, and trigger predefined conditions without manual intervention (Nakamoto 2008) (Corbet, et al. 2019). Because every change in token balances passes through these contracts, the link between the on-chain supply and off-chain gold holdings remains visible and resistant to tampering.

3. Validators (Nodes)

Validators, sometimes called nodes, examine incoming transactions, confirm that they follow the protocol rules, and then include them in new blocks. They reject double-spending attempts, malformed messages, and any action that conflicts with the consensus rules. By doing so, they protect the historical record of transfers and sustain confidence that gold-backed tokens reflect genuine activity rather than fabricated entries (Dyhrberg 2016) This is the technical backbone.

4. Oracles

Because the blockchain itself cannot access external information, oracles supply off-chain data that the smart contracts need to function correctly. In a gold-backed system, these oracles provide reference gold prices, information on total reserves, and in some cases regulatory or market indicators (Klein, Thu et Walther 2018), When oracles feed correct data into the contracts, the token valuation stays aligned with physical gold, which supports price stability and helps users trust the peg. Bad oracle data would break that link, so their reliability matters a great deal.

5. User Accounts

Each user interacts with the system through an account interface that aggregates several types of information. The Precious Metals Balance (PM) reflects the quantity of gold held in reserve that backs the user's tokens. The Reserve Money Balance (RM) displays the corresponding amount in digital units or fiat currency that the system recognizes as equivalent to that gold. Account History (AC

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History) keeps a structured record of all prior movements, including purchases, transfers, and redemptions. Because users can inspect these records at any time, they gain a clear view of how their position has changed and how the platform operates in practice (Bullmann, Klemm et Pinna, In search for stability in crypto-assets: Are stablecoins the solution? 2019) Transparent, traceable, and easy to audit.

6. Fee Structure

The business model rests on a set of fees tied to different activities. Purchase and sale fees apply whenever users acquire or dispose of tokens through the platform's primary channels. Storage fees cover the cost of physically safeguarding the gold, such as insurance, vault space, and security arrangements. Transfer fees may arise when users move units between accounts or wallets, depending on the operator's policy and network costs. Redemption fees appear when users convert tokens back into physical gold bars or fiat funds, since this step usually requires logistical work, settlement, and sometimes shipping (Gorton et Zhang 2021). Without this fee schedule, the system would not cover the costs of handling real metal.

7. Redemption and Cash Withdrawal

When users decide to exit their position in tokens, they can request redemption for physical gold or cash through authorized partners. Central banks (C-Bank) may offer oversight and liquidity support where such arrangements exist. Regulatory or supervisory bodies (ICRO) monitor whether the issuer and intermediaries follow legal and prudential rules. Digital mint platforms (E-Mint) handle the actual issuance and burning of tokens in line with verified reserve changes. Storage facilities hold the gold itself in secure vaults and coordinate deliveries or transfers of title. Together, these actors make sure that anyone who holds tokens can turn them into recognized assets that carry legal and economic weight. Not just numbers on a screen.

8. Unit Transfers and Transactions

Within the system, users can send gold-backed cryptocurrency units, often described as P2-units, between accounts or use them to settle payments with other participants. These transfers follow standard blockchain procedures but embed a claim on physical gold rather than a pure digital asset (Dyhrberg 2016). Corporates can integrate such transfers into their treasury functions, using tokens for internal settlements, cross-border payments, or collateral arrangements while still retaining exposure to gold. Peer-to-peer use cases remain possible as well, since any two users with compatible wallets can transact directly.

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9. Final Procedures and Strategic Significance

Over the full life cycle, users can move from fiat into tokens, hold a claim on gold, and then exit again into physical metal, cash, or other approved assets according to their preferences and constraints. The technical design links each step to a verifiable portion of gold reserves, while institutional partners keep custody and regulatory control in place. In effect, the structure ties long-established gold storage and banking functions to decentralized blockchain rails, so it offers stability from the metal and speed and reach from the digital layer. For corporate finance, this mix turns gold-backed cryptocurrencies into a practical tool for risk management, liquidity planning, and cross-border operations, combining the perceived safety of gold with transparent, globally accessible transaction infrastructure (Baur, KiHoon et Lee 2018) (Bullmann, Klemm et Pinna, In search for stability in crypto-assets: Are stablecoins the solution? 2019) (Gorton et Zhang 2021)

V-Integrating Gold-Backed Digital Assets into Corporate Financial Strategies

Gold-backed digital assets are slipping into corporate finance playbooks as part of a much bigger shift in how firms manage money in an increasingly digital system. Instead of behaving like typical cryptocurrencies such as Bitcoin, which swing sharply in price and often attract short-term speculation, these instruments tie their value directly to holdings of physical gold. Because of that link, they sit in a middle ground between traditional commodities and digital tokens, giving companies a tool that lines up better with their needs around stability, clearer pricing expectations, and tighter control of financial risk (Arner, Auer et Frost 2020) (Adrian et Mancini-Griffoli 2019)

1. Strategic Role in Corporate Treasury Management

Putting gold-backed digital assets on the balance sheet signals a pretty clear change in how companies think about treasury risk in shaky economies. Instead of holding only fiat-based instruments that inflation and loose monetary policy can quietly erode, finance teams are starting to hold tokens tied to real bullion. Because those tokens sit on blockchain rails, they can move value quickly while still anchoring it to physical gold, which helps protect purchasing power without freezing funds. That’s the theory, at least. In practice, firms still worry about how deep the secondary markets really are, how fast they could redeem at scale, and whether they can fully trust the claims about reserves, especially if panic hits and everyone runs for the exit at once (Eichengreen 2019).

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2.Portfolio Diversification and Value Preservation

Put yourself in a portfolio manager's seat for a moment: gold-backed digital assets sit in an odd middle ground, part commodity, part digital currency. Because of that mix, they can give firms another way to spread risk and dial down the wild price swings they see in completely unbacked cryptocurrencies like Bitcoin. Still, the actual benefit hangs on how these gold-linked tokens move in relation to other holdings, and current research barely scratches the surface on those correlations. So firms have to dig into the data and decide whether these instruments truly sharpen portfolio performance or just repackage the same old gold exposure with a digital label (Arner, Auer et Frost 2020).

3. Risk Management and Hedging Implications

Gold-backed digital assets create a new avenue for corporate risk management as companies can now explore gold-related hedging strategies in a more flexible manner. Although gold is traditionally used as a safe-haven asset, it is also associated with other risks due to its tokenization. These risks include technological risks like smart contract risks and cybersecurity risks. There are also operational risks due to the involvement of third-party custodians who are responsible for holding physical gold. These risks associated with gold-backed cryptocurrencies are not only market risks; rather, they also include operational risks that need to be factored in corporate risk management (Catalini et Gans 2019)(Catalini & Gans, 2016).

4. Efficiency in Cross-Border Transactions

One of the most promising uses of gold-backed digital assets is in cross-border financial activities. This is due to their ability to utilize Blockchain technology in facilitating almost instantaneous transactions with low transaction costs and without the need for intermediaries such as correspondent banking. This is particularly beneficial for MNCs with international operations. However, this is subject to limitations in terms of current fragmented regulations and the lack of international standards in digital assets, which may impede their scalability and adoption (Adrian et Mancini-Griffoli 2019)

5. Governance, Accounting, and Regulatory Challenges

Although the benefits of the integration of gold-backed digital assets in corporate finance are obvious, there are various governance and regulatory issues that hinder the process. The accounting standards do not comprehensively address the classification and valuation of hybrid financial instruments. This has led to inconsistencies in financial reporting and disclosure. In addition, the lack of

regulatory clarity in various countries has made it difficult to comply with the regulations. This has led to legal risks for organizations. The lack of standard auditing procedures for the verification of gold reserves has raised concerns about transparency and trust, which are critical in the adoption of the digital assets (Arner, Auer et Frost 2020).

6. Strategic Integration and Future Implications

A holistic strategic approach for the successful integration of gold-backed digital assets involves ensuring that the capabilities of digital assets are aligned with financial objectives. This requires investing in digital infrastructure, as well as building internal capabilities and establishing governance structures for the management of gold-backed digital assets. Instead of replacing traditional financial assets, gold-backed cryptocurrencies are considered supplementary tools that increase the malleability, robustness, and creativity of financial strategies. The sustainability of gold-backed cryptocurrencies will depend on regulatory clarity, technological advancement, and the emergence of global standards for digital finance.

VI-Results and Discussion

1. Financial Stability and Risk Reduction

From the results, it is clear that gold-backed digital assets ensure a balance between stability and flexibility compared to other conventional and digital financial instruments. While fiat currencies face risks due to inflationary forces, and cryptocurrencies like Bitcoin face risks due to price volatilility, gold-backed assets enjoy value stability due to their direct linkage with gold reserves.

However, it is important to note that value stability is not absolute in nature. The stability is conditional in nature and depends on the credibility of reserve management and auditing. Unless credible verification is in place, value stability may not translate into financial security in times of need (Eichengreen 2019)

2. Efficiency in Corporate Financial Operations

From an operational point of view, the results show that gold-backed cryptocurrencies increase the efficiency of transactions, especially in international transactions. The Blockchain technology helps reduce the number of intermediaries, lower transaction costs, and speed up settlement.

However, this efficiency is subject to limitations, especially in terms of regulatory fragmentation and institutional adoption. There may be challenges for companies seeking to incorporate these assets into existing financial systems,

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especially considering regulatory compliance and the absence of standardization (Adrian et Mancini-Griffoli 2019)

3. Portfolio Diversification and Strategic Value

From the analysis, it is evident that gold-backed digital assets provide considerable benefits in terms of diversification due to their ability to combine commodity and currency characteristics. This is in contrast to gold, which is not liquid and is difficult to transfer. Moreover, it is not as volatile as other unbacked currencies.

However, it is also important to understand that the benefits in terms of diversification depend on market correlations, which are still not well understood. There is also a possibility that gold-backed assets may behave in a similar manner to gold, thus limiting their benefits in terms of optimization (Arner, Auer et Frost 2020)

4. Risk Dimensions and Operational Challenges

The results emphasize that there is a new type of risk profile for gold-backed cryptocurrencies, which is composed of the following factors:

- Market risk, which is associated with the price of gold
- Technological risk, which is associated with the blockchain
- Counterparty risk, which is associated with the holders of the gold reserves

This new type of risk profile necessitates the use of more complex risk management models. Indeed, financial models may not be appropriate for managing hybrid financial instruments, as argued in (Catalini et Gans 2019).

5. Regulatory and Governance Implications

One key point is that regulatory uncertainty is still the major hindrance in terms of adoption. While fiat currencies and conventional assets enjoy a set and defined regulatory system, gold-backed digital assets face a fragmented regulatory system.

This brings about issues in terms of:

- Financial reporting
- Asset classification
- Compliance and auditing

This leads to companies being hesitant to fully integrate these assets, despite their theoretical benefits (Arner, Auer et Frost 2020).

6. Strategic Implications for Corporate Finance

The overall findings suggest that gold-backed cryptocurrency is not considered a replacement option for existing financial instruments but is considered a supporting factor in the overall diversified financial strategy.

The strategic significance of gold-backed cryptocurrency is seen in the following:

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- Enhanced financial stability
- Flexibility in liquid assets
- Digital transformation of the finance sector

However, the adoption of gold-backed cryptocurrency is subject to the alignment of technology, regulations, and governance structures

This table illustrates a comparative analysis of the different financial instruments, which include fiat currencies, physical gold, Bitcoin, and gold-backed cryptocurrencies. The comparative analysis of the different financial instruments is based on different financial characteristics, which include stability, liquidity, volatility, transactional efficiency, and risk management capabilities. The comparative analysis of the different financial instruments is crucial in the context of corporate finance, where different organizations often strive to achieve different financial characteristics.

Criteria	Fiat Currency	Gold (Physical)	Bitcoin	Gold-Backed Cryptocurrencies
Stability	Medium	High	Low	High
Liquidity	Very High	Medium	High	High
Volatility	Moderate	Low	Very High	Low
Transaction speed	Slow	Very Slow	Fast	Fast
Cross-border efficiency	Limited	Limited	High	High
Security	Institution-based	Physical risk	Cyber risk	Hybrid
Transparency	Limited	Low	High	High
Storage cost	Low	High	Low	Medium
Hedging capability	Weak	Strong	Weak	Strong
Regulatory clarity	High	High	Medium	Low

Table 1: Comparative Analysis of Financial Instruments

The comparative evaluation presented in Table 1, is grounded in existing empirical and theoretical literature. Studies indicate that gold remains a more stable and reliable safe-haven asset compared to cryptocurrencies, particularly Bitcoin, which exhibits significantly higher volatility (Kyriazis 2020). Furthermore, Bitcoin demonstrates distinct behavior compared to fiat currencies and traditional financial assets, limiting its suitability for corporate financial stability (Corbet, et al. 2019).

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In contrast, gold-backed digital assets attempt to combine the stability of gold with the efficiency of blockchain technology, offering potential advantages in portfolio diversification and risk management (Irfan et S 2023). Additionally, gold has been shown to improve risk-adjusted returns and reduce portfolio drawdown's, reinforcing its role as a hedging instrument (concil 2020)

Conclusions

This current research has discussed the role of gold-backed digital currencies in the context of an emerging trend in modern corporate finance. From the analysis, it is evident that these digital currencies are an amalgamation of gold and Blockchain technology. They are an effective solution to some of the major challenges facing corporate finance.

The findings of this research indicate that gold-backed digital currencies are an alternative to highly volatile digital currencies such as Bitcoin. They are also an alternative to gold in terms of flexibility. These digital currencies are an improvement in the context of corporate finance. They are expected to add value in terms of stability. However, it is also evident from the analysis that such stability is only conditional. It is dependent upon the credibility of gold reserves, transparent mechanisms, and robust technology.

It is also evident from the analysis of gold-backed digital currencies in the context of corporate finance that despite their potential, these digital currencies are also facing many challenges. These challenges include uncertainty in terms of regulations, accounting, auditing, and governance. These challenges are indicative of the fact that the shift in favor of gold-backed digital currencies in corporate finance is in its developmental stage.

It can be concluded from the analysis of gold-backed digital currencies in the context of corporate finance that these digital currencies are an emerging trend in modern corporate finance. Their role in corporate finance in the future is dependent upon the ability of markets, regulators, and institutions to build trust.

Recommendations

In conclusion, on the basis of the findings of this study, several recommendations could be proposed that could facilitate the effective integration of gold-backed digital assets into corporate financial strategies. Some of the recommendations include:

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1. Strengthening Regulatory Frameworks

Financial authorities should develop clear regulatory frameworks that guide gold-backed digital assets. Clarity in regulations is extremely significant in order to avoid confusion.

2. Enhancing Transparency and Auditability

Issuing organizations of gold-backed cryptocurrencies should ensure that there is transparency in gold reserves. This could be done by conducting independent third-party audits.

3. Developing Corporate Governance Practices

Organizations should develop internal corporate governance practices specifically designed for gold-backed digital assets. This could include risk assessment mechanisms, compliance mechanisms, and guidelines on integrating gold-backed digital assets into corporate treasury management.

4. Investing in Technological Infrastructure

Organizations should invest in digital infrastructure in order to effectively manage blockchain-based gold-backed digital assets. This could include investing in cybersecurity mechanisms, smart contract audit tools, etc.

5. Promoting Financial and Technical Expertise

Organizations should develop internal expertise in digital finance and blockchain-based technologies. This could be done by training internal financial management teams in digital finance.

6. Encouraging Further Academic and Empirical Research

Further academic and empirical research should be conducted on gold-backed digital assets to better understand their behavior in real-world corporate environments. This may include analyses of portfolio performance, liquidity dynamics, and risk-adjusted returns.

Despite the increased focus on various digital financial innovations, gold-backed digital assets remain an untapped and unexplored segment in corporate finance literature. Although prior studies have contributed significantly to our understanding of gold-backed digital assets like cryptocurrency and stablecoins, there is still limited empirical evidence available on the applicability and usage of gold-backed cryptocurrency in corporate settings.

Future research in this direction should be directed towards assessing the performance of gold-backed digital assets in corporate settings in terms of risk-adjusted returns, volatility patterns, and value preservation. Further, additional studies need to be conducted to assess and examine the applicability and usage of gold-backed digital assets in corporate settings in terms of liquidity management

and optimization, especially in different market settings and under various economic shocks.

Another direction that future research in corporate finance should be directed towards is assessing and examining the interaction between gold-backed digital assets and conventional financial instruments and their implications for portfolio diversification strategies. Further, additional empirical studies need to be conducted to assess and examine the applicability and usage of gold-backed cryptocurrency in corporate settings. Moreover, further research is also required in assessing and examining the regulatory and governance implications associated with gold-backed cryptocurrency in corporate settings. This is due to the fact that these factors remain critical in terms of successful integration in corporate financial systems.

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ANALYSING THE INNOVATIVENESS IN FIN-TECH APPLICATIONS OF BANKING SECTOR: THE INFLUENCE OF TRANSFORMATIONAL LEADERSHIP

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Abstract

This study investigates the extent to which transformational leadership promotes innovation and enhances customer trust within digital financial technology (FinTech) applications. Drawing on transformational leadership theory, it examines how leadership influences key outcomes that are vital to the effective functioning of FinTech systems in the banking sector. A quantitative research approach was adopted, involving a survey of 771 employees from selected banks, with a sample size of 264 respondents determined using Yamane's formula. Data were collected through a structured questionnaire and analysed using multiple regression techniques in the Statistical Package for Social Sciences (SPSS). The findings indicate that transformational leadership has a significant and positive effect on the innovativeness of digital FinTech applications within the banking industry. Based on these results, the study recommends that banks should prioritise the development of transformational leadership competencies at all managerial

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levels. Such efforts will enhance organisational and employee innovativeness while strengthening mechanisms that support sustained productivity within a rapidly evolving digital financial ecosystem.

Keywords: *banking sector, customer trust, fin-tech applications, innovativeness, transformational leadership*

Jel Classification: G21, O31, M12, M15

INTRODUCTION

Digital financial technology (FinTech) applications are fundamentally transforming the global banking landscape through the deployment of advanced tools such as artificial intelligence, blockchain, machine learning, and data analytics. These technologies are being used to redesign traditional financial services and product offerings, making them more efficient, accessible, and customer-focused. Given the fast-paced and highly competitive nature of the banking industry, there is a growing need for leadership approaches that can stimulate innovation, build customer confidence, and effectively manage the complexities associated with digital transformation. Among the various leadership approaches, transformational leadership is particularly noted for its ability to drive organisational change and revitalisation, especially within dynamic environments like the banking sector (Etele *et al,* 2024). Originally conceptualised by Burns (1978) and later expanded by Bass (1985), this leadership style centres on visionary direction, inspiration, intellectual stimulation, and individualised consideration for employees. Transformational leaders are adept at communicating a clear and compelling vision, questioning established practices, and encouraging employees to go beyond routine expectations by embracing innovative thinking. In the banking sector, such leadership plays a critical role in fostering a culture of continuous innovation, which is essential for maintaining long-term productivity and competitiveness.

It is claimed that the innovativeness in digital fin-tech applications encompasses not only novel products and services but also innovative approaches to existing business models, operational processes, and customer engagement strategies (Lottu *et al.,* 2022). In this context, transformational leaders foster organisational climates that encourage experimentation, teamwork, and creative thinking (Bass & Avolio, 1994; Tushman & O'Reilly, 1996). At the same time, customer trust remains a critical foundation within financial services, particularly in the adoption of digital FinTech solutions, where maintaining consumer confidence is essential. Through

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ethical conduct, transparency, and a strong focus on value delivery, transformational leadership helps to build and sustain trust, thereby strengthening customer loyalty (Jung & Avolio, 2000). The global banking industry has experienced rapid expansion, driven by technological advancements and evolving customer expectations for accessible, affordable, and transparent financial services. Within such a fast-evolving and competitive environment, transformational leadership becomes vital in promoting innovation. This leadership approach is especially significant in regions with continuously evolving regulatory systems. For example, within the European Union, frameworks such as PSD2 and MiFID II are designed to encourage innovation while ensuring consumer protection, transparency, and security (European Commission, 2020). Transformational leaders are well-equipped to navigate these regulatory complexities while simultaneously fostering innovation that aligns with market demands. Similarly, countries across Asia, including China, India, and Singapore, have become prominent centres for digital FinTech innovation due to supportive regulations, technologically skilled populations, and growing middle-income groups. In such diverse environments, transformational leadership is essential for managing varied teams and guiding them through both technological and regulatory complexities.

Social Exchange Theory by Blau, 1964

The study is grounded in the Social Exchange Theory (SET), a foundational framework in organisational and human relations research originally introduced by Blau (1964). The theory posits that social behaviour is shaped by an exchange process in which individuals seek to maximise benefits while minimising costs in their interactions with others (Blau, 1964). Within organisational contexts, this exchange typically manifests as a reciprocal relationship between managers and subordinates, characterised by trust, respect, and mutual advantage that guide workplace interactions (Monyei *et al.,* 2022). SET emphasises trust as a key determinant of effective social exchanges. When leaders demonstrate honesty and fairness in their actions, they cultivate trust, which in turn enhances employee satisfaction and organisational commitment (Eisenberger *et al.,* 2001; Blau, 1964). The theory further suggests that individuals are motivated to participate in relationships that yield mutual benefits, with the expectation that positive actions will be reciprocated over time. For exchanges to be sustainable, they must remain balanced, ensuring that all parties derive value and develop shared understanding.

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Transformational Leadership

Transformational leadership, as developed by Burns (1978) and later expanded by Bass (1985), is distinguished by its ability to motivate and inspire employees to achieve higher levels of performance through visionary direction, intellectual stimulation, and individualised consideration. Scholars such as Monyei *et al.* (2022) and Bass and Avolio (1994) describe transformational leaders as those who energise and inspire followers, articulate a compelling vision that aligns individual efforts with organisational objectives, and promote innovation by challenging conventional thinking and encouraging creativity. They also foster pro-social behaviour and build trust through honesty, transparency, and empathy, thereby establishing strong, trust-based relationships within organisations.

Such leadership significantly enhances an organisation's capacity for innovation by cultivating a culture that supports risk-taking, creative problem-solving, and continuous improvement (Jung & Avolio, 2000). These attributes are particularly critical in the banking sector, where the fast-paced evolution of FinTech applications demands adaptable and forward-thinking leadership. In this regard, transformational leadership places strong emphasis on innovation, often promoting agility, creative independence, and rapid iteration. These elements create an enabling environment in which advanced financial innovations, including blockchain and cryptocurrency technologies, can develop and flourish (Gartner, 2021).

In the African context, the relevance of transformational leadership is increasingly evident in the success of mobile money platforms such as M-Pesa, which have helped to address infrastructural limitations and expand financial inclusion. Leaders operating in such environments focus on building trust, ensuring regulatory compliance, and demonstrating cultural awareness in order to overcome barriers to adoption and encourage widespread use of these digital financial solutions (Mas & Morawczynski, 2021).

MATERIALS AND METHODS

This study aims to explore the role of transformational leadership in driving the innovativeness in digital fintech applications, focusing on selected firms in the banking sector. Specifically, focusing on the financial institutions' regional headquarters in the both Aba and Umuahia Metropolis in Abia State, Nigeria. There are a total of 51 financial institutions across Abia State, as of October 8, 2024 (Nigeria Galleria, 2025; Nigeria Directory, 2025). The study, however, concentrated on regional head offices of the selected banks. They include: Access Bank Plc, First Bank of Nigeria Plc, United Bank for Africa (UBA), Fidelity Bank

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Plc, Eco Bank Nigeria Plc, Abia State University Microfinance bank, Central Bank of Nigeria, and Bank of Industry (BOI), all located in Abia State, South-eastern, Nigeria, as they represent a key financial hub in the region's banking and financial landscape. This branch provides a wide range of banking services and is a central hub for customers seeking digital financial solutions, and an industrial market area situated within the industrial sector of the region. This branch focuses on catering to the needs of business owners and entrepreneurs that are well-engaged in its local economy. Additionally, these institutions have been chosen based on their offering of microcosm of the banking environment in Abia state, with one focused on retail banking and the other serving more business-oriented clients. These regional branches are also integral to financial institution's efforts to introduce digital banking solutions to customers within the region. A structured questionnaire served as the main tool for gathering data for this investigation. The structure and purpose of the questionnaire was to collect information on the management of financial institutions' creative practices, leadership philosophies, and initiatives to foster trust. The questionnaire was distributed to both junior and senior staff at these branches. This includes frontline staff such as tellers, customer service representatives, and operations personnel (junior staff), as well as branch managers, team leaders, and other managerial staff (senior staff). The study involved 264 respondents from a total population of 771, which was drawn using the Yamane formula, with a balanced representation from both staff cadres at these firms, and was achieved through a purposive sampling technique to ensure the inclusion of staff members who possess adequate experience and comprehensive knowledge of the banking sector's operations. Before participation, all selected individuals were clearly informed about the study's objectives and provided their informed consent.

Hypothesis Testing

H_0: Transformational leadership cannot build and sustain trust among consumers in FinTech.

H_1: Transformational leadership builds and sustains trust among consumers in FinTech.

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Model Summary[b]

Model	R	R^2	Adjusted R^2	Std. Error of Estimate	Durbin-Watson
1	0.801	0.641	0.637	0.561	1.923

a. Predictors: (Constant), Transformational leadership

b. Dependent Variable: Innovation

ANOVA Table

	Sum of Squares	df	Mean Square	F	Sig. (p-value)
Regression	123.45	1	123.45	392.16	0.000 **
Residual	69.45	221	0.314		
Total	192.90	222			

Coefficients Table

Variables	Unstandardized B	Std. Error	Beta (β)	t-value	Sig. (p-value)
(Constant)	1.055	0.147	—	7.18	0.000 **
Transformational Leadership	0.783	0.040	0.801	19.80	0.000 **

Interpretation

The regression analysis reveals a strong positive association between transformational leadership and consumer trust, evidenced by a correlation coefficient of R = 0.801. According to the coefficient of determination (R2 = 0.641), 64.1% of the variation in customer trust levels can be explained by transformational leadership practices. With a robust model fit and an F-value of 392.16 and a p-value of 0.000, the ANOVA findings further support the model's statistical significance. Higher levels of consumer trust are correlated with transformational leadership techniques, according to the regression coefficient (B = 0.783), which is both positive and statistically significant. The alternative hypothesis (H_1) is accepted in place of the null hypothesis (H_0) since the p-value is less than the 0.05 cutoff. Therefore, building and preserving consumer trust in FinTech companies depends heavily on transformative leadership.

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Discussion of Findings

The findings of the study reveal that transformational leadership has a significant influence on innovation within FinTech start-ups, suggesting that the adoption of such leadership behaviours is essential for fostering innovative practices, organisational cultures, and outcomes in financial technology firms (Bass & Riggio, 2006). This result is consistent with the studies of Adekanmbi and Ukpere (2023) and Chukwuma (2022), which indicate that transformational leadership positively drives employees' innovative behaviour. The leadership style focuses on critical elements such as vision, intellectual stimulation, and individualised consideration, all of which are fundamental in creating an environment that supports innovation. Given the dynamic and technology-driven nature of FinTech start-ups, where constant innovation is necessary for survival in uncertain markets, transformational leadership becomes even more crucial. Leaders in these organisations are expected to communicate a clear innovation-driven vision, encourage critical thinking and creativity, and support the continuous development of their workforce. This, in turn, nurtures a culture that embraces experimentation and calculated risk-taking, both of which are vital for innovation.

Supporting this perspective, Jung *et al.* (2003) found that transformational leadership significantly enhances organisational innovation by encouraging intellectual stimulation and fostering a supportive work climate. This is particularly relevant in FinTech settings, where innovation goes beyond product creation to include the transformation of traditional financial systems and services. In a similar vein, Zhang *et al.* (2015) observed that in rapidly evolving industries, transformational leadership behaviours such as articulating a compelling vision and promoting creative problem-solving are highly effective in driving innovative performance. Therefore, the argument that transformational leadership influences innovation in FinTech start-ups is strongly supported by both theoretical and empirical evidence. It highlights that leadership in knowledge-intensive and fast-changing industries is less about controlling resources and more about motivating employees to innovate, adapt, and advance the sector.

Recommendation

Digital FinTech start-ups operating within transition economies need to deliberately integrate transformational leadership into their core organisational development strategies to strengthen both innovation capacity and consumer trust. This recommendation is based on two key considerations. Firstly, transformational leadership helps to create an internal environment that encourages creativity,

adaptability, and effective problem-solving, which are essential for driving innovation in the fast-changing FinTech sector. In transition economies, where regulatory systems, digital infrastructure, and consumer behaviours are still evolving, the ability to innovate quickly and responsibly offers a significant competitive advantage. Secondly, transformational leadership contributes to building trust by promoting transparency, ethical conduct, and a clearly articulated, value-driven vision. These qualities are particularly important in digital finance, where consumer scepticism is often high and institutional trust may be weak. In such contexts, especially where the financial sector has experienced instability or governance challenges, establishing a strong reputation for reliability and integrity becomes crucial for attracting and retaining customers.

Suggestion for further studies

Future research should explore the moderating role of regulatory environments on the relationship between transformational leadership and innovation outcomes in FinTech firms operating within transition economies.

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DOES SUB-NATIONAL DEBT AFFECT POVERTY AND UNEMPLOYMENT? PANAL DATA ESTIMATION

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Abstract

This study evaluated the effect of sub-national debts on the poverty and unemployment of Nigeria's six North-Eastern states, measured by the extent to which these states debts have impacted on the levels of poverty and unemployment between 2012 to 2021. We used panel random effects and panel Pedroni cointegration estimation techniques to analyse secondary longitudinal series that were sourced from the central Bank of Nigeria, Debts management office and the national bureau of statistics. The study found that both domestic and external debts have a negative insignificant effect on the level of poverty in these states. While the relationship between domestic debts and unemployment was discovered to be insignificantly positive, the effect of external debts on unemployment level was found to be negatively insignificant in the short term.

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The Pedroni cointegration result also found that all variables in the poverty model co-move together in the long-run, whereas, there exists no long-run association among the variables in the unemployment model. The policy implications of the results is that these 6 states have not deployed a significant quotient of their domestic and foreign debts to program and project that have the capacity to reduce poverty and unemployment in these states. Therefore, the 6 states should endeavor to deployed a significant share of state resources to human capital development program by investing in education, agricultural value chain development and social infrastructural development so as to curb the alarming level of poverty and unemployment in the zone.

Keywords: *subnational, debt, poverty and unemployment*

JEL Classification: H63, H74, I13, J64

1.1 INTRODUCTION

Subnational debt is a type of public indebtedness procured by constituent units from surplus units of the economy to supplement the shortfalls in government revenue at that level of governance, which is required to provide public goods and services needed to drive economic growth and development. Investments in public goods and services are ubiquitous function of every modern state and remain the necessary pre-condition and catalyst for the improvement of social welfare both in developed and developing economies (Ayayi & Edewusi, 2020). According to Seers (1969), economic development can only be quantified in terms of how well it addresses the three cardinal macroeconomic concerns of poverty, unemployment, and income inequality in any given society.

In a developing country like Nigeria with enormous deposit of macroeconomic challenges such as Poverty, unemployment, inequality, low capital formation, lack of infrastructural development to name but a few vis-à-vis the perceived drought in revenue required to address the aforesaid chronic macroeconomic needs among others by both the national and subnational governments. Incidentally, the shortfalls in revenue both at the federal and the Subnational levels of governance have been exacerbated and attributed to factors such as the over-reliant of all layers of governments on proceeds from oil exports and allocations from the central purse which are grossly insufficient, as well as the non-diversification of revenue base at these states, resulting in the drastic shortfalls in the federating units internally generated revenue. Consequently, these enumerated factors and many more has given rise to the unprecedented rise in public borrowing by all layers of

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government in Nigeria to solve the aforementioned macroeconomic bottlenecks (Rahman, 2012).

Similarly, the six states that makes up the North-East zone namely; Adamawa, Bauchi, Borno, Gombe Taraba and Yobe are geographically contiguous and are located in the North-Eastern hemisphere of Nigeria. And, like every other state in Nigeria, these states are faced with enormous macroeconomic challenges and core among the numerous macroeconomic bottlenecks facing these states are the problem of multidimensional poverty, unemployment, inequality, high illiteracy level, infrastructural deficits, inadequate capital formation among others. In-view of these daunting macroeconomic shortfalls and the gross deficiencies in these six Subnational governments' internally generated revenue and allocations from the federation account, these states have resorted to borrowing from both domestic and foreign creditors to supplement the shortage in financial resources required to provide public goods and services, in order to promote economic growth and development that is in line with Seers perspective of economic development (Adegboyega (2021) and Biodun (2022).

Consequently, within the national public debts landscape, these six states domestic debt increased by 353% from N118.3 billion in 2012 to N536.4 billion in 2020, while the total foreign debts of the states rose by 76.7% from $197.5 million in 2012 to over $348.8 million in 2020, indicating that the public borrowing of these federating units were dominated by domestic debts. More specifically , Yobe, Taraba, and Bauchi's domestic debts climbed from N3.9 billion, N16.7 billion, and N18.8 billion in 2012 to N54.9 billion, N106 billion, and N102.8 billion in 2020, representing a 1310%, 535%, and 447% growth in domestic debt volume, respectively. While, the least percentage increase in domestic debts of 181%, 265% and 305% between 2012 to 2020 was witnessed in Gombe, Borno and Adamawa. However, in all the 6 states it is apparent that the increase in domestic debts was disproportionately distributed (BudgiT, (2022)

On the other hand, Adamawa state's foreign debts increased by 259%, making it the highest within the zone, followed by Bauchi 101%, Borno 42% and Gombe 15%, conversely, the external debts of Taraba and Yobe states declined by 10% and 16% from $22.9 million and $31 million in 2012 to $20.8 million and $26.6 million in 2020 respectively.

Ironically, despite the apparent growth in these six states' domestic and foreign debts overtime, the incidence of poverty and Unemployment problem have remain two major insurmountable macroeconomic challenges faced by these states that are yet to be fully addressed. Unfortunately, these two macroeconomic challenges are

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thought to have a multiplier effect, of causing the associated problems of Bukuharam terrorism, banditry, child labour and trafficking, arm robbery, prostitution, and many other social vices and misdemeanours that have persisted in these states in recent years and would continue to do so.

According to Tunji (2022), considering the high level of poverty and unemployment in the north-east, that averages about 76% of the region population that live below $2.15 per day and over 28.4% of the region total workforce that are jobless. For instance, the levels of poverty were 75.4%, 72.3%, 72.2%, 72% in Adamawa, Yobe, Taraba and Borno, others were Bauchi 68.5% and Gombe 62.3% respectively. While, the level of unemployment were 39.4%, 29.9%, 27.6% and 25.3% in Taraba, Gombe, Yobe and Borno, with Adamawa and Bauchi having 24.8% and 23.3%. Hence, it is necessary to question what influence does these 6 state governments' massive debts have had on the degree of poverty and unemployment in the region.

However, the economic rationale behind the concept of public borrowing as regards its effects on any economy is still a contentious issue in the literature. On the one hand, the Keynesians upholds that public borrowing acts as a catalyst for stimulating economic growth and development through its crowd-in effect on the private sector investment and by so doing helps to reduce the propensity of poverty and Unemployment. On the other hand, the classical economists of the Smithian school argued that public borrowing do stifle economic growth and development by crowding out private sector investment, resulting in the increase in poverty and unemployment levels in any society.

Given the preceding dichotomy in the literature, the purpose of this study is to empirically determine the influence of public borrowing by the six North-Eastern states on poverty and unemployment levels in the region.

2.1 Literature Review

2.1.1Theoretical Framework

This section of the work is set to review a handful of economic theories, incidentally in the literature there is no theoretical consensus surrounding the relationship between public debt and economic growth and development. The theories underpinning public debt, economic growth and development are basically dichotomize into three theoretical stratum namely: the Crowd-in theory of public debt which is a thought process of the Keynesians economists (Keynes, 1936). The Crowd-in theory posit that public debt act as a stimulant of economic growth and development, hence it is one of the linear optimistic theory of public debt. In any

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case, the potential transmission power of public debt to reduce poverty and unemployment is through the effective capacity of public debt to increase aggregate demand that would bring about economic growth and development (Krugman,1988) & (Musgrave 1949) . Whereas, the exponents of the Crowd-out theory of public debt were the classical economists of the Smithian extraction. The assumption of the Crowd-out theory is that public debt is distortive of the smooth operation of market system. Thus, public debt repels and stifle economic growth and development through its passthrough effect on private sector investments. For instance, the theory assume that the competition for loanable funds between the public and the private sector causes the cost of funds to rise, thereby increasing the cost of production and by extension stifle private sector investment. Leading to divestments of private sector investments resulting in the increase in poverty, unemployment level and other sundries macroeconomic issues. This theory is a linear pessimistic theory of public debt that tends to suggest that economic growth and development inversely reacts to the increase in public debt (Friedman (1962), Friedman and Schwartz (1963).

The theory of public debt overhang was propounded by Howard in 1972 and further amplified by (Sachs, 1989) & (Calvo, 1989) . The Overhang theory of public debt posits that economic growth and development is a non-linear function of public debt. The thrust of the theory is centered on public debt sustainability assumption. The impact of public debt on economic growth and development as assumed by the theory is that public debt do emits positive effects on economic growth and development when the debt is moderately incurred, however, when public debt grow beyond the frontier of debt sustainability such increase tends to inhibits economic growth and stifle development and results in the increase in the level of poverty and unemployment.

Lastly, the Ricardence Equivalent- Boro hypothesis is a theory that asserted that the relationship between public debt and economic growth and development is sterile or neutral (Barro,1989). The theory opines that the contemporary government borrowing is merely an act of temporarily withholding of taxes, with the view to increasing taxes in near future to service the outstanding debts obligations.

2.1.2 Empirical literature

In this section of the research we reviewed some of the literature that have empirically examine the relationship between public debt and economic growth and development

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Thanh et al (2024) investigated the effect of public debt on economic growth, using threshold regression framework of data analyzes. They uncovered that government debt do have a slowing down effect on economic growth across the Asian countries.

Dawood, et al (2024) studied the nature of the relationship between foreign debt, debt servicing and economic progress of 32 developing countries in Asia, using Generalized Method of Moments (GMM). They discovered that public debt emit a crowding out effect on the economies of these studied countries.

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 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.

Ayana et al (2023) studied the impact of foreign debt on economic growth in 39 Sub-Saharan Africa economies, using GMM technique of data analysis. The findings of the study reveals that foreign debt has a negative effect on the economic progress of 39 Sub-Saharan economies both in the short and long runs.

Using a threshold regression analysis, Lau et al (2022) interrogated the effect of public debt on economic growth in 16 developing countries in Asia. And they discovered that the appropriate debt to GDP threshold across the 16 economies are contextual or country specific.

Akanbi and Olaoluwa (2022) used the Ordinary Least Squares method of data analysis to study the nexus between state governments and economic growth in Nigeria spanning from 1981 to 2019. They discovered that the response of economic growth to subnational debt in Nigeria is positive but statistically insignificant. While the state deficit budgeting exacts an insignificant inverse relationship with economic growth in Nigeria. Nonetheless, this thesis intends to fill in the unexplored gaps in the literature that bothers on the impact of the states' government borrowing on the economic development of the 36 subnational in Nigeria

Elekwa and Onyenama (2022) deployed the ARDL technique of data analysis and estimated the effect of foreign debt on unemployment in Nigeria from 1992 to 2020. Empirical evidence from the ARDL test result showed that there is a positive and significant relationship between foreign debt and unemployment in Nigeria.

Hassan and Meyer (2021) investigated the transmission effect of external debt on the economic growth of Sub-Saharan Africa, using Generalized Method of Moments (GMM).They found that external debt has a negative significant impact on the economic growth of the Sub-Saharan Africa through it transmission impact public and private investments, interest rate and total factor productivity.

Ojewumi and Aremu (2021). Estimated the relationship between foreign debt and the poverty rate in Nigeria from 1981 to 2018. Using the ECM framework of data analysis on secondary data of the following variables external debt, debt services, foreign reserve, exchange rate, investment, economic growth as the independent variables and poverty rate as the dependent variable that was sourced from the national bureau of statistics and the central Bank of Nigeria. The result of the study revealed that there exists a positive relationship between foreign debt and poverty in Nigeria. On the other hand external debt services has a negative short run effect on poverty. While in the long run the variables were found to jointly co-move together.

Ojukwu, (2021) investigated the effect of Nigeria's foreign debt on sustainable Development Goals (SDG) 2 and SDG 3 the Secondary data for the study to was sourced from DMO, IMF, NBS and WB covering a period of 16years from 2003 to 2019. Using Spearman's Rank Correlation tool. The findings of the work uncovered that there is no significant association between foreign debt and the sustainable development goals 2 and 3 in Nigeria. The paper argues that the accumulated external debts in Nigeria are not properly utilized for sustainable developmental projects that reduce the high poverty index and low life expectancy of its populace.

Cahyadin and Ratwianingsih (2020) undertook a study of a sample of 4 ASEAN economies which encompassed Thailand, Indonesia, Philippines and Malaysia from 1980 to 2017 and unraveled the impact of external debt, exchange rate on unemployment. The extracted data from the World Bank statistical bulletin was confronted with the Autoregressive Distributed Lag ARDL, Granger causality and Error correction model estimation techniques. The study uncovered that there is a significant long run association among the model variables. On the other hand, external debt and inflation significantly influence unemployment rate in the short-term in the four countries evaluated. However, a unidirectional causal association that flows from external debt and exchange rate to unemployment exists only in the case of Indonesian economy.

Iwuoha (2020) employed the Johansen cointegration and Vector error correction model (VECM) econometrics techniques of data analysis to examine the nexus

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between government borrowing and unemployment rate in Nigeria from 1981 to 2019. The study confirmed that there is a negative long-run interaction between public debt and unemployment in Nigeria within the study timeframe.

Emeka (2018) sought to analyze the effect of deficit financing on the rate of unemployment in Nigeria from 1997 to 2017, using the Johansen cointegration and Error correction model econometrics techniques of data analysis on data that was extracted from the country Apex Bank statistical bulletin and the national Bureau of statistics. The results of the research revealed that the rate of unemployment is significantly and positively influenced by government deficit financing and government expenditures, whereas exports has a negative significant impact on the unemployment rate in Nigeria.

Omedero (2018) examined the effect of revenue allocation to the various tiers of government and sustainable economic development in Nigeria. Using an OLS regression technique of data analysis, the study found that the revenue allocated to both the federal and state government were negatively impacting on income per head though insignificantly, while the share of allocations to local government areas were significant in increasing the level of income per head in Nigeria.

Ominyi and Saka (2016) using the ordinary least square regression method and Engel Granger data estimation techniques, explored the impact of deficit financing on unemployment rate in Nigeria from 1986 to 2015. The following variables were used as the explanatory variables external debt, domestic debt, fiscal outlay, government revenue and GDP and unemployment rate as the explained variable. The study uncovered empirically that both domestic and foreign debts has a negative effect on the rate of unemployment in Nigeria. While fiscal outlay, tax revenue and GDP were found to exert a positive influence on the unemployment rate in Nigeria. In the long-run, all variables co-move together.

Ogonna et al (2016) deployed the Autoregressive Distributed Lag (ARDL) econometrics techniques of data estimation and calibrated the impact of public debt on unemployment in Nigeria from 1980 to 2015. They discovered that there is a long-term relationship among the model variables. Particularly, the results indicated that an increase in public debt exerted a positive long-run effect on the unemployment rate in Nigeria.

Igberi, Odo and Anoke (2016). Investigated the impacts of government debts on the rate of unemployment in Nigeria from 1980 to 2015, using the ARDL econometrics technique of data analysis on secondary time series that was sourced from the CBN, NBS, DMO and the World Bank. The work found out that in the long-term the model variables co-move together. Implying that as public debt

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increased, the rate of unemployment also increased in the long-term all things being equal. Evidence from the study results disclosed that in the short-run the relationship between inflation, public debt and unemployment is positive and significant at 5% level, denoting that as public debt and inflation increased the rate of unemployment in Nigeria increased.

Essien, Agboegbulem and Mba (2016) studied the macroeconomic effect of public debt in Nigeria, the paper employed vector Autoregressive method (VAR) and the Granger causality test to explore the nature of the relationship. The work found that both external and internal public debt does not have any significant effect on the growth of the Nigerian economy and does not also in any way fueled inflation. Nonetheless, the result discovered that external debt increase over time had led to the increase in the lending rates.

Using the ordinary least square regression framework, Sweis and Sabri (2016) investigated the effect of public debt on unemployment and economic growth in Palestine. The study found that public debt has a positive and significant impact on unemployment in Palestine, while the impact of government borrowing on growth is insignificantly positive.

Eze and Nwambeke (2015) used the Johansen cointegration test, Error correction model ECM and Granger causality econometrics analytical tools to understudied the consequences of the various components of fiscal deficit financing such as, external borrowing, ways and means, banking sector, non-banking public, interest rate and exchange rate which were deployed as independent variables on unemployment in Nigeria from 1970 to 2013. They discovered that the long run association among the model variables is statistically feasible or plausible. But, in the short-term the ECM results indicated that a negative relationship exists between unemployment rate and the following independent variables: external debt, interest rate and ways and means. Contrarily, the banking system and exchange rate emits significant positive influence on the unemployment rate in Nigeria.

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.

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Thus, from the foregoing empirical review it is evidence that there exists a void in the literature bothering on the impact of subnational debts on poverty and unemployment at the constituent units, which this study attempt to abridged.

3.1 Research Methodology

This study employed a expo facto research design to examine the impact of subnational debts of the North-Eastern Zone of Nigeria on the levels of poverty and unemployment. The secondary data for the work spanning from 2012 2021 were longitudinal series of the 6 states that makes up the Zone and the series were sourced from the central Bank of Nigeria (CBN), Debt Management Office (DMO) and National bureau of statistics (NBS).

3.1.1 Model Specification

One of the basic pre-condition for model specification requires that the theoretical framework should be established as a guide. Hence, our models for this work were constructed based on the Keynesians' Crowd-in theory of public debt. However, these two models were derived from the work of Alaoye and Alonge (2022). The two models of the work is set to determine the effects of the independent variables viz: subnational domestic debts (SDD), subnational external debts (SED), internally generated revenue (IGR) and subnational federal allocation (SFA) on the level of poverty and unemployment that are explanatory variables.

Thus, the two panel models of this work are functionally specified as shown below:

POV- F(SDD, SED, IGR, SFA)---(1). Model I

UEM= F(SDD, SED, IGR, SFA) ------(2) Model II

These two functional models are further transformed into their panel Log-Log models, so as to estimate the degree of responsiveness of the dependent variables to change in the independent variable

$$LnPOV_{it} = ¥_{0it} + Ln¥_1 SDD_{it} + Ln¥_2 SED_{it} + Ln_3 IGR_{it} + Ln_4 SFA_{it} + U_{it.}$$ Model I (Poverty Model)

$$LnUEM_{it} = ¥_{0it} + Ln¥_1 SDD_{it} + Ln¥_2 SED_{it} + Ln_3 IGR_{it} + Ln_4 SFA_{it} + U_{it.}$$ Model II (Unemployment Model)

Where;

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Ln= Natural Logarithm i= Cross section identifier, t= time, u= Error term

¥0= intercept, and ¥1 - ¥4 = Coefficients of the parameters estimates.

The a-priori assume bothering on the relationship between the two dependent variables poverty (POV) and unemployment (UEM) levels and the explanatory variables; subnational domestic debts (SDD) and subnational external debts (SED) and control variables; internally generated revenue (IGR) and states allocations from the federation account (SFA) followed the Keynesians economists crowd-in theory of public debt is expected to be less than zero. Based on the foregoing theory, the a-priori expectations between the two dependent and the explanatory variables are assumed to be ¥1 - ¥4 <0.

Data analytical techniques

The study deployed the panel least squares (PLS), panel fixed effect model (PFEM) and panel random effect model (PREM) and the panel cointegration test as its estimating techniques.

To determine which technique of data analysis is best suited for the study we conducted Breaush Pagan test to choose between PLS and the PFEM and PREM, with the hypothesis stated below.

H_0: PLS is better

H_1: PFEM or PREM is better

Decision Rule: Reject H_0 if P-value <0.05.

However, the Hausman test was also carried out to ascertain which one of the two tests PFEM and PREM is best fit or efficient for the research, with the hypothesis as follows:

H_0: PREM is best fit

H_1: PFEM is best fit

Decision Rule: Reject H_0 if P-value< 0.05

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4.1 Result and Discussion

Table:4.1; Descriptive Statistics

	LNPOV	LNUEM	LNSDD	LNSED	LNIGR	LNSFA
Mean	4.198552	3.103917	24.35308	17.46298	22.42800	24.63268
Median	4.254901	3.220824	24.65152	17.25773	22.37827	24.65822
Maximum	4.502029	3.673766	25.38713	18.72012	23.93128	25.03299
Minimum	3.374169	2.174752	20.83894	16.46554	21.30281	24.10766
Std. Dev.	0.210121	0.375521	0.986953	0.636837	0.535517	0.216887
Skewness	-1.690097	-1.055993	-1.571795	0.704995	0.317351	-0.541240
Kurtosis	6.917044	3.217334	5.802629	2.217161	2.962447	2.710012
Jarque-Bera	66.92238	11.26930	44.34222	6.502272	1.010641	3.139641
Probability	0.000000	0.003572	0.000000	0.038730	0.603312	0.208083
Sum	251.9131	186.2350	1461.185	1047.779	1345.680	1477.961
Sum Sq. Dev.	2.604896	8.319942	57.47053	23.92814	16.91996	2.775351
Observations	60	60	60	60	60	60

Source: Researcher's computation from E-views 12 (2024).

The above the descriptive statistics output of the longitudinal data of the 6 states that makes up the north-east zone of Nigeria was deployed for this work. The descriptive series indicates that the maximum (Max) and minimum (Min) values of the data which defines the range of the series from the highest and the lowest rates and the Max and Min range were LNPOV(4.502029max 3.374169min), LNUEM(3.220824max 2.174752min), LNSDD(25.38713max 20.83894min), LNSED(18.72012max 16.46554min), LNIGR(23.93128max 21.30281min) and SFA(25.03299max 24.10766min)

The following figures 4.198552, 3.103917, 24.35308, 17.46298, 22.42800 and 24.63268 were the mean values of LNPOV, LNUEM, LNSDD, LNSED, LNIGR and LNSFA respectively. These mean values are simply the averages of each of the longitudinal data employed for this research.

Lastly, the Jarque-Bera p-values of each of the variables indicates that all the variables were not normally distributed.

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Breusch Pagan LM Test Result for Poverty and unemployment models

Table:4.2; Breusch Pagan LM Test Result for Poverty Model

Test Method	Test Hypothesis Cross-section	Time	Both
Breusch-Pagan P-value	1.043567. (0.3070).	24.60441 (0.0000)	25.64798 0.0000

Source: Researcher's computation from E-views 12 (2024).

Table: 4.3; Breusch Pagan LM Test Result for Unemployment Model

Test Method	Test Hypothesis Cross-section	Time	Both
Breusch-Pagan P-value	7.545883 (0.0060)	5.617117 (0.0178)	13.16300 0.0003

Source: Researcher's computation from E-views 12 (2024).

The Breusch-Pagan test results above for both model I & II invalid the application of PLS method for this research, hence implying or validating the use of panel PFEM or PREM giving that the P-values of the both cross section and time were statistically significant at 5% level.

Table: 4.4; Hausman Test Result of Poverty Model

Test Summary	**Chi-sq. Statistic.**	**Chi-sq d.f**	**P-value**
Period Random	5.445872.	4	0.2445

Source: Researcher's computation from E-views 12 (2024).

Table: 4.5; Hausman Test Result of Unemployment Model

Test Summary	Chi-sq. Statistic.	Chi-sq d.f	P-value
Period Random	5.780691.	4	0.2161

Source: Researcher's computation from E-views 12 (2024).

The Hausman test results of both model I & II more so reveal that the best fit regression method between the PFEM and PREM is the PREM giving that the P-value > 0.05 significant level., thus we reject in the Null hypothesis and accept the alternative which validate the application of PREM as the estimating technique of data analysis.

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Table: 4.6; Panel Random Effect result of Model I (Poverty)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	12.96900	2.948246	4.398887	0.0001
LNSDD	-0.026598	0.038733	-0.686704	0.4952
LNSED	-0.015300	0.042555	-0.359531	0.7206
LNIGR	0.069519	0.078889	0.881224	0.3820
LNSFA	-0.382203	0.129005	-2.962710	0.0045

Source: Researcher's computation from E-views 12 (2024).

The PREM result presented above indicates that the slope coefficients of both LSDD and LSED of -0.026598 and -0.015300 with the corresponding P-values of 0.4952 and 0.7206, inferred that the coefficients are statistically not significant at 5%. This results underscores that the increase in both subnational domestic and external debts do insignificantly leads to the reduction in the levels of poverty across the 6 subnational units in the north -East zone of Nigeria . More importantly, both coefficients of SDD and SED been negative implies that the coefficients are in conformity with the a-priori expectations of the research that is centered on Keynesian Crowd in theory. The policy implications of these results is that these 6 states have not sufficiently deployed a significant proportion of their domestic and external debts into people-centered program and project that have the capacity to reduce the level of poverty such as human capital development, social infrastructural development and agricultural value chain development. Thus, the borrowed funds might have been mismanaged, embezzled, misappropriated or the funds may have been used for debts servicing resulting in the non-sustainability of these states domestic and foreign debts. More so, the estimated coefficient of these 6 states internally generated revenue (IGR) was found to be 0.069519 and the P-value of 0.3820, indicates that the increase in IGR have led to the insignificant rise the level of poverty in the 6 states that makes up the north -East zone. The result further uncovered that the coefficient value of the 6 states allocations from the federation account of -0.382203 and P-value of 0.0045 indicate that the increase in SFA have had the significant effect of reducing the level of poverty in the short run.

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Table:4.6; Panel Random Effect result of Model II (Unemployment)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-16.89326	5.486190	-3.079233	0.0032
LNSDD	0.024351	0.068775	0.354071	0.7246
LNSED	-0.157850	0.116685	-1.352792	0.1817
LNIGR	-0.050489	0.127196	-0.396939	0.6929
LNSFA	0.945616	0.227487	4.156789	0.0001

Source: Researcher's computation from E-views 12 (2024).

The PREM result presented above Indicates that the slope coefficient and the corresponding P-value of LSDD of 0. 024351 and 0.7246, inferred that the coefficient of SDD is statistically not significant at 5%. This result underscores that the increase in the subnational domestic debts of the 6 states do insignificantly leads to the increase in the levels of unemployment across the 6 subnational units in the north -East zone of Nigeria. More importantly, the coefficient of SDD been positive implies that the coefficient do not align with the a-priori expectations of the research that is centered on Keynesian Crowd in theory. The policy implications of these results is that these 6 states have not deployed a significant quotient of their domestic debts into people-centered program and project that have the capacity to reduce the level of unemployment such as human capital development, social infrastructural development and agricultural value chain development. Thus, the borrowed funds might have been mismanaged, embezzled, misappropriated and funds may have been used for debts servicing resulting in the non-sustainability of these states domestic and foreign debts. Whereas, the result above indicates that the estimated coefficient of LSED of -0.157850 with the corresponding P-values of 0.1817 inferred that the coefficient of SED was found to be statistically not significant at 5%. However, this results underscores that the increase in subnational external debts do insignificantly leads to the reduction in the levels of unemployment across the 6 subnational units in the north -East zone of Nigeria . More importantly, the estimated coefficient of SED been negative implies that the coefficient conformed with the a-priori expectations of the research that is centered on Keynesian Crowd in theory. The policy implications of these results is that these 6 states governments have not sufficiently deployed a

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significant proportion of their external debts into people-centered program and project that have the capacity to reduce the level of unemployment, such as human capital development, social infrastructural development and agricultural value chain development. Thus, the borrowed funds might have been mismanaged, embezzled, misappropriated and funds may have been used for debts servicing resulting in the non-sustainability of these states domestic and foreign debts.

More so, the coefficient of these 6 states internally generated revenue (IGR) was found to be -0.050489 and the P-value of 0.6929, indicates that the increase in IGR have led to the insignificant reduction the level of unemployment in the 6 states that makes up the north -East zone. Conversely, result further uncovered that the coefficient value of the 6 states allocations from the federation account of 0.945616 and P-value of 0.0001 indicate that the increase in SFA have had the significant effect of increasing the level of unemployment in the short run.

Table: 4.7; Pedroni cointegratrion test result of Model I (Poverty)

Alternative hypothesis: common AR coefs. (within-dimension)

	Statistic	Prob.	Weighted Statistic	Prob.
Panel v-Statistic	-0.465359	0.6792	-1.064215	0.8564
Panel rho-Statistic	0.879833	0.8105	1.324186	0.9073
Panel PP-Statistic	-13.88807	0.0000	-11.68462	0.0000
Panel ADF-Statistic	-8.676649	0.0000	-5.877925	0.0000

Alternative hypothesis: individual AR coefs. (between-dimension)

	Statistic	Prob.
Group rho-Statistic	2.382082	0.9914
Group PP-Statistic	-13.80041	0.0000
Group ADF-Statistic	-9.030185	0.0000

Source: Researcher's computation from E-views 12 (2024).

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The Pedroni cointegration test result presented above indicates that there exists a long-run association or relationship among the variables in model I giving that the P-values of six (6) out the eleven (11) statistical conditions were found to be statistically significant at 5% level. Hence, going by the majority rule on the number of significant P-values we can come to the conclusion that in the long-run the variables in our poverty model co-move together in the long-run ceteri paribus.

Table: 4.8; Pedroni cointegratrion test result of Model II (Unemployment)

Alternative hypothesis: common AR coefs. (within-dimension)

	Statistic	Prob.	Weighted Statistic	Prob.
Panel v-Statistic	-0.399721	0.6553	-1.237953	0.8921
Panel rho-Statistic	2.467463	0.9932	2.310702	0.9896
Panel PP-Statistic	-2.461811	0.0069	-3.914321	0.0000
Panel ADF-Statistic	-0.962863	0.1678	-1.603333	0.0544

Alternative hypothesis: individual AR coefs. (between-dimension)

	Statistic	Prob.
Group rho-Statistic	3.549871	0.9998
Group PP-Statistic	-4.945637	0.0000
Group ADF-Statistic	-0.889574	0.1868

Source: Researcher's computation from E-views 12 (2024).

In model II, nine (9) out of eleven (11) statistical conditions P-values were found to be statistically not significant at 5% level in the unemployment model. Thus, incompliance with majority rule we can empirically infers from the results that all the variables in the unemployment model were not cointegrated in the long-run, which implies that the model variables do not co-move together in the long-run all things being equal.

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Post estimation test Result of model I & II

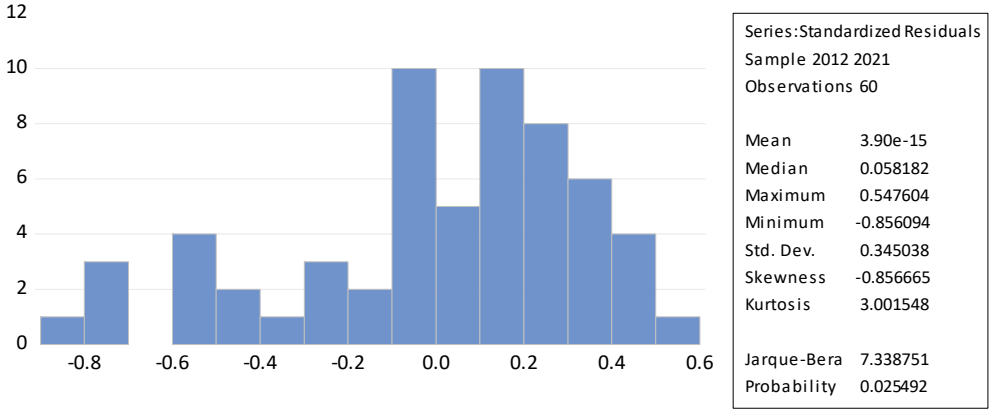


Figure: 1; Normality test of Model II (Unemployment)

Source: Researcher's computation from E-views 12 (2024).

Table: 4.9; Result of Cross sectional dependency test of Unemployment Model

Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	44.01989	15	0.0001
Pesaran scaled LM	5.298282		0.0000
Pesaran CD	2.625123		0.0087

Source: Researcher's computation from E-views 12 (2024).

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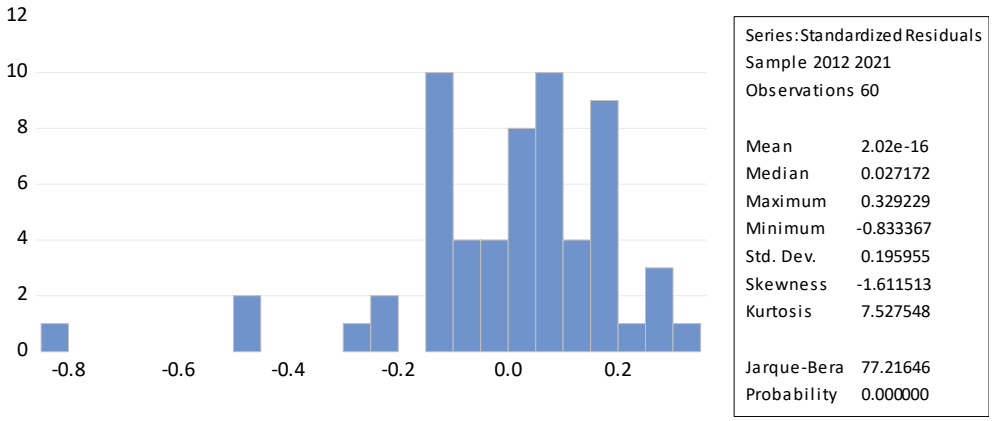


Figure:2; Result of Normality test of Model I (Poverty)

Source: Researcher's computation from E-views 12 (2024).

Table: 4.10; Result of Cross sectional dependency test of Model I (Poverty)

Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	60.23906	15	0.0000
Pesaran scaled LM	8.259484		0.0000
Pesaran CD	6.610482		0.0000

Source: Researcher's computation from E-views 12 (2024).

5.1 Recommendations

The 6 states that makes up the north-eastern zone are encouraged to invest a significant share of the borrowed funds to human capital development through investment in education and health, investment in cottage industries, agricultural value chain development, as well as social infrastructures development. The 6 subnational units are also encouraged to imbibed the culture of fiscal discipline in the governance of public fund, in order to guide against borrowed funds deviations, misapplications or misappropriations, embezzlement, thievery and odious borrowing that are often associated with states' borrowing. These states are admonished to invest the borrowed funds on sustainable and productive projects so as to eliminate debt overhang challenges.

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Conclusion

Conclusively, the findings of the study inferred that these 6 states have not significantly appropriated a significant proportion of their borrowed fund into human capital development project that have the capacity to reduce the level of poverty and unemployment in these states. Thus, these states government should be more committed to investing in human capital development by investing in education, health facilities, as well as investing infrastructures that could attract private investment in productive and sustainable development programs that could help create jobs and reduce poverty.

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DOES ECONOMIC COMPLEXITY OFFER A SOLUTION TO THE RESOURCE CURSE? NEW INSIGHTS FROM AN EMERGING ECONOMY

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Abstract

Despite crystal-clear evidence of the resource curse syndrome in South Africa's economy, manifesting in slower economic growth compared to other upper-middle-income nations with similar natural resource endowments, high unemployment rates, persistent poverty, significant income inequality, declining institutional quality, and deteriorating performance of the manufacturing and productive sectors, no known study examines the role of economic complexity (ECI) in mitigating or intensifying resource curse in the country. Also, this study provides one of the earliest examinations of how asymmetries and nonlinearities influence ECI's role in addressing the resource curse and overreliance. We adopt a nonlinear variant of the Autoregressive Distributed Lag, ARDL, estimator to analyse the South African annual dataset for the period 1984-2023. The findings validate short- and long-run asymmetries in how natural resource rents (NRR) respond to ECI shifts in South Africa. Short- and long-run ECI upgrades (positive shock) significantly reduce overreliance and mitigate the resource curse. ECI deterioration (negative shock) strongly aggravates the resource curse in the short run. Also, long-run ECI declines reduce it by structurally and strategically diminishing resource-based ECI-related initiatives, thereby mitigating the risk of the

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resource curse and incentivising the development of non-resource knowledge-based innovation, manufacturing capabilities, capacity building, and economic diversification.

Keywords: *natural resource rents; economic complexity; resource curse; asymmetry; South Africa.*

JEL Classification: O31, O32, P28, Q55

1. Introduction

Starting with the work of Canh et al. (2020), economic complexity (ECI) upgrades have been identified as an important and reliable pathway for developing strategies to mitigate resource curses associated with natural resource endowments (NRE hereafter) in developing and emerging economies. Upgrading ECI also offers refined insights and initiatives that can trigger expansion in innovative industries, foster entrepreneurial inclinations, develop sophisticated manufacturing capabilities, and expand productive knowledge, all of which are essential ingredients for diversifying the economy and developing non-resource capacity, sectors, and a knowledge economy. Following this strand of thought, ECI - which is a metric that defines the extent of knowledge intensity, technological sophistication, and advanced manufacturing capabilities embedded in an economy's productive structure to generate a chain of globally competitive, high-tech, high-quality products for exports (Olaniyi & Odhiambo, 2025a & d; Aydin et al., 2026) - has continued to attract the attention of scholars as an antidote to mitigate the resource curse and reduce overreliance on NRE. ECI fosters advancement in the knowledge economy, technical skills, innovation, technology, innovative products and businesses, manufacturing acumen, and structural transformation, resulting in economic diversification and capacity building in the non-resource sector. Thus, massive and deliberate efforts to upgrade ECI offer opportunities for forward-looking innovation, advanced manufacturing capabilities, and economic diversification strategies to shift the attention of resource-rich countries from NRE to capacity building and sectors that do not depend on NRE, thereby addressing the resource curse and dependence.

Following this proposition, studies have continued to emerge on the critical roles of ECI in evading the resource curse and reducing overreliance on NRE, with mixed findings (Canh et al. 2020; Mai et al. 2023; Destek et al. 2023; Ul-Durar et

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al. 2023; Sun & Hasi 2024; Li et al. 2024; Kelly et al. 2024; Olaniyi & Odhiambo, 2025a; Olaniyi et al. 2026). Most of these studies confirm that ECI upgrades lessen dependence on resources and extenuate the resource curse in resource-rich countries. A few others establish that ECI aggravates the resource curse. The third strand affirms that ECI's import is insignificant in natural resource rents (NRR). Aside from these mixed findings, our thorough review of the literature reveals that most studies assume a symmetric, linear effect of ECI on NRR, except for Olaniyi et al. (2026), which considers the case of Saudi Arabia. Recent advances in empirical analysis and econometrics show that linearity and symmetry are cosmetic and impractical in light of real-world fundamentals, which reflect robust asymmetries and nonlinearities in the data distribution of economic complexity (Hatemi-J, 2012; Shin et al., 2014; He, 2020; Ikizlerli *et al.,* 2019; Olaniyi, 2019; Olaniyi & Odhiambo, 2025b & c). The asymmetric approach digs deeper into the real-world realities to provide estimates to reveal socioeconomic-consistent insights and policy dimensions in the NRR's responsiveness to shifts in ECI. Unlike most existing research, this approach offers new explanations for how changes in ECI can reduce overreliance on resource wealth and the risks of the resource curse in economies with NRE. The following rationales justify the essence of accounting for asymmetries and nonlinearities in analysing the effect of ECI on NRR:

This approach provides deeper information and insights by decomposing ECI data into negative and positive change elements (ECI deteriorations and upgrades, respectively). These procedures enable testing the differential effects of ECI upgrades and deteriorations on NRR. Hence, it offers new insights into the resource curse's sensitivity to changes in ECI, revealing that ECI upgrades distinctly affect NRR differently from ECI deteriorations. Unlike symmetric, linear approaches in previous studies, which provide rigid analysis and restrictive policy alternatives, the asymmetric method uses a flexible estimator. It offers more comprehensive, pragmatic, and flexible policy options that align with socioeconomic realities and real-world conditions, providing deeper information and insights. Three, asymmetric analysis unravels hidden information beyond the scope of prevailing symmetric approaches for leveraging ECI as a strategy to evade the resource curse associated with NRE.

In addition to analysing asymmetries in NRR's responsiveness to ECI changes, this research effort is among the earliest to consider country-specific factors. Previous studies predominantly focus on panel analyses of countries, without accounting for each country's peculiarities. Existing studies impose the condition

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of homogeneity and assume restrictive uniform policies across all countries within panel frameworks. These assumptions neglect the varying levels of ECI upgrades across countries and ignore the diverse depths of resource reliance and the varying degrees of the resource curse. Generalising results and policy options from panel analysis may be unsuitable for addressing each country's idiosyncrasies and peculiar challenges. Panel analysis may be unrealistic for explaining real issues in leveraging ECI to address the resource curse and to offer pathways to lessen resource dependence. Thus, panel and cross-sectional studies exhibit a blind spot to country-specific issues and challenges. Hence, this study differs from previous studies by conducting one of the earliest analyses of NRR's responsiveness to shifts in ECI, using an annual dataset for South Africa. South Africa's choice is strategic because the puzzles and issues surrounding ECI and NRR data align with the study's objectives. The following highlights validate our country's choice.

One, despite the abundance of natural resources - diamond, platinum, coal, and gold - in South Africa, it is difficult to free the country from a list of countries that suffer from the resource curse. Certain macroeconomic indicators indicate the presence of the resource curse in South Africa. The country suffers from slower economic growth (compared to other upper-middle-income countries rich in NRE), high unemployment, entrenched poverty, high income inequality, deteriorating institutional quality, deteriorating manufacturing and productive sectors' performance, and other symptoms of being a rentier state (Harvey, Morrison & Desai, 2025; Elbra, 2013). These signs persist despite the country earning the most money from natural resources in Africa in 2022 (AJLabs, 2022). Two, data from the MIT Media Lab's Economic Complexity (ECI) Observatory indicate that, on average, South Africa scores higher than other African countries in ECI (see Figure 1). It implies that South Africa has the most sophisticated knowledge-based productivity, technical skills, technological advancement, and a diverse range of high-tech manufacturing in Africa. Figure 1 reveals that all other African countries are on the negative side of ECI performance, except South Africa. From 1995 to 2023, South Africa has consistently been on the positive side of ECI performance. Juxtaposing the opposing evidence on the resource curse and South Africa's ECI performance relative to other African countries presents an intriguing puzzle that calls for a critical empirical analysis. Hence, this study examines whether South Africa's ECI offers a solution to the resource curse. Also, given significant asymmetries and nonlinearities in the ECI data spread (see Figure 2), this study captures asymmetry in NRR's responsiveness to shifts in ECI. This innovative idea

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and approach are the first empirical analysis to examine how asymmetric structures influence ECI's contributions to NRR in Africa's resource-abundant economies.

In summary, one, this study enhances the existing knowledge space by providing the maiden study that explains how asymmetric features shape NRR's sensitivities to shifts in ECI in Africa, using the dataset of South Africa, which has unique issues surrounding the resource curse and ECI upgrades and how the two strategically link for enhanced policy suggestions and coordination to leverage ECI as a policy instrument to evade the resource curse. Two, this research effort is the maiden country-specific study of how ECI contributes to or impedes NRR in Africa. Hence, our study is distinctive in being the first to examine the role of ECI in NRR in South Africa.

Aside from this introductory aspect, Section 2 reviews both theoretical and empirical literature. Section 3 addresses issues such as data description, sources, and methodological procedures. Data analysis, presentation, and discussion of findings are the main focus of Section 4. The last section addresses the study's summary, conclusion, policy suggestions, and identifiable limitations for future research.

2. Literature review

2.1 Theoretical evidence

This study grounds its theoretical basis in rentier-state and resource-curse theories. The rentier state theory holds that continuous flows of rents from natural resource endowments (NRE) may create complacency and prompt governments, stakeholders, technocrats, and policymakers to neglect and lose interest in promoting productive, creative, and innovative manufacturing sectors (Mahdavy, 2015; Beblawi, 2015; Mitonga-Monga, 2025). The accumulation of resource revenues may abet opportunism, rent-seeking, and manipulative tendencies. This perverted disposition may cause neglect of forward-looking innovation and divert resource rents away from initiative, knowledge-based, and technologically driven productive capacities, thereby inhibiting ECI-enhancing initiatives, stunting economic diversification, and ultimately hampering the production of a chain of globally competitive, high-tech, diverse products for export. Similarly, the resource curse theory explains that resource-rich countries - especially those with widespread corruption and weak institutions– perform worse than resource-scarce countries in macroeconomic indicators, such as economic growth, developmental outcomes, economic complexity, and others. Resource abundance and the accrued resource rents create incentives that give rise to varying degrees of poor

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governance practices, breed corruption, and result in inefficient management and distribution of resources (Auty, 2007).

This situation leads to the neglect of reasonable investment in creative and innovative industries, driven by an overreliance on natural resources. Thus, political officeholders and stakeholders become complacent and overlook leveraging resource wealth to diversify the economy and to promote initiatives that enhance knowledge-based productivity and technical capabilities in manufacturing, thereby producing an array of high-tech, competitive products for export. Hence, following an innovative idea of Canh et al. (2020), which emphasises that ECI upgrades are antidotes and strategies to mitigate the risks of curses associated with the resource endowments and catalyse pathways to reduce overreliance on natural resources. This creative idea implies that enhancing ECI expands knowledge intensity, technical capabilities, and innovation within an economy's productive structure. This process leads to the development of innovative businesses and products, patent markets, entrepreneurial inclinations, and non-resource capacity-building, thereby promoting economic diversification and the active production of a basket of competitive, high-quality, sophisticated products for export. By extension, these processes generated by ECI upgrades and their induced initiatives reduce resource dependence and provide pathways, strategies, and opportunities to mitigate the resource curse in resource-rich countries.

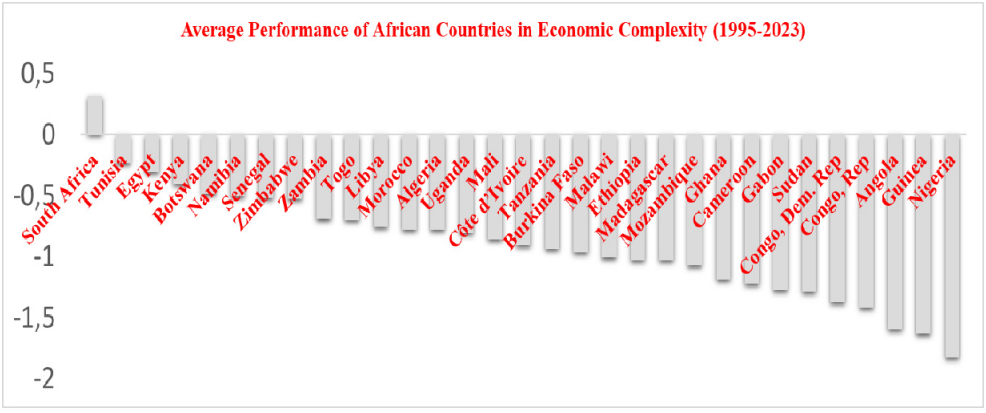


Figure 1: The Performance of African Countries in Economic Complexity

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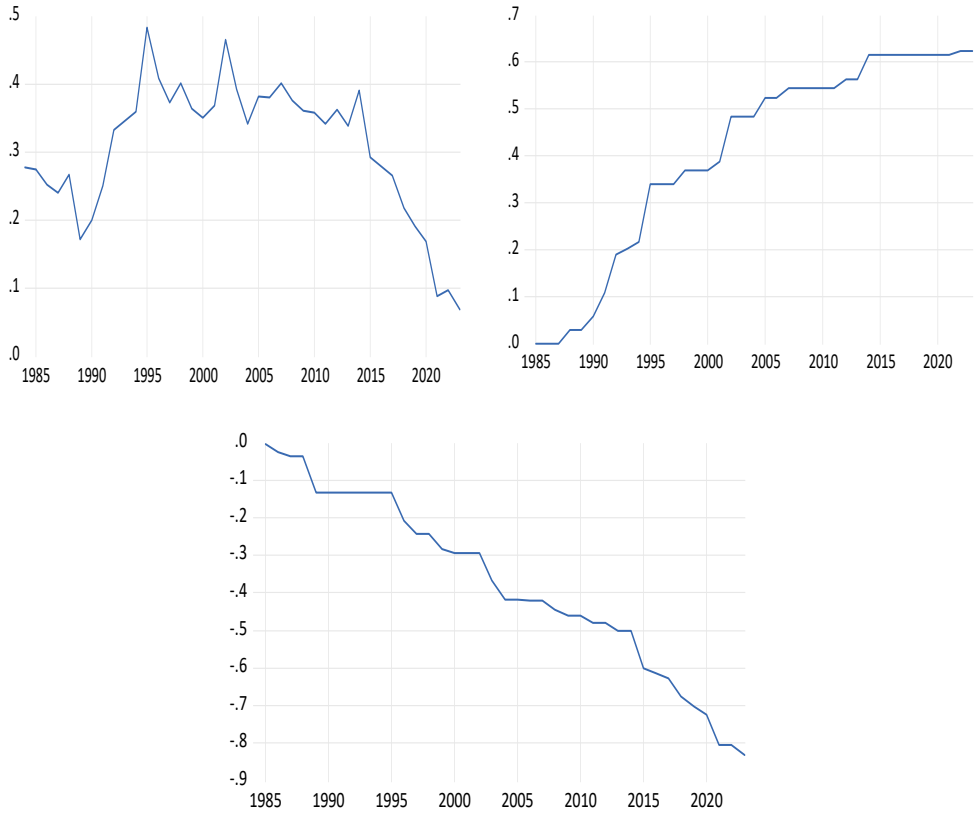


Figure 1: The raw data of ECI and their positive (ECI^{+}) and negative (ECI^{-}) change components:

An expansion in ECI shifts an economy's focus from resource dependence to the enhancement of non-resource capacities in manufacturing and other productive sectors. Thus, this study hypothesises that ECI upgrades convert the resource curse into a blessing and provide initiatives to reduce overreliance on natural resources. This study adds fresh insights to existing theoretical expositions by incorporating real-world evidence of asymmetric features and linearities in NRR's responsiveness to changes in ECI. These two theories assume symmetry and

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linearity within the framework of monotonic NRR's responsiveness to ECI changes. This novelty provides more informative, insightful, and flexible empirical estimates, as well as real-world-consistent policies, to address the fundamentals that align with socioeconomic dynamics, leveraging ECI changes to explain the resource dependence and curse in more practical ways. This fresh insight explains how cumulative positive changes (ECI upgrades) in ECI contribute to NRR, different from its responses to cumulative negative changes (ECI deteriorations) in ECI.

2.2 Evidence from empirical studies

Empirical research on how economic complexity offers pathways to reduce overreliance on natural resources and mitigate the resource curse is still nascent, with mixed results. Canh et al. (2020) propose one of the first studies examining the role of ECI in evading the curse of natural resources, analysing data from 90 nations for the years 2002–2017. To address econometric flaws, the study employs estimators such as panel-corrected standard errors (PCSE), feasible generalised least squares (FGLS), and system generalised method of moments (SGMM). The research outcomes found that ECI lowers NRR in the total sample. These findings align with separate analyses of lower-middle- and high-income economies. This suggests that enhancing ECI reduces the curse of natural resources by increasing the likelihood of creative entrepreneurial opportunities and innovative initiatives independent of NRE. On the contrary, ECI, which marginally increases natural resource dependence in upper-middle-income nations, passively mitigates the resource curse syndrome.

Using a panel-corrected standard error estimator on a sample of 26 EU countries from 2011 to 2019, Mai et al. (2023) reported that ECI upgrades reduce the possibilities of natural resource curses and provide measures to lessen resource dependency. This result supports the idea that increased ECI leads to greater creative knowledge and advanced productive capabilities. This promotes the growth of creative initiatives and innovative entrepreneurial opportunities, and eventually the diversification of the economy. These results align with the research findings of Destek et al. (2023), which employed the method of moments-quantile regression to analyse data from nine countries with high dependence on natural resources spanning 1995 to 2019. The research outcomes demonstrate that ECI mitigates the resource curse and offers pathways to lessen dependence on resources. Similar findings are reported in a study by Destek et al. (2024), which

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finds that the resource curse is mitigated and dependency declines as countries experience ECI upgrades. Following the same line of argument, Ul-Durar et al. (2023) use a quantile regression variant of the panel autoregressive distributed lag estimator to analyse a dataset of 20 resource-rich economies. The research outputs show that enhancing ECI reduces NRR. This suggests that increased ECI enhances knowledge intensity, boosts productive capacity, and stimulates technical innovation in the production process. Consequently, it develops non-resource capacity-building and economic diversification, thereby reducing reliance on natural resources.

By contrast, Sun & Hasi (2024) find that ECI increases reliance on natural resources across 10 OECD nations. This study employs estimators such as feasible generalised least squares, the system generalised method of moments, and method-of-moments-quantile regression to analyse data covering the period from 2004 to 2021. The findings reveal that high-tech and highly developed economies may become more dependent on mineral resources. The authors explain that this greater reliance on these resources stems from the demand for specific minerals and raw materials necessary for technological development. Highly sophisticated economies are interdependent and vulnerable to fluctuations in resource availability as they produce complex products through global supply networks. Demand for the diverse variety of products linked to ECI is rising, strengthening the link to vital resources. Resource reliance can increase as industries specialise and interconnect; this happens because failures in one sector can affect the entire system. The demand for resources may result from the need for both sophisticated infrastructure and cutting-edge industrial processes. The drive to improve global competitiveness and the sophistication of production structures may result in some critical industries requiring substantial resource inputs. This would increase overall resource dependency. Furthermore, pursuing environmental goals, such as switching to renewable energy sources or adopting electric vehicles, may unintentionally increase demand for certain key minerals.

Contrarily, Li et al. (2024) conduct a panel analysis of 10 recently industrialised nations (NICs) and demonstrate that ECI mitigates the resource curse and reduces reliance on resources. The data spanning 1975–2020 are analysed using quantile regression, the system generalised method of moments, and pooled ordinary least squares. The study's findings show that as economic complexity rises, these nations' economic diversification in production structures will improve and their reliance on natural resources will decrease. These results suggest that as ECI rises, knowledge intensity improves, creative business opportunities increase, and the

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dependence of NIC countries on natural resources decreases. It implies that boosting ECI increases economic diversification. This, in turn, enables NIC economies to shift away from comparatively "low-ubiquity products" that use more natural resources. Kelly et al. (2024) also confirm that ECI reduces resource dependency and mitigates the curses associated with resource endowments in Africa. Their study uses the generalised method of moments estimator to analyse panel data from 36 African countries spanning 1995-2017. However, in their analysis of 20 resource-rich African economies, Olaniyi & Odhiambo (2025a) find that ECI has an insignificant effect on resource reliance and the resource curse. They employ quantile regression, Driscoll-Kraay regression, and fully modified least squares for the years 1995–2021.

Aside from conflicting findings across existing studies, most prior studies assume that NRR is monotonic, linear, and symmetric in its response to shifts in ECI. The symmetric assumption is cosmetic and impractical to explain asymmetries in the ECI data spread. Accounting for asymmetries in NRR's responsiveness to ECI changes is a recent and understudied aspect of the relationship. The only study in this area is Olaniyi et al. (2026), which uses the nonlinear ARDL and FMOLS estimators to test the asymmetric effect of ECI on NRR in Saudi Arabia for the period 1984-2021. The study establishes asymmetric sensitivity of NRR to ECI shifts in the short- and long-runs. The results indicate that cumulative declines in ECI mitigate the resource curse and catalyse the pathway to reduce resource dependence in the short run. Meanwhile, ECI upgrades deepen reliance on natural resources and aggravate the resource curse in the long- and short-run.

The findings of Olaniyi et al. (2026) validate the argument that asymmetric sensitivity of NRR to ECI change is more informative, insightful, flexible, and comprehensive, yielding real-world, consistent policy options for leveraging ECI to mitigate the resource curse and reduce resource-rich countries' dependence on resource endowments. Hinging on these premises, this study adds to the understanding of how ECI impacts NRR within the context of an asymmetric framework, using the case of South Africa, which reveals robust asymmetries, nonlinearities, and exciting issues surrounding the country's ECI performance, and highlights the resource curse syndrome.

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3. Data (sources and descriptions) and methodological procedures

3.1 Descriptions and sources of data

This study examines asymmetric features in the role of economic complexity in natural resource rents in South Africa for the period 1984-2023. The study's scope is determined by data availability. The study obtains data on the main and control variables from the World Development Indicators 2025 of the World Bank, the International Country Risk Guide, the International Monetary Fund (IMF) financial statistics database, and the Observatory on Economic Complexity, collated by the Media Lab at MIT. Table 1 contains detailed information on the data sources and descriptions of all variables in the study.

Table 1: Descriptions of variables, measurements, and sources of data

Variables	Symbol	Data descriptions	Sources
Total natural resource rents	NRR	Total natural resources rents (% of GDP)	WDI
Economic complexity	ECI	Economic complexity	MIT Media's Lab of Observatory of Economic Complexity
Financial development	FD	Financial development	IMF
Real GDP per capita	RGDPP	GDP per capita (constant 2015 US$)	WDI
Foreign direct investment	FDI	Foreign direct investment, net inflows (% of GDP)	WDI
Control of corruption (0-6)	CC	Corruption	ICRG

Note: WDI stands for World Development Indicator; IMF: International Monetary Fund; ICRG: International Country Risk Guide; MIT: Massachusetts Institute of Technology; Financial development adopted is the broad-based indicator that contain access, depth and efficiency of financial markets and institutions from IMF financial statistics database. The study takes natural logarithms of RGDPP to deal with outliers and heteroscedasticity in the data spreads.

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3.2 Methodological procedures and strategies.

This study draws its modelling style from existing studies, such as Canh et al. (2020), Destek et al. (2023), Kelly et al. (2024), Li et al. (2024), Mai et al. (2022), Olaniyi & Odhiambo (2025a & c), Olaniyi et al. (2026), Sun & Hasi, (2024), and Ul-Durar et al. (2023), that examine the role of economic complexity (ECI) in natural resource rents (NRR), with some adjustments to accommodate our study's innovations strategies. The study specifies the model as follows:

$$NRR_t = \alpha_0 + ECI_t\alpha_1 + FD_t\alpha_2 + LRGDPP_t\alpha_3 + FDI_t\alpha_4 + CC_t\alpha_5 + \mu_t \quad (1)$$

The acronyms for each variable are as defined in Table 1. α_0 is the shift parameter, while $\alpha_1, \ldots, \alpha_5$ are the coefficients that explain the impact of each variable on NRR. This study chooses control variables following previous research: financial development (Olaniyi & Odhiambo, 2025a; Olaniyi et al., 2026; Adabor, 2023; Canh & Thong, 2020); real income per capita (Destek et al., 2023; Olaniyi et al., 2026; Canh et al., 2020; Li et al., 2024); foreign direct investment (Canh et al., 2020; Olaniyi & Odhiambo, 2025a; Sun & Hasi, 2024); and control of corruption (Olaniyi & Odhiambo, 2025a). Hence, extant literature guides the choices of variables in the model and this process validates the scientific procedure observed in existing studies.

Consistent with previous studies (Pesaran et al., 2001; Bahmani-Oskooee et al., 2020; Babalola, 2022), this study presents an unrestricted error-correction version of the autoregressive distributed lag (ARDL) estimator in Equation (2). The ARDL variant provides short- and long-run error-correction estimates. It indicates that changes in NRR result from divergences and distortions relative to previous periods, as well as changes in other explanatory variables. These processes are explained in Equation (2) as follows:

$$\begin{aligned}\Delta NRR_t = \alpha_0 + \sum_{i=1}^{\rho_1} \theta_i \Delta NRR_{t-i} + \sum_{i=0}^{\rho_2} \beta_i \Delta ECI_{t-i} + \sum_{i=0}^{\rho_3} \emptyset_i \Delta FD_{t-i} + \sum_{i=0}^{\rho_4} \vartheta_i \Delta LRGDPP_{t-i} \\ + \sum_{i=0}^{\rho_5} \exists_i \Delta FDI_{t-i} + \sum_{i=0}^{\rho_5} \omega_i \Delta CC_{t-i} + \gamma_0 NRR_{t-1} + \gamma_1 ECI_{t-1} + \gamma_2 FD_{t-1} \\ + \gamma_3 LRGDPP_{t-1} + \gamma_4 FDI_{t-1} + \gamma_5 CC_{t-1} + \mu_t \quad (2)\end{aligned}$$

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This study uses the ARDL bounds testing approach to verify the existence of a long-run relationship among the variables, while accounting for their long- and short-run effects on NRR. The components of Equation (2) with first-differenced variables deal with the short-run effects. The respective long-run effects are examined through the following processes:

$$\cap_1 = \frac{\gamma_1}{\gamma_0}, \quad \cap_2 = \frac{\gamma_2}{\gamma_0}, \quad \cap_3 = \frac{\gamma_3}{\gamma_0}, \quad \cap_4 = \frac{\gamma_4}{\gamma_0}, \quad \cap_5 = \frac{\gamma_5}{\gamma_0} \tag{3}$$

We establish cointegration or a long-run relationship if the F-statistic calculated exceeds the critical table values of upper I(1) and lower I(0) bounds. The upper bound assumes that the variables are stationary at first differences, while the lower bound assumes that the variables are integrated of order zero. The ARDL approach does require pre-testing for unit roots, but the method breaks down if any variable is integrated of order 2 (I(2). It is crucial to stress that Equation (2) is restrictive and rigid, as it only explains symmetric NRR's responsiveness to changes in ECI. Thus, this study follows the procedural processes of Hatemi-J (2012), Shin et al. (2014), Olaniyi & Odhiambo (2025c), and Olaniyi et al. (2026) to decompose ECI into partial cumulative positive and negative shock components as follows:

$$ECI_t = ECI_0 + ECI_t^+ + ECI_t^- \tag{4}$$

Respectively, ECI^- and ECI^+ are cumulative partial sums of negative and positive shock components of ECI. The decomposition procedures are as follows in Equations (5) and (6).

$$ECI_t^- = \sum_{j=1}^{t} \Delta ECI_j^- = \sum_{j=1}^{t} \min(\Delta ECI_j, 0) \tag{5}$$

$$ECI_t^+ = \sum_{j=1}^{t} \Delta ECI_j^+ = \sum_{j=1}^{t} \max(\Delta ECI, 0), \tag{6}$$

The operational definitions of these constructed components are defined as follows: ECI^+ are cumulative upgrades in economic complexity, that is, cumulative increases in knowledge intensity, technological sophistication, and advanced manufacturing capacity embedded in the productive structure to produce

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a chain of high-tech, high-quality, and internationally competitive products for export. On the contrary, ECI^- are the cumulative deteriorations in economic complexity, and the direct opposite of ECI^+.

To capture asymmetries in NRR's responsiveness to shifts in ECI, we integrate ECI_t^+ and ECI_t^- to replace ECI_t in the long- and short-run components of Equation (2). This process converts the linear ARDL into a nonlinear one. The Equation is re-specified as follows:

$$\begin{aligned}\Delta NRR_t = \alpha_0 + \sum_{i=1}^{\rho_1} \theta_i \Delta NRR_{t-i} + \sum_{2i=0}^{\rho_{2a}} \beta_{2ai} \Delta ECI_{t-i}^+ + \sum_{2i=0}^{\rho_{2b}} \beta_{2bi} \Delta ECI_{t-i}^- + \sum_{i=0}^{\rho_3} \emptyset_i \Delta FD_{t-i} \\ + \sum_{i=0}^{\rho_4} \vartheta_i \Delta LRGDPP_{t-i} + \sum_{i=0}^{\rho_5} \ni_i \Delta FDI_{t-i} + \sum_{i=0}^{\rho_5} \omega_i \Delta CC_{t-i} + \gamma_0 NRR_{t-1} \\ + \gamma_{1a} ECI_{t-1}^+ + \gamma_{1b} ECI_{t-1}^- + \gamma_2 FD_{t-1} + \gamma_3 LRGDPP_{t-1} + \gamma_4 FDI_{t-1} + \gamma_5 CC_{t-1} \\ + \mu_t \end{aligned} \quad (7)$$

The procedures for testing the long-run relationship among variables via ARDL bounds testing remain intact, except that the number of exogenous variables has increased by 1 due to the incorporation of asymmetric structures. Test for short- and long-run asymmetries. If ρ_{2a} and ρ_{2b} are unequal, it implies that both negative and positive shock change components have different lag lengths, and it may signal the presence of asymmetry. Short-run asymmetries exist if β_{2ai} and β_{2bi} are statistically different from each other. It implies that in the short run, positive and negative shock components have varying impacts on NRR. We use the Wald test to test the hypothesis that $\sum \beta_{2ai} = \sum \beta_{2bi} = 0$. Rejection of this hypothesis indicates the presence of asymmetric effects. Also, we test long-run asymmetries by testing the hypothesis, $\frac{\gamma_{1a}}{-\gamma_0} = \frac{\gamma_{1b}}{-\gamma_0}$, using Wald test procedures. This process verifies the presence of long-run asymmetries in NRR's responsiveness to shifts in ECI.

To further validate asymmetries, this study extracts dynamic asymmetric multipliers from both negative and positive changes in ECI, m_k^- and m_k^+. Consistent with a distortion, divergence, or disequilibrium, these procedures highlight the dynamic nonlinear shifts that can produce a new state of equilibrium. Hence, we use cumulative processes to assess dynamic multiplier effects. These

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procedures analyse how NRR responds to a one percentage point change in ECI^- and ECI^+, respectively, in Equation (8)

$$m_k^+ = \sum_{j=0}^{k} \frac{\partial NRR_{t+j}}{\partial ECI_t^+}, m_k^- = \sum_{j=0}^{k} \frac{\partial NRR_{t+j}}{\partial ECI_t^-}, \qquad k = 0, 1, 2, \ldots \tag{8}$$

Following these constructions, the dynamic processes indicate that as

$$k \to \infty,\ m_k^+ \to \frac{\gamma_{1a}}{-\gamma_0}, \text{and } m_k^- \to \frac{\gamma_{1b}}{-\gamma_0}.$$

This study uses the error-correction variant of the nonlinear ARDL estimator as a perfect fit for the following reasons: one, the nonlinear ARDL aligns with the study's objective; it helps unravel and establish the nonlinear and asymmetric NRR's sensitivity to changes in ECI. Two, it uncovers simultaneously short- and long-run asymmetric and differential effects of ECI upgrades (cumulative increases in ECI) on NRR, distinct from those of ECI declines (cumulative decreases in ECI).

4. Data analyses and discussion of findings

4.1 Preliminary analyses

Descriptive statistics

Table 2 reveals the main properties of the variables' data distributions using descriptive statistics. The coefficients of skewness for ECI (economic complexity) and NRR (natural resource rents) exhibit asymmetry, with the two variables skewing negatively and positively, respectively. Thus, the data distribution violates the assumption of symmetry. The Kurtosis coefficients also indicate evidence of outliers in the data spread of ECI and NRR, as they are leptokurtic and platykurtic, respectively. Based on the Jarque-Bera statistics, evidence of non-normality is clear for NRR and FDI. These statistical facts reveal the need to account for asymmetries in NRR's responsiveness to changes in ECI. The prevalent symmetric approach in existing research may have overestimated the role of ECI in NRR.

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Table 2: Descriptive statistics

	NRR	ECI	FD	LRGDPP	FDI	CC
Mean	5.332	0.306	0.428	8.557	1.177	3.565
Median	4.773	0.342	0.434	8.545	0.706	2.960
Maximum	11.990	0.483	0.593	8.728	9.681	6.000
Minimum	2.489	0.068	0.253	8.341	-0.702	2.000
Standard Deviation	1.998	0.099	0.117	0.135	1.769	1.295
Skewness	1.456	-0.720	-0.118	-0.085	3.174	0.627
Kurtosis	5.437	2.966	1.523	1.433	15.026	1.750
Jarque-Bera	24.019	3.455	3.727	4.139	308.209	5.226
Probability	0.000	0.178	0.155	0.126	0.000	0.073
Observations	40	40	40	40	40	40

Asymmetric structures in the trend of economic complexity (ECI)

Figure 2 portrays the raw data and asymmetric components of ECI. The graphical illustrations of the cumulative partial sums of the negative and positive shock components of ECI exhibit robust, significant evidence of nonlinearities and asymmetries in the data spread and distributions. The asymmetric patterns and structures in the trend analyses of ECI validate our argument that accounting for asymmetries and nonlinearities in NRR's response to ECI changes is more consistent with real-world fundamentals. It tends to capture deeper insights and information beyond the scope of symmetric approaches in existing studies, explaining how leveraging ECI can offer pathways to reduce overreliance on NRE and to address the resource curse. It provides more informative, flexible, and pragmatic policy options for resource-rich countries.

Unit root and cointegration tests

In ARDL models, testing for unit roots is not necessary, but the approach breaks down when any variable follows a second-order path of integration. Consistent with robust evidence of asymmetries and nonlinearities in the ECI data distribution (see Figure 2 and Table 2), this study adopts the asymmetric and nonlinear root test of Kapetanios & Shin (2008), commonly known as the KSUR. This approach follows a global, stationarity-based autoregressive technique for exponential-smooth transitions. This method utilises a Monte Carlo simulation model that accounts for nonlinearity and asymmetry. SIC, Schwarz Information Criterion, lag length criteria are used to determine the optimal lag length for this test. The results

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indicate that all variables, except for FDI, which is stationary at the level, attain stationarity at the first difference (see Table 3). These research outcomes support the use of the ARDL estimator. Given the evidence of mixed integration orders revealed by the KSUR nonlinear unit root test, it is necessary to determine whether a long-run relationship exists. The variables tend to behave divergently in the short run (Olaniyi et al., 2026). The findings in Table 4 indicate cointegration. It implies that the variables converge to their long-run dynamics after experiencing short-run divergences and disequilibria. It further validates the choice of the error-correction variant of the ARDL, which separates short-run estimates from the long-run counterpart.

Table 3: Nonlinear KSUR unit root test

Variables	KS test (Intercept and trend)		KS test (Intercept only)	
	Level	First difference	Level	First difference
NRR	-2.254	-5.150***	-1.660	-5.209***
ECI	-2.180	-6.547***	-1.404	-3.451***
FD	-1.229	-4.473***	-1.612	-4.512***
LRGDPP	-1.397	-5.567***	-1.371	-4.613***
FDI	-4.275***	---	-4.054***	---
CC	-1.414	-2.163**	-1.519	-2.471**

*, **, and *** represent 10%, 5%, and 1% levels of significance, respectively

Table 4: Cointegration (ARDL bounds tests)

	Value	j
F-statistic	16.334	6
Level of significance	Upper bounds	Lower bounds
	I(1)	I(0)
10%	3.23	2.12
5%	3.61	2.45
1%	4.43	3.15

j represents exogenous variables' number in the model

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4.2 The role of economic complexity (ECI) in natural resource rents (NRR) in South Africa

4.2.1 Examining the asymmetric responsiveness of NRR to ECI's shifts

Consistent with the study's main goal, this study uses the Wald diagnostic coefficient test and dynamic multiplier graph to examine whether asymmetries exist in NRR's responses to shifts in ECI. These tests explore both short- and long-run asymmetric dynamics to provide deep insights into leveraging ECI to address the resource curse within a real-world, consistent framework of asymmetry and nonlinearity. Table 5 highlights that there are robust asymmetries in NRR sensitivity to ECI's shifts. These findings persist in both the short-and long-run. These results support the need to accommodate asymmetry in the ways and patterns through which the extent of technological capabilities, manufacturing sophistication, and knowledge-based productivity, entrenched in South Africa's productive structure, could be utilised as potent strategies to deliver initiatives and innovations to mitigate the resource curse. ECI may promote or hinder high-intensity entrepreneurial inclinations and economic diversification that build non-resource capacity, sectors, and a knowledge economy, thereby metamorphosing into high-quality, sophisticated products for export. These findings challenge the popular assumptions of ECI's monotonic, symmetric, and linear roles in NRR in existing studies. It implies the restrictive nature of estimates from linear, symmetric analysis and questions the validity of policy recommendations.

Table 5: Asymmetry Analysis of the Impact of ECI on NRR in South Africa

		Wald diagnostic tests
Short-run test		66.715***
Long-run test		80.632***
*** denotes 1 percent level of significance		

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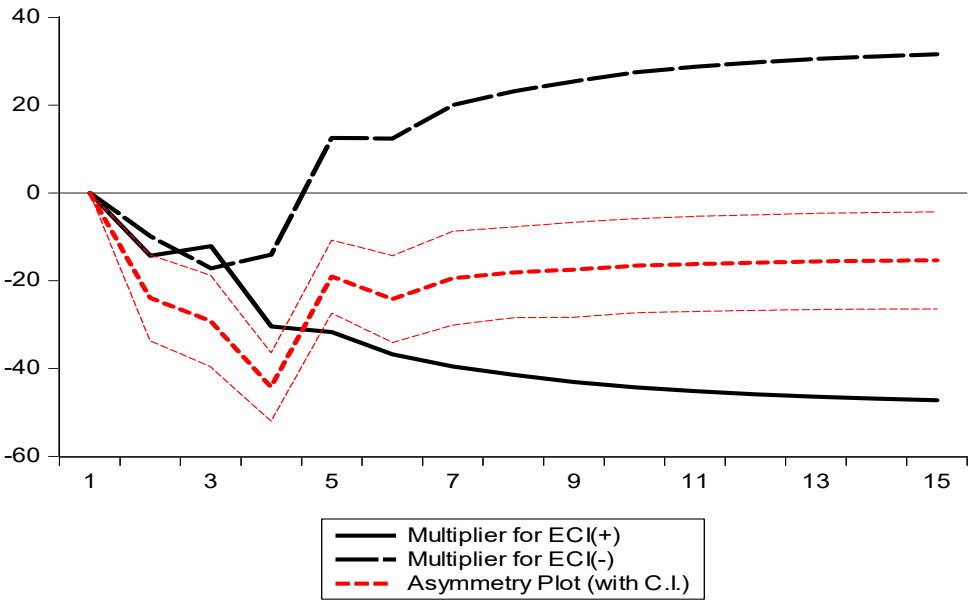


Figure 2: Dynamic multiplier graph for the nonlinear ARDL

Following the position of existing studies (Olaniyi et al. 2026), this study uses a nonlinear ARDL dynamic multiplier graph to validate the asymmetric structures in the sensitivity of NRR to changes in ECI. The graph indicates the asymmetric impact of ECI on NRR in the short-and long-run. The bold, broken red line lies within the 95% confidence interval and indicates the presence of asymmetric structures in how changes in ECI explain NRR in South Africa (Figure 3). These findings further explain that ECI upgrades (cumulative positive change components) and ECI deterioration (cumulative negative change components) have differential impacts on NRR in the long- and short-run. These findings validate our argument that asymmetries and nonlinearities matter in how economic complexity mitigates or aggravates the resource curse and dependence in resource-rich economies.

4.2.2 Examining short-and long-run asymmetric sensitivity of NRR to changes in ECI

Tables 6 and 7 present the error-correction version of nonlinear ARDL. While Table 6 contains short-run estimates, Table 7 provides the long-run estimates of the

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nonlinear error-correction variant of ARDL. To further validate the long-run relationship, the ARDL bounds test (see Table 4) indicates that the coefficient of the error-correction term (ECT) in Table 6 is negative and significant. Conventionally, it implies that there is evidence of a long-run relationship, suggesting that they will converge over the long run after experiencing distortions, disequilibria, and short-run divergences. The speed of adjustment to a stable equilibrium within a year is 61.3%. Consistent with the study's novelty and argument that ECI upgrades and deterioration tend to have differential impacts on natural resource rents, we proceed to interpret the estimates of the ECI components in Tables 6 and 7.

The sums (-0.247) of the coefficients of the combined effects of ECI upgrades (positive shock component, ECI^{+}) are significant and negative at 1% significant level in the short run. This finding also persists in the long run. These findings indicate that upgrading economic complexity (ECI) offers pathways to address the resource curse in South Africa. The implication is that improvements in ECI stimulate expansion in creative industries, knowledge intensity, manufacturing capabilities, and non-resource capacity building. This process further suggests that enhancing ECI-related initiatives spurs innovative products and businesses, entrepreneurial activities, patent markets, and technological advancement, thereby facilitating economic diversification that results in the development of non-resource-based innovative sectors and the manufacturing of a basket of diverse, high-tech, and competitive exports for international markets. These research outcomes are not surprising because South Africa, on average, has the most sophisticated knowledge-driven productive capacity in its production systems among African countries (see Figure 1). These findings align with the studies of Ul-Durar et al. (2023), Destek et al. (2023), Li et al. (2024), Kelly et al. (2024), and Ma et al. (2023), Canh et al. (2020). Meanwhile, it contradicts the findings of Olaniyi et al. (2026), which establish that ECI upgrades worsen the resource curse and heighten resource dependence in Saudi Arabia.

From a policy standpoint, these findings reveal that South Africa's government and stakeholders should prioritise consistent efforts and strategies to upgrade ECI. This policy suggestion is necessary because upgrading ECI can serve as an immediate and long-run solution to reverse macroeconomic problems, as evidenced by slower economic growth compared to other upper-middle-income nations with similar natural resource endowments, high unemployment rates, persistent poverty, significant income inequality, declining institutional quality, and deteriorating performance in the manufacturing and productive sectors. South Africa's

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improvements in ECI tend to increase knowledge-based productive capacity, enhance technical skills in manufacturing, create more job opportunities, and improve incomes, thereby reducing poverty and inequality in the South African economy. Thus, pursuing persistent ECI upgrading in South Africa sets the pace for mitigating the resource curse, offers pathways to lessen dependence on natural resources, and positions the country to generate an array of sophisticated, high-tech, and competitive products for export.

Conversely, the short-run coefficients of cumulative declines in ECI (ECI^{-}) is positive and significant at the 1% level, with a sum of 45.096. These findings highlight that the resource curse and dependence heighten following cumulative deteriorations in ECI. It is a clear signal that the resource curse deepens as the level of technological sophistication and knowledge intensity in South Africa's productive structure declines. It implies that persistent falls in the ECI performance indicator have immediate adverse effects of increasing the country's dependence on resource endowments and worsening the resource curse. This result points to the South African governments and stakeholders that they should devise actionable, strategic, and deliberate policy instruments to forestall unstructured declines in ECI. Hence, the country needs to maintain massive and persistent investment in ECI-related initiatives, such as research and development, innovation, sophisticated manufacturing capacity, entrepreneurial inclinations, human capital development, education, high-tech infrastructural facilities, and other programmes that can aid the development of creative and non-resource sectors and exports, as well as diversification of the economy. The long-run results appear different, as the coefficient of cumulative declines in ECI (ECI^{-}) are jointly and significantly negative. These long-run estimates have deep implications for leveraging ECI as a macroeconomic policy to reduce the burden of the resource curse in South Africa. Unlike short-run analysis, these findings reveal that structured, intentional reductions in ECI mitigate the resource curse and facilitate a decline in natural resource dependence. These aspects relate to the reduction in ECI-related initiatives and capacity-building that worsen the resource curse and push the country to rely on its NRE. South African governments and stakeholders need to make strategic moves to reduce knowledge intensity and technical capabilities that breed rent-seeking and cause the country to underperform in critical economic indicators and productive sectors, worse than in resource-scarce countries. This finding is critical and offers fresh insights: specific, strategic declines in ECI could address the resource curse and cause less reliance on NRE. The statistical properties and

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negative signs of the long-run estimates of ECI^{+} and ECI^{-} are to be treated and interpreted with caution. While ECI upgrades highlight the need to prevent declines in South Africa's knowledge-based productivity and technical skills in manufacturing, by maintaining strategic investment in initiatives to continue improving ECI and address the resource curse. This result affirms Olaniyi & $\Delta ECI^{+}(-1)$ Odhiambo's (2025c) findings that some aspects of ECI upgrades heighten resource dependence and worsen the resource curse in South Africa. A reduction in ECI in this regard tends to spur a decline in reliance on resources and mitigate the resource curse. On the other hand, it is important to emphasise the need to reduce ECI-related initiatives that aggravate the resource curse and heighten the intensity of increasing resource dependence. Hence, long-run leveraging of ECI changes to mitigate the resource curse has multidimensional angles that appear contradictory but should be addressed with caution. Having interpreted the effects of the main variable on NRR in South Africa, this study shifts attention to the control variables.

Table 6: Short-run estimates of nonlinear ARDL(3, 2, 3, 3, 3, 3, 3)

Dependent Variable: NRR (Natural resource rents)

Variable	Coefficient	Standard Error	t-Statistic	Prob.
ΔNRR(-1)	-0.391**	0.138	-2.824	0.020
ΔNRR(-2)	-0.118	0.076	-1.551	0.155
ΔECI^{+}	-14.292***	3.180	-4.494	0.002
$\Delta ECI^{+}(-1)$	14.045**	4.461	3.149	0.012
ΔECI^{-}	9.773**	3.787	2.581	0.030
$\Delta ECI^{-}(-1)$	5.678	3.605	1.575	0.150
$\Delta ECI^{-}(-2)$	29.645***	3.474	8.533	0.000
ΔFD	-7.631	8.148	-0.937	0.373
ΔFD(-1)	57.887***	9.281	6.237	0.000
ΔFD(-2)	-10.586*	5.076	-2.086	0.067

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ΔLRGDPP	9.683*	4.527	2.139	0.061
ΔLRGDPP(-1)	-1.153	9.422	-0.122	0.905
ΔLRGDPP(-2)	30.970***	6.144	5.041	0.001
ΔFDI	0.438***	0.068	6.445	0.000
ΔFDI(-1)	0.627***	0.106	5.935	0.000
ΔFDI(-2)	-1.498***	0.133	-11.223	0.000
ΔCC	0.471*	0.227	2.075	0.068
ΔCC(-1)	-0.640	0.386	-1.657	0.132
ΔCC(-2)	1.579***	0.297	5.309	0.001
ECT(-1)	-0.613***	0.175	-3.504	0.007
*, **, and *** denote 10%, 5%, and 1% levels of significance, respectively				

Table 7: Long-run estimates of nonlinear ARDL

Dependent Variable: NRR (Natural resource rents)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ECI^{+}	-43.092**	14.373	-2.998	0.015
ECI^{-}	-29.499**	11.429	-2.581	0.030
FD	11.180	13.167	0.849	0.418
LRGDPP	-1.709	9.468	-0.180	0.861
FDI	2.428***	0.374	6.487	0.000
CC	0.148	0.437	0.340	0.742
C	20.823	78.935	0.264	0.798
** and *** denote 5% and 1% levels of significance, respectively				

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The short-run coefficients of financial development (FD) are jointly significant and positive, with a sum of 39.670 at the 1% level. These results imply that South Africa's financial sector development deepens the extent of resource dependence and compounds the resource curse syndrome. It indicates that financial markets and institutions in the country have been channelling credit facilities and technical support to initiatives that frustrate the country's developmental agenda and cause it to underperform on economic fundamentals and indicators. These findings may indicate that South Africa's financial systems' support for creative and innovative sectors has been significant in spurring economic diversification. It rather promotes resource-based initiatives at the expense of channelling financial resources into knowledge intensity, technological sophistication, and advanced manufacturing and capacity building in the non-resource sector and in exports. South Africa's financial system favours the natural resource sector and promotes resource dependence. Financial markets and institutions' technical support for initiatives such as innovative products and businesses, entrepreneurial ingenuity, patent markets, sophisticated manufacturing capabilities, and non-resource capacity building are inefficient for promoting structural change and transformation that could reduce the country's overdependence on NRE and address the resource curse.

Meanwhile, financial development becomes insignificant in the long run. It suggests that the country's financial sector lacks long-term policies and prospects to address the resource curse and lessen overdependence on NRE. Thus, there is a need to refocus South Africa's financial systems to put the country on a path to provide insights to reduce overreliance on NRE and address the resource curse. Our findings support the studies of Olaniyi et al. (2026) and Adabor (2023), while they are incongruent with the research outcomes of Olaniyi & Odhiambo (2025a), establishing the crucial roles of financial development in curbing the menace of resource curse and offering technical support and financing initiatives that diversify the economy and reduce natural resource dependence. Similarly, the combined short-run coefficients of real income are positive and significant. It implies that the resource curse and dependence aggravate as real income increases. This result may suggest that more income is devoted to financing primitive and crude technologies and unsophisticated innovations. This process may lead to neglect of creative and innovative sectors and industries, thereby hindering economic diversification and the expansion of the non-resource export sector. It also indicates that South Africans and stakeholders have strong tastes and preferences for goods and services that depend mainly on NRE, thereby deepening evidence of the resource curse. Our findings align with studies' outcomes of Olaniyi et al. (2026), Olaniyi &

Odhiambo (2025a), Canh et al. (2020), while it stands incongruent with the findings of Li et al (2024) and Destek et al. (2023), which affirm that real incomes are channeled to initiatives that spur economic diversification and export expansion, and thereby mitigate resource curse and reduce overreliance on natural resources. The long-run coefficient on real income is insignificant, indicating that income is not an important determinant of natural resource rents and, by implication, the resource curse and dependence.

Foreign direct investment (FDI) coefficients in the short run are collectively negative and significant, with a sum of -0.433. These combined effects reveal that there are associated benefits that come with FDI inflows to South Africa, such as positive externalities, technology transfers, modern managerial skills, and other accrued advantages, which yield immediate effects to promote non-resource sectors and industries, enabling better and more sophisticated manufacturing capabilities, thereby spurring diversification of the economy. Hence, FDI inflows immediately enhance the economy's productive capacity and offer new initiatives and incentives, mitigating the resource curse and lessening overreliance on natural resources to run the economy efficiently. However, these short-run benefits of FDI inflows are temporary, as the long-run findings indicate that FDI inflows deepen reliance on NRE and exacerbate the resource curse. The potential of FDI inflows to catalyse the mitigation of the curse associated with resource endowments and the reduction of resource dependence peter out over the long run. The non-persistence of FDI inflows' benefits over the long run underscores that the government and stakeholders in the country should not view FDI as a reliable long-term economic tool to address the resource curse. It shows that a predetermined objective drives most FDI inflows into South Africa: first allowing the recipient country to reap the benefits before eventually revealing their selfish mission of gaining at the expense of the domestic economy's non-resource capacity-building. The South African government must be pragmatic in designing institutional structures and incentives to create an enabling environment that attracts the right FDI inflows, with a focus on reaping long-term benefits that translate into the development of creative and innovative industries, capacity building in the non-resource sector, and exports. These research outcomes align with the studies of Olaniyi et al. (2026), Olaniyi & Odhiambo (2025a), Sun & Hasi (2024), Destek et al. (2023), and Canh et al. (2020).

The corruption control (a measure of institutional quality) coefficients are positive, collectively significant, with a sum of 1.410. These research outcomes indicate that corruption control strategies and mechanisms in South Africa worsen

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the resource curse and deepen the country's reliance on NRE. The results are not entirely surprising because South Africa's anti-corruption efforts have been declining over the years. It was a flawless 6 out of 6 in 1984, but it has since declined to 2.80 in 2023. These findings may be a pointer to stakeholders and the government in South Africa that there are inherent sharp practices and ineffectiveness in natural resource management that promote rent-seeking and opportunistic tendencies, thereby aggravating the resource curse. These processes may have impeded efficient coordination of policies and strategic moves to mitigate resource curse phenomena and cripple the initiatives to diversify the economy to allow expansion of knowledge intensity, sophisticated manufacturing, creative sector, and non-resource industries for generating a chain of globally competitive and high-tech products for exports. The coefficient of corruption control loses its significance in the long run. This finding may imply that corruption control strategies and tactics do not have the potency to orchestrate a long-term perspective of diminishing the resource curse and dependence. Hence, the authorities and stakeholders need to examine the processes and redesign institutional structures to implement effective anti-corruption measures to tame racketeering, opportunism, rent-seeking, and other sharp practices in the administration of resource rents, and to examine how they impede other economic performance indicators.

4.2.3 Diagnostic tests for the error-correction version of nonlinear ARDL

This subsection examines the validity and reliability of the estimates, the discussion of the research outcomes, and the policy suggestions emanating from Tables 6 and 7, following the procedural steps in existing studies (Olaniyi et al., 2026; Ntembe *et al.,* 2018). Table 8 presents the results of the four conventional diagnostic tests. The Jarque-Bera statistic frees the analysis from the assumption of normality of the error terms, while the Ramsey RESET test also highlights the absence of specification error. The other two tests confirm that our estimates are not affected by serial correlation or heteroskedasticity. Hence, all the tests validate that our findings are robust, reliable, and dependable.

Furthermore, we follow the work of Bahmani-Oskooee and Ng (2002) to examine the stability of the study's parameters using CUSUM (cumulative sum) and CUSUMSQ (cumulative sum of squares). These two tests assess the stability of the mean and variance of the error terms, respectively. The stability lines stay within the 95% critical boundary lines in both CUSUM and CUSUMSQ (see

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Figure 4). Hence, we confirm the stability of our estimates and that the instability issue does not affect the analysis.

Table 8: Diagnostic tests of the nonlinear ARDL estimates		
	t-Statistics	P-value
Ramsey RESET test	1.337	(0.218)
Jarque-Bera - Normality test	1.635	(0.442)
Breusch-Godfrey Serial Correlation LM Test	3.367	(0.195)
Heteroskedasticity Test: Breusch-Pagan-Godfrey	0.541	(0.894)
Probability values are in ()		

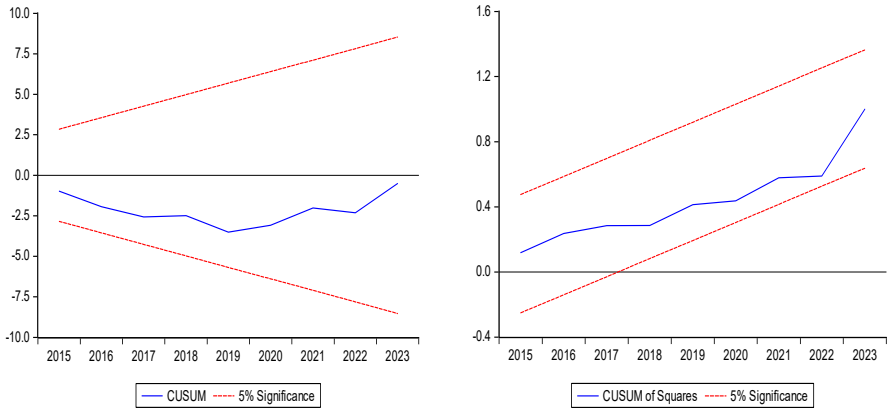


Figure 4: CUSUM and CUSUMSQ for Stability of Nonlinear ARDL (3 2 3 3 3 3 3)

5. Summary, conclusion, policy suggestions, and limitations of the study

This study adds fresh insights to existing research by providing one of the earliest examinations of how asymmetries and nonlinearities influence NRR's responsiveness to ECI changes, using the case of South Africa, which grapples with evidence of the resource curse, for the period 1984-2023. This study adopts an error-correction variant of nonlinear ARDL to account for both short- and long-run dynamics in the asymmetric sensitivity.

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Unlike impractical and cosmetic symmetry assumptions in existing research, the findings reveal significant asymmetries in NRR's responsiveness to shifts in ECI in South Africa. We establish the differential impacts of positive changes, distinct from the negative shock components, on the resource curse in South Africa. In short- and long-run periods, the study finds that ECI upgrades (cumulative positive shock components in ECI) mitigate the resource curse by spurring an expansion in creative and innovative sectors and industries, engineering sophisticated manufacturing capabilities, expanding entrepreneurial inclinations, and thereby resulting in diversifying the economic base and spurring development of non-resource capacity building strategies and sectors. On the contrary, cumulative deterioration in ECI deepens resource dependence and intensifies the severity of the resource curse in the short run. It implies that declines in ECI are associated with immediate reductions in knowledge-driven productivity, technological intensity, and manufacturing sophistication. ECI declines impede the development of export sectors that do not rely on NRE and disincentivise economic diversification. However, the long-run cumulative deterioration in ECI mitigates the resource curse and offers innovative initiatives to lessen reliance on NRE. These findings reveal that the government and stakeholders should devise long-term, strategic, and deliberate reductions in ECI-related initiatives that rely heavily on natural resource-based sectors and industries. This move tends to refocus the economy on the pathway to address the resource curse by forestalling and curbing manipulative tendencies, rent-seeking, and opportunistic behaviour associated with overreliance on resource endowments.

This study's findings offer insights and policy suggestions for society and practices on leveraging and optimising ECI as a solution to the resource curse, diversifying the economy, and reducing overreliance on NRE. The highlights are as follows: One, South Africa's government and stakeholders should devise consistent strategies and actionable policies aimed at upgrading ECI by making massive investments in ECI-related initiatives – creative and innovative industries, knowledge-based productivity, research and development, patent markets, technology and innovation, innovative products and businesses, entrepreneurial development, human capital development, high-powered and tech infrastructural facilities, and other initiatives - which are essential to spur expansion of non-resource capacity building and sectors and economic diversification. Two, policymakers and the government in South Africa should put in place measures and executable mechanisms to prevent unstructured declines in ECI. There should be consistent and serious moves in line with policy suggestion one. There should be

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actionable structures to monitor the country's performance in ECI, and a target threshold for ECI that South Africa must maintain to sustain the momentum of leveraging ECI as a potent solution to reduce the country's reliance on NRE and address the resource curse. Third, the country should refocus its long-term ECI upgrades from natural resource endowment-driven initiatives to non-resource capacity building and sectors as long-term strategies to reduce resource reliance in South Africa and address the resource curse. This policy suggestion hinges on the fact that ECI deterioration mitigates the resource curse in the long run. Hence, a structured reduction in ECI-related initiatives that mitigate the resource curse and make the country less reliant on NRE should be a consistent long-term developmental agenda. Fourth, there should be stronger, more robust institutional architectures structured to provide incentives and allocate more resources to facilitate the development of knowledge-based innovation, technical skills, and sophisticated manufacturing capabilities in non-resource sectors and industries, producing a basket of high-quality products with a high intensity of competitiveness to penetrate global markets. Fifth, the research findings highlight that analysing the sensitivity of the resource curse to changes in economic complexity in resource-rich countries without accounting for asymmetric and nonlinear features may yield suboptimal results. Hence, real-world, consistent, asymmetric, and nonlinear policy analyses are critical for explaining how resource-rich and dependent economies leverage economic complexity to mitigate the resource curse syndrome. Sixth, resource-rich and -dependent economies, especially developing and emerging ones, should prioritise ECI upgrades as a vital macroeconomic solution to mitigate the resource curse and diversify their productive base into non-resource manufacturing and capacity-building that reduces dependency on natural resource endowments.

Aside from its distinctiveness within the existing knowledge base, the study also encounters some constraints. The highlights include: one, this study uses South Africa's annual dataset. Hence, this sample may not explicitly capture the peculiar asymmetric characteristics in NRR's responsiveness to changes in ECI across the panel dataset of African countries. Other scholars should consider panel analysis of African countries, accounting for asymmetries, heterogeneity, distributional effects, and cross-sectional dependence, which remain underexplored in existing research. Two, our thorough review of existing studies reveals that institutional quality may moderate how NRR responds to each of the ECI change components (ECI upgrades (positive shock) and ECI deterioration (negative shock)). This aspect will add a fresh aura to the theoretical and empirical literature.

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Future research should consider exploring this innovative aspect. Three, this study finds that results may vary across different income classifications. Hence, subsequent research efforts should categorise countries into different income classifications to add fresh insights and augment understanding of NRR's responses to ECI's shifts. These limitations do not diminish the importance and policy relevance of this study; they show and maintain research objectivity and increase the universal acceptance and validation of our innovative initiatives.

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LEVERAGE AND FINANCIAL PERFORMANCE IN THE MINING SECTOR

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Abstract

This study examines the effect leverage on the financial performance of listed mining firms in South Africa. Returns on Assets (ROA) and Tobin's Q are employed to proxy firm financial performance while financial leverage was used as explanatory variable. Control variables are asset tangibility, firm growth, and firm size. The research uses the Generalised Method of Moments (GMM) estimator to analyse data gathered over the study period 2012-2024. The results reveal that leverage has a positive and significant influence on ROA, indicating that debt financing enhances operational efficiency. However, leverage shows a negative and insignificant relationship with Tobin's Q, which means that while leverage improves internal profitability, it does not translate into higher market valuation. Asset tangibility has a positive influence on ROA but a negative effect on Tobin's Q whereas firm growth has a positive effect on Tobin's Q and a negative influence on ROA. The size of the firm observed to boost ROA but reduce Tobin's Q. The paper concludes that leverage has significant influence on financial performance of mining firms. Hence, mining firms should engage in the optimal capital structure that will be able to balance the advantages and expenses of debt financing.

Keywords: *asset tangibility, financial performance, generalised method of moments, leverage, mining sector*

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***JEL Classification**:* G32; L72; C23

1. Introduction

The mining industry is a key sector in the global economy, and it provides the raw materials necessary in industrial production, infrastructure development, and the development of technologies. Despite its economic significance, the industry is inherently capital-intensive, requiring substantial upfront investment in exploration, extraction, and processing activities (Bronzo et al., 2024). This leads to mining companies frequently having to depend on external capital and especially debt to finance their operations and expansion plans (VanWyk & Enslin, 2025). Moreover, a critical decision variable in the mining industry is the use of debt as the capital structure in a firm, which is known as financial leverage. Although leverage has the potential to improve the work of a firm by offering tax benefits and allowing firms to make lucrative investments, it also amplifies financial risk, especially in an industry with unpredictable commodity prices and unpredictable market situations (Mai et al., 2024; Oleksy et al., 2025). The interaction between leverage and firm performance is complicated and situation-specific due to these peculiarities of the industry. Although the mining industry is a strategic sector, companies in the industry have continued to struggle in their choices of financing and performance goals. Debt financing increases financial risk for the mining companies, particularly in times of commodity price decline, cost overruns, or disruptions in the operation of the business (Blach et al., 2025; Jain & Banerjee, 2025). Such a situation is likely to diminish profitability and jeopardise the survival of firms due to excessive leverage. Besides, in resource-based industries, especially mining, leverage and performance are more complex due to the characteristics of the sector (Kanyepe, 2023; Liu et al., 2025). Mining companies are usually characterised by high asset tangibility and high capital investments, which can sustain an increased ability to borrow. Nevertheless, they also face the risk of commodity price fluctuations, geopolitical risks, and environmental uncertainties, which may increase the risks of high leverage (Liu et al., 2023; Mtotywa & Dube, 2023; Sandberg et al., 2023; Chabchoub et al., 2026). Simultaneously, underutilisation of leverage can restrict exploitation of investment opportunities, hence limiting growth and competitiveness. Thus the financial leverage presents a prima facie issue to mining companies, which is to find optimal level that will lead to the highest performance with the least financial risk.

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Though some studies (Stryekova, 2023; Hrynyuk et al., 2023; Hendaya et al., 2024; Liu et al. 2025) have investigated the effect of leverage on firm performance. However, empirical results are inconclusive, especially in the mining industry, where industry-specific risks and capital requirements are highly varied from other industries. Some articles indicate a positive correlation and the disciplining properties of debt, whereas other ones point at the negative implications of high leverage on profitability and financial stability. Much of this research has, however, been in the manufacturing and service sectors, with little emphasis being put on extractive industries like mining. Moreover, the degrees to which the firm characteristics (size, asset structure, and growth opportunities) have an impact on this relationship require further study. This empirical gap is a challenge to corporate managers, investors, and policymakers with regard to making informed financial decisions. In the absence of objective data regarding the impact of financial leverage on firm performance in the mining sector, companies can choose to implement an inefficient capital structure, which can deter value creation in the long run. It is against this background that this research paper examines the influence of financial leverage on performance of mining listed firms. The research is aimed at offering more precise information on the effect of capital structure decisions on corporate performance by targeting an industry with specific operational and financial peculiarities. Since the mining industry is vulnerable to commodity price changes and substantial investments in capital, the research provides subtle evidence on the role of debt financing in determining financial results. This study contributes to the existing literature by focusing specifically on the mining sector, which remains underexplored relative to other industries, and by providing policy-relevant implications for corporate managers, investors, and regulators. The study reveals the significant of balancing financing decisions with operational realities in order to achieve sustainable performance in volatile market environments.

2. Literature Review

2.1 Theoretical Review

The relationship between leverage and financial performance has had extensive study in the literature of corporate finance, with various theoretical models offering conflicting explanations. The most notable ones are considered in this study.

Trade-off Theory: The Trade-off Theory of capital structure is a theory that describes the determination of the optimal amounts of debt by firms based on the benefits and costs of borrowing. The theory assumes that trade-offs between the tax

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benefits of debt financing and the cost of financial distress and bankruptcy by the firm (Krynytsia et al., 2024; Hutsaliuk et al. (2024). This theory suggests that debt financing offers a tax shelter, as the interest paid can be deducted, hence adding to the value of the firm. Nonetheless, overdependence on debt exposes a company to the risk of financial distress, agency costs, and insolvency. Consequently, companies are striving to attain an optimal capital structure in which the marginal benefit of debt is equal to the marginal cost of debt (Moyoweshumba & Seitshiro, 2025). Beyond the optimal level of leverage, the benefits could be neutralised by the financial risks and costs incurred, hence lowering returns to shareholders. Therefore, the trade-off theory is a theory that offers a paradigm of the dual effect of leverage wherein firms are required to strike a balance between the benefits of debt and financial risk.

Pecking Order Theory: This theory states that firms pursue a hierarchical sequence of financing because of the information asymmetry between managers and external investors. This is because their preference is given to internal funds due to the fact that they do not involve disclosure of any private information or issuance fees Grajales & Albanés Uribe, 2024). Debt is used when internal resources are inadequate, and debt is less prone to information asymmetry as compared to equity. The issuance of equity is also usually avoided due to the fact that it might indicate that the company is overvalued, and the share price will decrease (Wahyuningrum et al., 2024). The mining companies can use their own resources to better their shareholder value, with debt being utilised only when there is necessity (Coelho et al., 2023; Le, 2024). The theory is also useful in explaining the ambivalent effects of leverage by indicating that companies do not aim at a given optimal capital structure but rather change their financing policies in response to their internal capabilities.

2.2. Empirical Review and Hypotheses Development

Empirical evidence on leverage and financial performances has been carried out in developed and developing countries. For instance, a recent study by Shkvarchuk et al., (2026) assesses how industry-specific factors affect the capital structure of firms in Ukraine. The study reveals that the most influential determinants are the volume of assets and the volume of liabilities. In this way in the agriculture sector and the mining industry, big companies tend to resort less frequently to borrowing and more often to their own sources. Similarly, Mahmood et al. (2025) examined the connections between short-term borrowings and the profitability in six Chinese firm sectors. The results prove that there is an upturned U-shaped relationship

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between working capital finance and earnings, with the exception of textile, which is very sensitive to leverage level. Moreover, Mnyaka-Rulwa and Akande (2025) in their study concluded that as the moderating effects of leverage are taken into consideration, companies are able to enhance their performance, as well as reduce the pay disparity. Also, Köycü and Nur (2025) assess the moderating role of the use of leverage in the relationship between agency cost and firm financial performance. The study observed that leverage have a positive influence on Tobin's Q and ROA. Moreover, Dsouza et al. (2025) revealed that moderate level of debt boost profitability while extreme leverage leads to decrease in earnings.

Similarly, Sani et al. (2024) reveal a negative and strong relationship between debt and total assets. Equally, Hendayana et al. (2024) identified the effects of profitability, leverage and intensity of capital on tax avoidance and how firm size is one of the moderators. The results indicate that profitability and leverage has significant effect on tax avoidance. In addition, Aboagye-Otchere and Boateng (2023) observed positive relationship between total debt funding and Tobin's Q in a study conducted among selected firms in Ghana. Moreover, Stryckova (2023) examined the corporate financing practice in the Czech Republic family businesses and compare it with population information of all active companies. Hypothesis of empirical findings entails family businesses being leveraged more than non-family firms and vice versa. Meanwhile, there is a slightly positive effect of family influence on Tobin's Q and ROAs. Thus, after conducting a review of past research in both developed and developing economies, the authors have noted that little has been done to determine the relationship between financial leverage and firm performance in the mining industries particularly in South Africa as well as Africa at large where political instability prevails. Hence, the study hypotheses are as follows.

H_{01}: Financial leverage has no significant influence on return on assets

H_{02}: Financial leverage has no significant influence on Tobin's Q

3. Methodology

This study adopts a quantitative research design using Generalised Method of Moments (GMM) to examine the effect of study variables among selected mining companies in South Africa. The population comprises 31 listed mining companies operating in South Africa. The sample consists of 23 selected mining firms listed on Johannesburg Stock Exchange based on availability of consistent financial data needed for the study.

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Study models

$ROAit=\beta_0+\beta_1LEVit+\beta_2ATANGit+\beta_3FGit+\beta_4FSit+\epsilon it$ (i)

$Tobin's\ Qit=\beta_0+\beta_1LEVit+\beta_2ATANGit+\beta_3FGit+\beta_4FSit+\epsilon it$ (ii)

Table 1: Measurement of variables

Variables	**Acronym**	**Measurements**	**Sources**
Dependent			
Return on assets	ROA	Net income/ average total assets	Allen et al. (2025).
Tobin's Q	Tobin's Q	Share price × Share outstanding + Total liabilities/ Total Assets	Shittu and Oladipo (2025)
Independent			
Leverage	LEV	Total debt to total assets ratio	Shittu and Onifade (2023)
Control			
Assets tangibility	ATANG	fixed assets/total assets	Onaolapo and Shittu (2022)
Firm growth	FG	Log of total assets	Ghadiridehkordi et al. (2025)
Firm size	FS	Natural log of total revenue	Shittu and Amao (2022)
β_0	represent Regression Intercept		
ϵit	represent Error term		

Source: Authors' compilation 2026

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4. Results

4.1 Descriptive Statistics

Table 2: Descriptive Statistics

Variable	ROA	TOBIN'sQ	LEV	ATANG	FG	FS
Mean	-.9254	1.2364	.5031	.4692	.6690	.3099
SD.	8.4853	1.7106	1.1772	.9650	.9073	.4477
Minimum	-113.5797	-9.7042	.0111	0.0000	0.0000	6.90e-07
Maximum	.5332	10.4919	14.7074	16.1438	10.7866	1.8015
Median	.0073	.8714	.3851	.4431	.542246	.0568
Observation	299	299	299	299	299	299

Source: Authors' Computations (2026)

The results show that ROA has a negative mean value (-0.9254), suggesting that, on average, firms in the mining sector experienced low or negative asset profitability in the period that has been used to conduct the study. The high Standard Deviation (SD) (8.4853) and extreme minimum (-113.58) values indicate substantial variability and the presence of outliers. In contrast, Tobin's Q recorded a positive mean (1.2364), implying that shareholders earned returns despite poor asset performance. However, the relatively high standard deviation (SD = 1.7106) suggests volatility in equity returns. LEV shows an average of 0.5031, indicating moderate reliance on debt financing, although the wide range and the maximum value (14.71) suggest that some firms are highly leveraged. ATANG has a mean of 0.4692, reflecting the capital-intensive nature of the mining sector, where firms rely heavily on physical assets. FG and FS exhibit moderate averages with noticeable dispersion, indicating heterogeneity among firms. Overall, the statistics reveal high variability and non-uniform performance across firms, justifying the need for robust estimation techniques.

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4.2. Normality Test Results

Table 3: Normality Test Results (Sktest and Shapiro-Wilk)

Variable	Pr(Skewness)	Pr(Kuritosis)	Adj Chi2(2)	Prob>Chi2	W(SW Test)	Prob>z
ROA	0.0000	0.0000	0.00	0.0000	0.09948	0.00000
TOBIN's Q	0.0000	0.0000	72.09	0.0000	0.76758	0.00000
LEV	0.0000	0.0000	0.00	0.0000	0.17322	0.00000
ATANG	0.0000	0.0000	0.00	0.0000	0.21117	0.00000
FG	0.0000	0.0000	0.00	0.0000	0.57798	0.00000
FS	0.0000	0.0007	60.72	0.0000	0.72943	0.00000

Source: Authors' Computations (2026)

The normality tests (Skewness/Kurtosis and Shapiro-Wilk) show that all variables are not normally distributed, as evidenced by probability values less than 0.05. The non-normality can be explained by the existence of outliers, skewness, and the characteristics of the financial data in the mining industry. As indicated in Table 3, both Sktest and Shapiro-Wilk tests strongly reject normality for all variables: All variables have p-values = 0.0000, meaning they are not normally distributed. The Shapiro-Wilk W statistics are far from 1, confirming deviations from normality. The data is not normal, which is probably caused by skewness and outliers. This justifies the GMM over OLS since GMM can withstand non-normality.

4.3. Correlation Matrix

Table 4: Correlation Matrix

Variable	ROA	TOBIN'sQ	FL	ATANG	FG	FS	VIF
ROA	1						
TOBIN'sQ	0.0887	1					
LEV	-0.0239	-0.0149	1				2.15
ATANG	0.0477	-0.0262	0.6434	1			1.77
FG	-0.0102	0.2923	0.5015	0.6211	1		1.04
FS	0.0831	0.2758	-0.0337	0.0076	0.148	1	1.74

Source: Authors' Computations (2026)

The outcome of relationships between study variables is presented in Table 4. For instance, LEV and Tobin's Q (-0.0239): very weak negative relationship, LEV

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and Tobin's Q (-0.0149): also weak negative relationship which suggests leverage may not strongly influence performance at the bivariate level. Also, FG and Tobin's Q (0.2923) and FS and Tobin's Q (0.2758): moderate positive relationships which indicate growth and size may improve shareholder returns. Moreover, ATANG and LEV (0.6434) and FG and ATANG (0.6211): strong positive correlations implies that firms with more tangible assets tend to borrow more and grow more. Also, FG and FS show moderate positive relationships with Tobin's Q, indicating that expanding and larger firms tend to generate higher returns for shareholders. In addition, Multicollinearity check, all VIF values are within (1.04 to 2.15), all are below the threshold of 10, which means that the variables did not have multicollinearity and are suitable to be used in regression analysis.

4.4. Effect of Leverage on Financial Performance

Table 5: Generalised Method of Moments Estimator Results (Two steps)

Variables and other statistics	ROA Model	TOBIN's Q Model
ROA_{t-1}	**99.50**** (0.0000)	
TOBIN's Q_{t-1}		**11.88**** (0.0000)
LEV	**143.80**** (0.0000)	-1.18 (0.238)
ATANG	**57.26**** (0.000)	**-16.65**** (0.000)
FG	**-32.32**** (0.0000)	**5.97**** (0.0000)
FS	**18.19**** (0.0000)	**-14.34**** (0.0000)
Constant	**-234.08**** (0.0000)	**21.72**** (0.0000)
Wald chi2 Statistic p-value	147450.01** (0.0000)	1518.00** (0.0000)
Sargan Test p-value	18.20076 (1.0000)	21.0149 (1.0000)
First Order autocorrelation test p-value	-.99859 (0.3180)	-1.168 (0.2428)
Second Order autocorrelation test p-value	-1.0009 (0.3169)	1.1678 (0.2429)
Firms	23	23
Observations	276	276

Source: Authors' Computations (2026), Note: ** p< 0.05, while () t-statistics in parentheses

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According to the results of two-step system GMM estimator obtained as shown in Table 5, the study reveal that, the lagged dependent variables (ROA_{t-1} and Tobin's Q_{t-1}) coefficient is positive and significant ($\beta=99.50$, $p < 0.05$; $\beta=11.88$, $p < 0.05$) show strong persistence in firm performance, suggesting that past profitability and market valuation significantly influence current performance. Moreover, financial leverage ($\beta=143.83$, $p < 0.05$) shows positive and significant effect on ROA which suggest that higher leverage improves asset returns. ATANG show positive ($\beta=57.26$, $p < 0.05$) on ROA which means it enhance performance. FG ($\beta=-32.32$, $p < 0.05$) negatively affects ROA possibly due to expansion costs or inefficiencies. FS ($\beta=18.19$, $p < 0.05$) positively influence ROA, which implies that, larger firms perform better in terms of assets. With regards to Tobin's Q, financial leverage ($\beta=-1.18$, $p > 0.05$) shows negative insignificant effect on Tobin's Q which implies that FL does not improve shareholder returns. Also, ATANG ($\beta=-16.65$, $p < 0.05$) shows negative effect on Tobin's Q which implies heavy asset structures may reduce equity returns. Moreover, FG ($\beta=5.97$, $p < 0.05$) reveal positive and significant on Tobin's Q which implies FG improves shareholder returns. However, FS ($\beta=-14.34$, $p < 0.05$) shows negative and significant on Tobin's Q which suggest that larger firms reduce Tobin's Q. The diagnostic results confirm the robustness of the models. The Wald test ($p = 0.0000$), indicates that the models are jointly significant. The Sargan test ($p = 1.0000$) confirms the validity of the instruments used in the GMM estimation. The absence of first- and second-order autocorrelation tests (AR1 & AR2 insignificant) implies no serial correlation problem which suggests that the models are properly specified. These results validate the reliability of the findings.

4.5. Discussion of Results

The GMM outcome of both models depicts that lagged ROA and Tobin's Q is positive and significant, which implies that there is persistence in performance of the firm in the long run. This outcome aligns with recent studies such as (Agyemang & Ansong, 2021) who reveal dynamic adjustment behaviour in firm performance, mostly in capital-intensive industries. The positive and statistically significant impact of financial leverage on ROA indicates that the greater the debt financing, the more the asset utilisation and operation efficiency in the mining industry. This is in support of the trade-off theory, where the tax shield benefits of debt outweigh financial distress costs. However, leverage, on the other hand negatively but insignificantly affects Tobin's Q, which means that while leverage

improves internal profitability, it does not translate into higher market valuation. Investors may perceive high debt levels as risky, especially in a volatile sector like mining. These mixed findings of leverage on financial performance are consistent with recent literature. For instance, Dsouza et al. (2025) reveal that excessive leverage reduces investor confidence in emerging markets. The level of asset tangibility also has a positive and substantial effect on ROA, which suggests that companies with more tangible assets do better based on their capabilities of facilitating production and obtaining financing. Though, tangibility of assets influences Tobin's Q negatively and significantly, and thus, markets may discount firms with heavy non-current assets, probably due to lower flexibility and higher maintenance costs. This result aligns with the work of (Sibanda & Holden, 2022), who reveal similar contrasting effects in resource-based industries. Moreover, the impact of firm growth on ROA is negative and significant but positive and significant on Tobin's Q. This implies that fast growth can decrease efficiency, which might be the result of higher operational costs or inefficiency in the investments. However, it increases market valuation as investors anticipate future earnings. Moreover, the size of the firm is positively and significantly related to ROA, implying that larger firms enjoy economies of scale and higher resource exploitation. The results is conform with the work of (Dsouza et al., 2025) On the other hand, firm size impacts negatively and significantly on Tobin's Q, indicating that, bigger firms may suffer from inefficiencies which lower market value. These results align with (Boateng et al., 2021), who documented diminishing marginal returns to size in emerging markets.

5. Conclusion

This study gives the empirical results of the research on leverage and financial performance. The study shows that leverage has a dual influence on financial performance in the South African mining sector. While it significantly improves ROA (accounting-based measurement), it does not significantly enhance Tobin's Q (market-based valuation). The study concludes that financial leverage has positive and significant effect on ROA. However, it reveals negative insignificant influence on Tobin's Q. Hence, both trade-off theory and pecking order theory are valid since the results indicate a dual role of leverage in the performance of firms. Moreover, asset tangibility has positive and significant effect on ROA while shows negative and significant effect on Tobin's Q. However, firm growth has negative and significant effect on ROA while reveals positive and significant effect on Tobin's Q. In addition, firm size shows positive and significant effect on ROA

while reveals negative and significant effect on Tobin's Q. This paper justifies the moderate financing strategy, in which mining firms should exercise a trade-off between the benefits and risks of the debt with a lot of care.

6. Recommendations

Based on the study results, the following recommendations are suggested:

1. Optimal use of leverage: Mining companies must have an ideal capital structure, which means leverage must be used in a wise manner to maximise the productivity of assets but not to an extent of excessive financial risk.
2. Efficient asset management: Firms ought to make sure that the investments in physical assets are well utilised to prevent diminishing returns to the shareholders.
3. Growth management: The management should consider the growth strategies that are sustainable and the growth should not affect the efficiency of the operations.
4. Size efficiency: Big companies ought to adopt effective management and governance systems to reduce inefficiencies relating to size.
5. Financial policy formulation: The policymakers and regulators ought to offer frameworks that would promote responsible borrowing and financial discipline within the mining sector.
6. Companies should adopt optimal leverage ratios for profitability and investor perceptions.
7. Managers should enhance investor relations to reduce the negative effects of debt.
8. Governments should encourage financial stability measures to lower risk perceptions.

7. Contribution to Knowledge

This research adds to the existing body of work by offering an empirical data base on the mining industry which is still under research relative to manufacturing and banking industries. It also shows the dual effect of leverage on various performance indicators (ROA vs Tobins'Q). Moreover, it endorses the application of GMM estimation to manage the problems of endogeneity and dynamic panel data.

8. Study Limitation and Future Research Suggestion.

The study is limited to 23 firms, which may restrict generalisability. The future research may consider more sectors to compare performance and apply more firm

performance indicators apart from financial performance. Moreover, they ought to examine the non-linear impacts of leverage and examine the influence of macroeconomic variables.

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SUB-NATIONAL DEBTS AND ECONOMIC DEVELOPMENT

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Abstract: *This study evaluated the effect of subnational debts on the economic development of Nigeria's six North-Eastern states, measured by the extent to which these states debts have impacted on the levels of poverty and unemployment between 2012 to 2021. We used panel random effects and panel Pedroni cointegration estimation techniques to analyse secondary longitudinal series that were sourced from the central Bank of Nigeria, Debts management office and the national bureau of statistics. The study found that both domestic and external debts have a negative insignificant effect on the level of poverty in these states. While the relationship between domestic debts and unemployment was discovered to be insignificantly positive, the effect of external debts on unemployment level was found to be negatively insignificant in the short term. The Pedroni cointegration result also found that all variables in the poverty model co-move together in the long-run, whereas, there exists no long-run association among the variables in the unemployment model. The policy implications of the results is that these 6 states have not deployed a significant quotient of their domestic and foreign debts to program and project that have the capacity to reduce poverty and unemployment in these states. Therefore, the 6 states should endeavor to deployed a significant share of state resources to human capital development program, agricultural value chain development and social infrastructural development so as to curb the alarming level of poverty and unemployment in the zone.*

Keywords: *subnational, debt, development, poverty and unemployment.*

JEL Classification: H63, H74, I13, J64

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1.1 Introduction

Subnational debt is a type of public indebtedness procured by constituent units from surplus units of the economy to supplement the shortfalls in government revenue at that level of governance, which is required to provide public goods and services needed to drive economic growth and development. Investments in public goods and services are ubiquitous function of every modern state and remain the necessary pre-condition and catalyst for the improvement of social welfare both in developed and developing economies (Ayayi & Edewusi, 2020). According to Seers (1969), economic development can only be quantified in terms of how well it addresses the three cardinal macroeconomic concerns of poverty, unemployment, and income inequality in any given society.

In a developing country like Nigeria with enormous deposit of macroeconomic challenges such as Poverty, unemployment, inequality, low capital formation, lack of infrastructural development to name but a few vis-à-vis the perceived drought in revenue required to address the aforesaid chronic macroeconomic needs among others by both the national and subnational governments. Incidentally, the shortfalls in revenue both at the federal and the Subnational levels of governance have been exacerbated and attributed to factors such as the over-reliant of all layers of governments on proceeds from oil exports and allocations from the central purse which are grossly insufficient, as well as the non-diversification of revenue base at these states, resulting in the drastic shortfalls in the federating units internally generated revenue. Consequently, these enumerated factors and many more has given rise to the unprecedented rise in public borrowing by all layers of government in Nigeria to solve the aforementioned macroeconomic bottlenecks (Rahman, 2012).

Similarly, the six states that makes up the North-East zone namely; Adamawa, Bauchi, Borno, Gombe Taraba and Yobe are geographically contiguous and are located in the North-Eastern hemisphere of Nigeria. And, like every other state in Nigeria, these states are faced with enormous macroeconomic challenges and core among the numerous macroeconomic bottlenecks facing these states are the problem of multidimensional poverty, unemployment, inequality, high illiteracy level, infrastructural deficits, inadequate capital formation among others. In-view of these daunting macroeconomic shortfalls and the gross deficiencies in these six Subnational governments' internally generated revenue and allocations from the federation account, these states have resorted to borrowing from both domestic and

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foreign creditors to supplement the shortage in financial resources required to provide public goods and services, in order to promote economic growth and development that is in line with Seers perspective of economic development (Adegboyega (2021) and Biodun (2022).

Consequently, within the national public debts landscape, these six states domestic debt increased by 353% from N118.3 billion in 2012 to N536.4 billion in 2020, while the total foreign debts of the states rose by 76.7% from $197.5 million in 2012 to over $348.8 million in 2020, indicating that the public borrowing of these federating units were dominated by domestic debts. More specifically , Yobe, Taraba, and Bauchi's domestic debts climbed from N3.9 billion, N16.7 billion, and N18.8 billion in 2012 to N54.9 billion, N106 billion, and N102.8 billion in 2020, representing a 1310%, 535%, and 447% growth in domestic debt volume, respectively. While, the least percentage increase in domestic debts of 181%, 265% and 305% between 2012 to 2020 was witnessed in Gombe, Borno and Adamawa. However, in all the 6 states it is apparent that the increase in domestic debts was disproportionately distributed (BudgiT, (2022)

On the other hand, Adamawa state's foreign debts increased by 259%, making it the highest within the zone, followed by Bauchi 101%, Borno 42% and Gombe 15%, conversely, the external debts of Taraba and Yobe states declined by 10% and 16% from $22.9 million and $31 million in 2012 to $20.8 million and $26.6 million in 2020 respectively.

Ironically, despite the apparent growth in these six states' domestic and foreign debts overtime, the incidence of poverty and Unemployment problem have remain two major insurmountable macroeconomic challenges faced by these states that are yet to be fully addressed. Unfortunately, these two macroeconomic challenges are thought to have a multiplier effect, of causing the associated problems of Bukuharam terrorism, banditry, child labour and trafficking, arm robbery, prostitution, and many other social vices and misdemeanours that have persisted in these states in recent years and would continue to do so.

According to Tunji (2022), considering the high level of poverty and unemployment in the north-east, that averages about 76% of the region population that live below $2.15 per day and over 28.4% of the region total workforce that are jobless. For instance, the levels of poverty were 75.4%, 72.3%, 72.2%, 72% in Adamawa, Yobe, Taraba and Borno, others were Bauchi 68.5% and Gombe 62.3% respectively. While, the level of unemployment were 39.4%, 29.9%, 27.6% and 25.3% in Taraba, Gombe, Yobe and Borno, with Adamawa and Bauchi having 24.8% and 23.3%. Hence, it is necessary to question what influence does these 6

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state governments' massive debts have had on the degree of poverty and unemployment in the region.

However, the economic rationale behind the concept of public borrowing as regards its effects on any economy is still a contentious issue in the literature. On the one hand, the Keynesians upholds that public borrowing acts as a catalyst for stimulating economic growth and development through its crowd-in effect on the private sector investment and by so doing helps to reduce the propensity of poverty and Unemployment. On the other hand, the classical economists of the Smithian school argued that public borrowing do stifle economic growth and development by crowding out private sector investment, resulting in the increase in poverty and unemployment levels in any society.

Given the preceding dichotomy in the literature, the purpose of this study is to empirically determine the influence of public borrowing by the six North-Eastern states on poverty and unemployment levels in the region.

2.1 Literature Review

This section of the work is set to review a handful of economic theories, incidentally in the literature there is no theoretical consensus surrounding the relationship between public debt and economic growth and development. The theories underpinning public debt, economic growth and development are basically dichotomize into three theoretical stratum namely: the Crowd-in theory of public debt which is a thought process of the Keynesians economists (Keynes, 1936). The Crowd-in theory posit that public debt act as a stimulant of economic growth and development, hence it is one of the linear optimistic theory of public debt. In any case, the potential transmission power of public debt to reduce poverty and unemployment is through the effective capacity of public debt to increase aggregate demand that would bring about economic growth and development (Krugman,1988) & (Musgrave 1949). Whereas, the exponents of the Crowd-out theory of public debt were the classical economists of the Smithian extraction. The assumption of the Crowd-out theory is that public debt is distortive of the smooth operation of market system. Thus, public debt repels and stifle economic growth and development through its passthrough effect on private sector investments. For instance, the theory assume that the competition for loanable funds between the public and the private sector causes the cost of funds to rise, thereby increasing the cost of production and by extension stifle private sector investment. Leading to divestments of private sector investments resulting in the increase in poverty, unemployment level and other sundries macroeconomic issues. This theory is a

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linear pessimistic theory of public debt that tends to suggest that economic growth and development inversely reacts to the increase in public debt (Friedman (1962), Friedman and Schwartz (1963).

The theory of public debt overhang was propounded by Howard in 1972 and further amplified by (Sachs, 1989) & (Calvo, 1989). The Overhang theory of public debt posits that economic growth and development is a non-linear function of public debt. The thrust of the theory is centered on public debt sustainability assumption. The impact of public debt on economic growth and development as assumed by the theory is that public debt do emits positive effects on economic growth and development when the debt is moderately incurred, however, when public debt grow beyond the frontier of debt sustainability such increase tends to inhibits economic growth and stifle development and results in the increase in the level of poverty and unemployment.

Lastly, the Ricardence Equivalent- Boro hypothesis is a theory that asserted that the relationship between public debt and economic growth and development is sterile or neutral (Barro,1989). The theory opines that the contemporary government borrowing is merely an act of temporarily withholding of taxes, with the view to increasing taxes in near future to service the outstanding debts obligations. Having, undertook the theoretical review, it is also necessary we carryout the empirical review in order to review some of the literature that have empirically examine the relationship between public debt and economic growth and development.

Gomez-Puig, M. et al (2022) evaluated the heterogeneous nexus between public debt and economic growth in a sample of 115 countries that comprises the advanced, emerging and developing economies from1995–2016, the study used panel GFE method to analyze the extent to which the relationship between the public debt-to- GDP ratio and economic growth differs across groups of countries. The study uncovered that the effect public debt on economic growth is disproportional across the various blocks of development, even within member state in the same block.

Igberi, Odo and Anoke (2016). Investigated the impacts of government debts on the rate of unemployment in Nigeria from 1980 to 2015, using the ARDL econometrics technique of data analysis on secondary time series that was sourced from the CBN, NBS, DMO and the World Bank. The work found out that in the long-term the model variables co-move together. Implying that as public debt increased, the rate of unemployment also increased in the long-term all things being equal. Evidence from the study results disclosed that in the short-run the

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relationship between inflation, public debt and unemployment is positive and significant at 5% level, denoting that as public debt and inflation increased the rate of unemployment in Nigeria increased.

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 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

Emeka (2018) sought to analyze the effect of deficit financing on the rate of unemployment in Nigeria from 1997 to 2017, using the Johansen cointegration and Error correction model econometrics techniques of data analysis on data that was extracted from the country Apex Bank statistical bulletin and the national Bureau of statistics. The results of the research revealed that the rate of unemployment is significantly and positively influenced by government deficit financing and government expenditures, whereas exports has a negative significant impact on the unemployment rate in Nigeria.

Onofrei, M., et al (2022) Investigated the effect of public debt on the economic development of European countries between 1995 to 2019. Using the panel ARDL technique of data estimation for it empirical analysis, the findings of the study both in the short and long terms indicates that the relationship between public debt and economic growth was found to be negative in these EU countries.

Eze and Nwambeke (2015) used the Johansen cointegration test, Error correction model ECM and Granger causality econometrics analytical tools to understudied the consequences of the various components of fiscal deficit financing such as, external borrowing, ways and means, banking sector, non-banking public, interest rate and exchange rate which were deployed as

independent variables on unemployment in Nigeria from 1970 to 2013. They discovered that the long run association among the model variables is statistically feasible or plausible. But, in the short-term the ECM results indicated that a negative relationship exists between unemployment rate and the following independent variables: external debt, interest rate and ways and means. Contrarily, the banking system and exchange rate emits significant positive influence on the unemployment rate in Nigeria.

Ominyi and Saka (2016) using the ordinary least square regression method and Engel Granger data estimation techniques, explored the impact of deficit financing on unemployment rate in Nigeria from 1986 to 2015. The following variables were used as the explanatory variables external debt, domestic debt, fiscal outlay, government revenue and GDP and unemployment rate as the explained variable. The study uncovered empirically that both domestic and foreign debts has a negative effect on the rate of unemployment in Nigeria. While fiscal outlay, tax revenue and GDP were found to exert a positive influence on the unemployment rate in Nigeria. In the long-run, all variables co-move together.

Ogonna et al (2016) deployed the Autoregressive Distributed Lag (ARDL) econometrics techniques of data estimation and calibrated the impact of public debt on unemployment in Nigeria from 1980 to 2015. They discovered that there is a long-term relationship among the model variables. Particularly, the results indicated that an increase in public debt exerted a positive long-run effect on the unemployment rate in Nigeria.

Iwuoha (2020) employed the Johansen cointegration and Vector error correction model (VECM) econometrics techniques of data analysis to examine the nexus between government borrowing and unemployment rate in Nigeria from 1981 to 2019. The study confirmed that there is a negative long-run interaction between public debt and unemployment in Nigeria within the study timeframe.

Essien, Agboegbulem and Mba (2016) studied the macroeconomic effect of public debt in Nigeria, the paper employed vector Autoregressive method (VAR) and the Granger causality test to explore the nature of the relationship. The work found that both external and internal public debt does not have any significant effect on the growth of the Nigerian economy and does not also in any way fueled inflation. Nonetheless, the result discovered that external debt increase over time had led to the increase in the lending rates.

Dascalu (2016) investigated public debt based on sustainability indicators of Romania, using threshold analysis the result indicates that there exists a non-linear relationship between public debt and macroeconomic growth fundamentals.

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Akanbi and Olaoluwa (2022) used the Ordinary Least Squares method of data analysis to study the nexus between state governments and economic growth in Nigeria spanning from 1981 to 2019. They discovered that the response of economic growth to subnational debt in Nigeria is positive but statistically insignificant. While the state deficit budgeting exacts an insignificant inverse relationship with economic growth in Nigeria. Nonetheless, this thesis intends to fill in the unexplored gaps in the literature that bothers on the impact of the states' government borrowing on the economic development of the 36 subnational in Nigeria.

Ojukwu, (2021) investigated the effect of Nigeria's foreign debt on sustainable Development Goals (SDG) 2 and SDG 3 the Secondary data for the study to was sourced from DMO, IMF, NBS and WB covering a period of 16years from 2003 to 2019. Using Spearman's Rank Correlation tool. The findings of the work uncovered that there is no significant association between foreign debt and the sustainable development goals 2 and 3 in Nigeria. The paper argues that the accumulated external debts in Nigeria are not properly utilized for sustainable developmental projects that reduce the high poverty index and low life expectancy of its populace.

Elekwa and Onyenama (2022) deployed the ARDL technique of data analysis and estimated the effect of foreign debt on unemployment in Nigeria from 1992 to 2020. Empirical evidence from the ARDL test result showed that there is a positive and significant relationship between foreign debt and unemployment in Nigeria.

Ojewumi and Aremu (2021). Estimated the relationship between foreign debt and the poverty rate in Nigeria from 1981 to 2018. Using the ECM framework of data analysis on secondary data of the following variables external debt, debt services, foreign reserve, exchange rate, investment, economic growth as the independent variables and poverty rate as the dependent variable that was sourced from the national bureau of statistics and the central Bank of Nigeria. The result of the study revealed that there exists a positive relationship between foreign debt and poverty in Nigeria. On the other hand external debt services has a negative short run effect on poverty. While in the long run the variables were found to jointly co-move together.

Using the ordinary least square regression framework, Sweis and Sabri (2016) investigated the effect of public debt on unemployment and economic growth in Palestine. The study found that public debt has a positive and significant impact on unemployment in Palestine, while the impact of government borrowing on growth is insignificantly positive.

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Cahyadin and Ratwianingsih (2020) undertook a study of a sample of 4 ASEAN economies which encompassed Thailand, Indonesia, Philippines and Malaysia from 1980 to 2017 and unraveled the impact of external debt, exchange rate on unemployment. The extracted data from the World Bank statistical bulletin was confronted with the Autoregressive Distributed Lag ARDL, Granger causality and Error correction model estimation techniques. The study uncovered that there is a significant long run association among the model variables. On the other hand, external debt and inflation significantly influence unemployment rate in the short-term in the four countries evaluated. However, a unidirectional causal association that flows from external debt and exchange rate to unemployment exists only in the case of Indonesian economy. Thus, from the foregoing empirical review it is evidence that there exists a significant shortfalls in the literature bothering on the impact of subnational debts on economic development of the constituent units, which this study attempt to abridged.

3.1 Research Methodology

This study employed a expo facto research design to examine the impact of subnational debts of the North-Eastern Zone of Nigeria on the levels of poverty and unemployment. The secondary data for the work spanning from 2012 2021 were longitudinal series of the 6 states that makes up the Zone and the series were sourced from the central Bank of Nigeria (CBN), Debt Management Office (DMO) and National bureau of statistics (NBS).

3.2 Model Specification

One of the basic pre-condition for model specification requires that the theoretical framework should be established as a guide. Hence, our models for this work were constructed based on the Keynesians' Crowd-in theory of public debt. However, these two models were derived from the work of Alaoye and Alonge (2022). The two models of the work is set to determine the effects of the independent variables viz: subnational domestic debts (SDD), subnational external debts (SED), internally generated revenue (IGR) and subnational federal allocation (SFA) on the level of poverty and unemployment that are explanatory variables.

Thus, the two panel models of this work are functionally specified as shown below:

POV- F(SDD, SED, IGR, SFA)---(1). Model I

UEM= F(SDD, SED, IGR, SFA) ------(2) Model II

These two functional models are further transformed into their panel Log-Log models, so as to estimate the degree of responsiveness of the dependent variables to change in the independent variable

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$LnPOV_{it} = ¥_{0it} + Ln¥_1 SDD_{it} + Ln¥_2 SED_{it} + Ln_3 IGR_{it} + Ln_4 SFA_{it} + U_{it}$. Model I (Poverty Model)

$LnUEM_{it} = ¥_{0it} + Ln¥_1 SDD_{it} + Ln¥_2 SED_{it} + Ln_3 IGR_{it} + Ln_4 SFA_{it} + U_{it}$. Model II (Unemployment Model)

Where;

Ln= Natural Logarithm i= Cross section identifier, t= time, u= Error term

¥0= intercept, and ¥1 - ¥4 = Coefficients of the parameters estimates.

The a-priori assume bothering on the relationship between the two dependent variables poverty (POV) and unemployment (UEM) levels and the explanatory variables; subnational domestic debts (SDD) and subnational external debts (SED) and control variables; internally generated revenue (IGR) and states allocations from the federation account (SFA) followed the Keynesians economists crowd-in theory of public debt is expected to be less than zero. Based on the foregoing theory, the a-priori expectations between the two dependent and the explanatory variables are assumed to be ¥1 - ¥4 <0.

3.3 Data analytical techniques

The study deployed the panel least squares (PLS), panel fixed effect model (PFEM) and panel random effect model (PREM) and the panel cointegration test as its estimating techniques.

To determine which technique of data analysis is best suited for the study we conducted Breaush Pagan test to choose between PLS and the PFEM and PREM, with the hypothesis stated below.

H_0: PLS is better

H_1: PFEM or PREM is better

Decision Rule: Reject H_0 if P-value <0.05.

However, the Hausman test was also carried out to ascertain which one of the two tests PFEM and PREM is best fit or efficient for the research, with the hypothesis as follows:

H_0: PREM is best fit

H_1: PFEM is best fit

Decision Rule: Reject H_0 if P-value< 0.05

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4.1 Result and Discussion

Table:4.1; Descriptive Statistics

	LNPOV	LNUEM	LNSDD	LNSED	LNIGR	LNSFA
Mean	4.198552	3.103917	24.35308	17.46298	22.42800	24.63268
Median	4.254901	3.220824	24.65152	17.25773	22.37827	24.65822
Maximum	4.502029	3.673766	25.38713	18.72012	23.93128	25.03299
Minimum	3.374169	2.174752	20.83894	16.46554	21.30281	24.10766
Std. Dev.	0.210121	0.375521	0.986953	0.636837	0.535517	0.216887
Skewness	-1.690097	-1.055993	-1.571795	0.704995	0.317351	-0.541240
Kurtosis	6.917044	3.217334	5.802629	2.217161	2.962447	2.710012
Jarque-Bera	66.92238	11.26930	44.34222	6.502272	1.010641	3.139641
Probability	0.000000	0.003572	0.000000	0.038730	0.603312	0.208083
Sum	251.9131	186.2350	1461.185	1047.779	1345.680	1477.961
Sum Sq. Dev.	2.604896	8.319942	57.47053	23.92814	16.91996	2.775351
Observations	60	60	60	60	60	60

Source: Researcher's computation from E-views 12 (2024).

The above the descriptive statistics output of the longitudinal data of the 6 states that makes up the north-east zone of Nigeria was deployed for this work. The descriptive series indicates that the maximum (Max) and minimum (Min) values of the data which defines the range of the series from the highest and the lowest rates and the Max and Min range were LNPOV(4.502029max 3.374169min), LNUEM(3.220824max 2.174752min), LNSDD(25.38713max 20.83894min), LNSED(18.72012max 16.46554min), LNIGR(23.93128max 21.30281min) and SFA(25.03299max 24.10766min)

The following figures 4.198552, 3.103917, 24.35308, 17.46298, 22.42800 and 24.63268 were the mean values of LNPOV, LNUEM, LNSDD, LNSED, LNIGR and LNSFA respectively. These mean values are simply the averages of each of the longitudinal data employed for this research.

Lastly, the Jarque-Bera p-values of each of the variables indicates that all the variables were not normally distributed.

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Breusch Pagan LM Test Result for Poverty and unemployment models

Table:4.2; Breusch Pagan LM Test Result for Poverty Model

Test Method	Test Hypothesis Cross-section	Time	Both
Breusch-Pagan	1.043567.	24.60441	25.64798
P-value	(0.3070).	(0.0000)	0.0000

Source: Researcher's computation from E-views 12 (2024).

Table: 4.3; Breusch Pagan LM Test Result for Unemployment Model

Test Method	Test Hypothesis Cross-section	Time	Both
Breusch-Pagan	7.545883	5.617117	13.16300
P-value	(0.0060)	(0.0178)	0.0003

Source: Researcher's computation from E-views 12 (2024).

The Breusch-Pagan test results above for both model I & II invalid the application of PLS method for this research, hence implying or validating the use of panel PFEM or PREM giving that the P-values of the both cross section and time were statistically significant at 5% level.

Table: 4.4; Hausman Test Result of Poverty Model

Test Summary	**Chi-sq. Statistic.**	**Chi-sq d.f**	**P-value**
Period Random	5.445872.	4	0.2445

Source: Researcher's computation from E-views 12 (2024).

Table: 4.5; Hausman Test Result of Unemployment Model

Test Summary	Chi-sq. Statistic.	Chi-sq d.f	P-value
Period Random	5.780691.	4	0.2161

Source: Researcher's computation from E-views 12 (2024).

The Hausman test results of both model I & II more so reveal that the best fit regression method between the PFEM and PREM is the PREM giving that the P-value > 0.05 significant level, thus we reject in the Null hypothesis and accept the alternative which validate the application of PREM as the estimating technique of data analysis.

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Table: 4.6; Panel Random Effect result of Model I (Poverty)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	12.96900	2.948246	4.398887	0.0001
LNSDD	-0.026598	0.038733	-0.686704	0.4952
LNSED	-0.015300	0.042555	-0.359531	0.7206
LNIGR	0.069519	0.078889	0.881224	0.3820
LNSFA	-0.382203	0.129005	-2.962710	0.0045

Source: Researcher's computation from E-views 12 (2024).

The PREM result presented above indicates that the slope coefficients of both LSDD and LSED of -0.026598 and -0.015300 with the corresponding P-values of 0.4952 and 0.7206, inferred that the coefficients are statistically not significant at 5%. This results underscores that the increase in both subnational domestic and external debts do insignificantly leads to the reduction in the levels of poverty across the 6 subnational units in the north -East zone of Nigeria. More importantly, both coefficients of SDD and SED been negative implies that the coefficients are in conformity with the a-priori expectations of the research that is centered on Keynesian Crowd in theory. The policy implications of these results is that these 6 states have not sufficiently deployed a significant proportion of their domestic and external debts into people-centered program and project that have the capacity to reduce the level of poverty such as human capital development, social infrastructural development and agricultural value chain development. Thus, the borrowed funds might have been mismanaged, embezzled, misappropriated or the funds may have been used for debts servicing resulting in the non-sustainability of these states domestic and foreign debts. More so, the estimated coefficient of these 6 states internally generated revenue (IGR) was found to be 0.069519 and the P-value of 0.3820, indicates that the increase in IGR have led to the insignificant rise the level of poverty in the 6 states that makes up the north -East zone. The result further uncovered that the coefficient value of the 6 states allocations from the federation account of -0.382203 and P-value of 0.0045 indicate that the increase in SFA have had the significant effect of reducing the level of poverty in the short run.

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Table:4.6; Panel Random Effect result of Model II (Unemployment)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-16.89326	5.486190	-3.079233	0.0032
LNSDD	0.024351	0.068775	0.354071	0.7246
LNSED	-0.157850	0.116685	-1.352792	0.1817
LNIGR	-0.050489	0.127196	-0.396939	0.6929
LNSFA	0.945616	0.227487	4.156789	0.0001

Source: Researcher's computation from E-views 12 (2024).

The PREM result presented above Indicates that the slope coefficient and the corresponding P-value of LSDD of 0. 024351 and 0.7246, inferred that the coefficient of SDD is statistically not significant at 5%. This result underscores that the increase in the subnational domestic debts of the 6 states do insignificantly leads to the increase in the levels of unemployment across the 6 subnational units in the north -East zone of Nigeria. More importantly, the coefficient of SDD been positive implies that the coefficient do not align with the a-priori expectations of the research that is centered on Keynesian Crowd in theory. The policy implications of these results is that these 6 states have not deployed a significant quotient of their domestic debts into people-centered program and project that have the capacity to reduce the level of unemployment such as human capital development, social infrastructural development and agricultural value chain development. Thus, the borrowed funds might have been mismanaged, embezzled, misappropriated and funds may have been used for debts servicing resulting in the non-sustainability of these states domestic and foreign debts. Whereas, the result above indicates that the estimated coefficient of LSED of -0.157850 with the corresponding P-values of 0.1817 inferred that the coefficient of SED was found to be statistically not significant at 5%. However, this results underscores that the increase in subnational external debts do insignificantly leads to the reduction in the levels of unemployment across the 6 subnational units in the north -East zone of Nigeria. More importantly, the estimated coefficient of SED been negative implies that the coefficient conformed with the a-priori expectations of the research that is centered on Keynesian Crowd in theory. The policy implications of these results is that these 6 states governments have not sufficiently deployed a significant proportion of their external debts into people-centered program and project that have the capacity to reduce the level of unemployment, such as human capital development, social infrastructural development and agricultural value

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chain development. Thus, the borrowed funds might have been mismanaged, embezzled, misappropriated and funds may have been used for debts servicing resulting in the non-sustainability of these states domestic and foreign debts.

More so, the coefficient of these 6 states internally generated revenue (IGR) was found to be -0.050489 and the P-value of 0.6929, indicates that the increase in IGR have led to the insignificant reduction the level of unemployment in the 6 states that makes up the north -East zone. Conversely, result further uncovered that the coefficient value of the 6 states allocations from the federation account of 0.945616 and P-value of 0.0001 indicate that the increase in SFA have had the significant effect of increasing the level of unemployment in the short run.

Table: 4.7; Pedroni cointegratrion test result of Model I (Poverty)

Alternative hypothesis: common AR coefs. (within-dimension)

	Statistic	Prob.	Weighted Statistic	Prob.
Panel v-Statistic	-0.465359	0.6792	-1.064215	0.8564
Panel rho-Statistic	0.879833	0.8105	1.324186	0.9073
Panel PP-Statistic	-13.88807	0.0000	-11.68462	0.0000
Panel ADF-Statistic	-8.676649	0.0000	-5.877925	0.0000

Alternative hypothesis: individual AR coefs. (between-dimension)

	Statistic	Prob.
Group rho-Statistic	2.382082	0.9914
Group PP-Statistic	-13.80041	0.0000
Group ADF-Statistic	-9.030185	0.0000

Source: Researcher's computation from E-views 12 (2024).

The Pedroni cointegration test result presented above indicates that there exists a long-run association or relationship among the variables in model I giving that the P-values of six (6) out the eleven (11) statistical conditions were found to be statistically significant at 5% level. Hence, going by the majority rule on the number of significant P-values we can come to the conclusion that in the long-run the variables in our poverty model co-move together in the long-run ceteri paribus.

Table: 4.8; Pedroni cointegratrion test result of Model II (Unemployment)

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Alternative hypothesis: common AR coefs. (within-dimension)

	Statistic	Prob.	Weighted Statistic	Prob.
Panel v-Statistic	-0.399721	0.6553	-1.237953	0.8921
Panel rho-Statistic	2.467463	0.9932	2.310702	0.9896
Panel PP-Statistic	-2.461811	0.0069	-3.914321	0.0000
Panel ADF-Statistic	-0.962863	0.1678	-1.603333	0.0544

Alternative hypothesis: individual AR coefs. (between-dimension)

	Statistic	Prob.
Group rho-Statistic	3.549871	0.9998
Group PP-Statistic	-4.945637	0.0000
Group ADF-Statistic	-0.889574	0.1868

Source: Researcher's computation from E-views 12 (2024).

In model II, nine (9) out of eleven (11) statistical conditions P-values were found to be statistically not significant at 5% level in the unemployment model. Thus, incompliance with majority rule we can empirically infers from the results that all the variables in the unemployment model were not cointegrated in the long-run, which implies that the model variables do not co-move together in the long-run all things being equal.

Post estimation test Result of model I & II

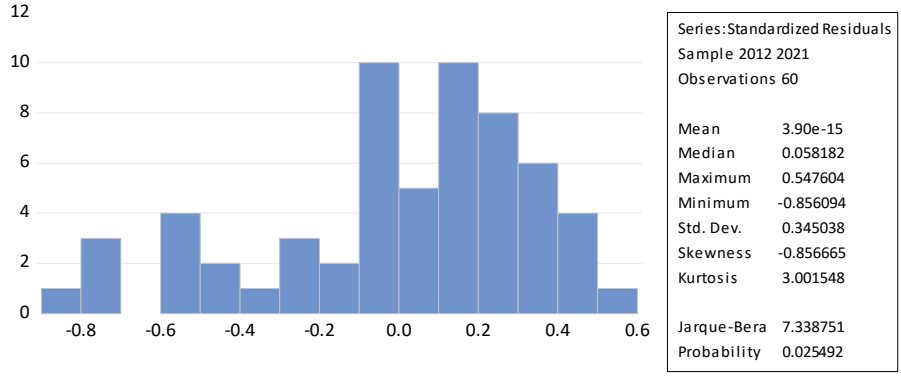


Figure: 1; Normality test of Model II (Unemployment)

Source: Researcher's computation from E-views 12 (2024).

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Table: 4.9; Result of Cross sectional dependency test of Unemployment Model

Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	44.01989	15	0.0001
Pesaran scaled LM	5.298282		0.0000
Pesaran CD	2.625123		0.0087

Source: Researcher's computation from E-views 12 (2024).

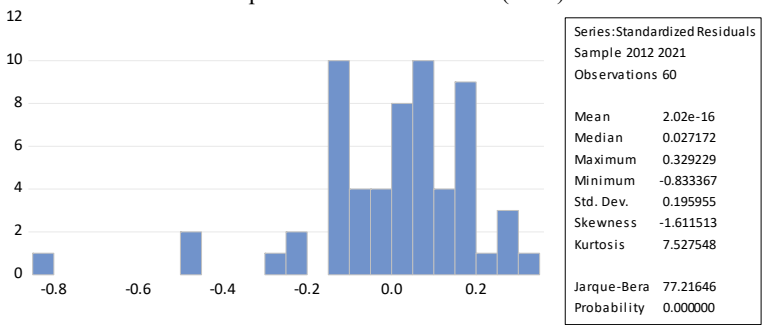


Figure:2; Result of Normality test of Model I (Poverty)
Source: Researcher's computation from E-views 12 (2024).

Table: 4.10; Result of Cross sectional dependency test of Model I (Poverty)

Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	60.23906	15	0.0000
Pesaran scaled LM	8.259484		0.0000
Pesaran CD	6.610482		0.0000

Source: Researcher's computation from E-views 12 (2024).

5.1 Conclusion

The 6 states that makes up the north-eastern zone are encouraged to invest a significant share of the borrowed funds to human capital development through investment in education, agricultural value chain development, as well as social infrastructures development. The 6 subnational units are encouraged to incorporate

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the culture of fiscal discipline in the governance of public fund, in order to guide against borrowed funds deviations, misapplications or misappropriations, embezzlement, thievery and odious borrowing that are often associated with states' borrowing. These states are admonished to invest the borrowed funds on sustainable and productive projects so as to eliminate debt overhang challenges. Conclusively, the findings of the study inferred that these 6 states have not significantly appropriated a significant proportion of their borrowed fund into human capital development project that have the capacity to reduce the level of poverty and unemployment in these states. Thus, these states government should be more committed to investing in human capital development, as well as productive and sustainable development programs.

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PEER AND MEDIA INFLUENCE ON DRUG MISUSE AND ITS IMPLICATIONS FOR HUMAN CAPITAL DEVELOPMENT AMONG FEMALE UNDERGRADUATES

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Abstract

Misuse of drugs among female undergraduates in Nigeria is a growing health issue in the country, being influenced by peer and media factors. This paper has discussed how peer and media issues contribute to the problem of drug misuse among undergraduate females specifically at the University of Ibadan. A descriptive survey design was adopted and 462 female students across the different faculties completed the study questionnaire as opposed to

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the 500 that was initially administered. A structured questionnaire was used to collect data which were analyzed by descriptive statistics, correlation and regression analysis. Results showed that drug misuse behaviours including self-medication, non-adherence to prescribed drugs and use of left over or non-prescribed drugs moderately occurred with the latter two being the most frequent. Peer influence played a moderate role in drug misuse with observational learning and peer conformity playing the most significant role. It was also found that media influence played a most significant role, especially through the presentation of celebrities and media romanticisation of drug use. Regression analyses indicated that peers and media had a combination of 30.8% variance of drug misuse with the media influence being the most dominant one. The research concludes that peers and media have a considerable influence in creating behaviours in the use of drugs and thus their gender sensitivity interventions are needed, media literacy and peer-based awareness should be employed to reduce drug abuse among female undergraduates.

Keywords: drug use, drug misuse, peer influence, media influence, female undergraduates.

JEL Classification: Q54; I18.

1. Introduction

Drug abuse among undergraduates has emerged as a growing social health and academic issue, especially in the third world like Nigeria. Students are exposed to new social networks and more independence and less parental supervision in the university environment, which can affect health-related behaviours. Especially vulnerable to social influences that might affects the attitude and practices of female undergraduate students' behaviours related to drugs. Drug misuse is frequently practiced among the female undergraduates in the form of self-medication, failure to take prescribed drugs, taking non-prescribed drugs and use of leftover drugs without medical guidance (Zeru, et al. 2020). Even though these behaviours are at times viewed as harmless or convenient, they have serious dangers such as adverse drug reactions, drug dependency, low academic performance and long-term health problems.

Peer influence is also a very strong determinant of behaviour in young adulthood. In the university, social norms, common practices and the need to be accepted can influence students to engage in drug-use behaviours, either directly or indirectly. If the female students see drug-use behaviours in their friends or

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classmates, they can tend to take up drug use habits this way especially in a setting where drug use is accepted or readily available. Media influence has also come into limelight as a strong social determinant to drug misuse among students in universities. With the quick emerging social media sites, entertainment sites and online advertising, people have been exposed to drug related content (Moyle, et al. 2019); (Omogbhe, Quadri & Kutu, 2020); (Omopo, Quadri & Ukpere, 2025). The media images, which romanticise drug use, portray women as involved in drug use as self-assured or accomplished, or imply that drugs provide a way to cope with stress can affect the attitude towards drug misuse implicitly. The repetition of exposure to media may normalise risky behaviours of drug-using even when the students are not consciously influenced by the effects of media.

Peer and media influence on young women have been enhanced in the Nigerian context due to the rising internet penetrations and the alteration of the youth culture (Imoka, 2023). The exposures of female undergraduate students at the University of Ibadan to peer interactions and media messages are incessantly conflicting with health guidelines and institutional regulations. It is important to know how these social factors lead to the misuse of drugs to come up with successful interventions that are gender sensitive. This empirical research thus investigates the effects of peers and media on drugs misuse in female undergraduate students in the University of Ibadan, Nigeria, with the intent of offering empirical evidence that can be used to inform health education programs, counselling programs and university policies on drugs as an intervention to prevent drugs misuse.

Statement of the Problem

The issue of drug misuse among female undergraduate students in universities particularly in Nigeria has emerged as a current public health issue and the other common trends including self-medication, non-adherence to prescribed drugs, use of non- prescribed drugs and taking of leftover drugs without any medical guidance. These behaviours are often seen to be harmless, but they are actually very dangerous to health, including adverse drug reactions, dependency and poor academic performance. The influence of peers plays a major role in drug-use behaviour, since students might adapt to peer pressure or might develop habits of others that they saw among peers, especially in socially interactive universities. In addition, the media role in drug-use addiction cannot be overemphasized.

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The media influence also has a significant role in attitude to the use of drugs. social media, entertainment media, online advertisements and endorsements of celebrities, exposure to drug related materials may normalise or romanticise drug abuse among female students (Lemo, 2024). Although this is of growing concern, very little attention has been given to the impact of peer and media influence on female undergraduates in Nigeria, as an empirical study. The University of Ibadan has demonstrated that exposure to peer networks and media content, academic pressure and easy access to drugs represent the subject of desirable research. It is thus an empirical investigation of the limited knowledge regarding the role of peer and media influence in the drug misuse on female undergraduate students that aims to inform valid prevention, counselling and policy interventions.

1.1 Objectives of the study

The following specific objectives guided the present study.

i. To investigate the rate and trend of drug abuse amongst undergraduate female student in University of Ibadan;
ii. To examine the level of the contribution of peer influence on drug misuse among female students in the University of Ibadan;
iii. To determine how exposure to the media affects drug misuse among female students at the University of Ibadan;
iv. To examine the relative contribution of peer and media influences on drug misuse by female students at the University of Ibadan

1.2 Significance of the study

This research is important since it reveals empirical data on the influence of peer and media on drug misuse among female undergraduate students to fill an important research gap on gender-specific determinants of drug-misuse behaviour in universities in Nigeria. The results would be of value to the administrators, policymakers and health authorities of universities in planning and developing specific and gender sensitive drug-prevention program/interventions, such as counseling and awareness-raising measures. The present research supports the general health of people through detecting trends, rates and social determinants of drug misuse and decreasing cases of drug dependence leading to health issues. Moreover, the study points at the value of media literacy and peer-education programs which would enable the students to become more skilled in their ability to discern negative pressures and media portrayal of drug misuse. Lastly, this research provides a basis on future studies

regarding other social, psychological and environmental factors affecting drug misuse among undergraduates in the Nigeria Universities.

2. Review of literature

2.2 Drug Misuse

The issue of drug misuse in university students has been a major concern of the whole society around the world, especially the young adults who are undergoing the process of transitioning between adolescence and adulthood. The university setting may also subject students to a high degree of independence, less parental control and increased social network, making them more vulnerable to risky behaviour, including drug abuse (World Health Organisation, 2022). Students are usually encouraged to self-medicate or use drugs without proper medical advice because of academic pressure, social issues and the desire to overcome stress or improve performance. Self-medication, non-adherence, use of remaining drugs, or non-prescribed drugs are some of the common forms of drug misuse among undergraduate female students. However, these practices are dangerous to health despite seeming to be convenient or safe at times, leading to adverse drug reactions, dependency and long-term physiological or psychological effects (Adebayo & Oladele, 2021). Studies also show that the academic performance can suffer due to the misuse of drugs as the effect of using drugs or stimulant improperly may result in lack of concentration, memory and negative cognitive ability.

Moreover, there are exceptional social cultural pressures that female students could be exposed to that would shape drug-use patterns. The problem of the gender expectations, social norms and the concerns about the appearance or coping with emotional stress may make young women more susceptible to risky health behaviours. All these are made worse by the fact that medications are readily available in urban and campus environments, there is the rise of online pharmacies and underground drug markets. Together, these forces indicated that it is necessary to comprehend not only the high rates of drug misuse but also the social and environmental conditions, including peer pressure and media coverage, which contribute to these behaviours among the undergraduates of female gender.

2.2 Substance Misuse and Peer Pressure

The peer groups are vital in influencing health behaviours in young adulthood when the individual is more autonomous and explores his/her identity. Students in the university and especially those who are away under the supervision of

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their parents are usually highly influenced by their social circles which include their friends and classmates, as well as their roommates. Studies show that students tend to be more inclined toward the drug use patterns of their peers where the habit is normalised or socially accepted (Ogunleye et al., 2020; Nwosu & Okeke, 2021). The mechanisms that peer influence commonly work by are observational learning, modeling, social reinforcement and need to be accepted or continue to stay a member of a group. Students can mimic behaviours of drug use because they see their friends who have successfully dealt with stress or improved academic success or gained social acceptance because of drugs. Such actions are seldom driven by direct coercion, but instead based on a feeling of minority pressures, group norms that everyone is involved make one conform.

Gender-based social parameters and cultural values might make female students particularly vulnerable to peer pressure. The desire to fit in, sustain relationships with friends or the necessity to make oneself fit in with the perceived behavioural standards in peer groups can predispose young women to the risk of adopting risky behaviours, such as self-medication and the use of non-prescribed/abandoned drugs. Research also indicates that female students might have extreme sensitivity to social consideration and acceptance and they are therefore sensitive to peer actions and suggestions (Akinyemi & Olawale, 2022). Besides, peer influence is usually exaggerated in both academic and social settings where stress, competition and social comparison are very common. Drug use in these environments can be considered a coping tool or a culturally accepted tool of dealing with academic stress as well as personal difficulties. It is thus necessary to understand how peer groups mediate drug misuse to come up with effective intervention programs which may include peer-led education programs, mentorship schemes and awareness campaigns to change risky health behaviours among female undergraduates.

2.3 Media Impact and Drug Abuse

It has become common knowledge that media exposure is a major determinant of drug related behaviour in young adults especially at the university level. Social media, music videos, films, TV shows and celebrity endorsements tend to demonstrate drug use in a glamorous or an appealing way, which implicitly implies to the audience that those behaviours are socially accepted, fashionable, or efficient stress coping or academic pressure coping methods (Eze et al. 2022; Adeyemi & Bello, 2023; Omokhabi, et al. 2025). The images may frame the attitudes and perceptions towards drugs particularly where repeated exposure would strengthen the idea that drug use is a normative or desirable

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behaviour. Research demonstrates that when students are repeatedly exposed to media material that contains drug use, the risky behaviour may be normalized unknowingly by the students. The social comparison theory states that people may imitate the actions of those they admire or peers in the media and assume that the imitation of the same behaviours may lead to the improvement of social status, self-esteem, or even attractiveness, particularly female students can be affected by media portrayal of women who use drugs with assertiveness or effectiveness into thinking that drug use is a socially accepted coping tool or a symbol of power (Okafor & Odetola, 2021).

Modern media is very interactive thus increasing this influence. Examples include social media which enable users to get access to drug-related information, i.e., by liking, commenting on and sharing social numbers, building a cycle of social reinforcement that further justifies drug use. Such digital trends, online peer networks and viral challenges can also be the factors that facilitate the acceptance of risky behaviours and increase their spread. Also, algorithm-based advertising and content targeting introduce students to controlled content that could glorify prescription or recreational drugs, spur curiosity, experimentation and possible misuse (Adewale & Fagbemi, 2022). In the Nigerian setting, the increasing internet connectivity and use by university students have enhanced the exposures to these forces. Empirical research evidence indicates that media messages have the potential to be combined with peer processes, academic pressures and personal stressors so as to raise the chances of drug misuse. Therefore, to create interventions, including media literacy programs, awareness campaigns and digital health education programs that empower students with critical skills to avoid the negative influences, one needs to learn how media exposure should be manipulated to create attitudes toward drugs and behaviours.

2.4 Peer, Media Influence and Drug Misuse.

The popularisation of social media, digital and mobile technology according to Collins-Dike et al. (2025), has been facilitated by the rapid rate in Nigeria and it has greatly escalated the impact of the peers and media on the behaviour of the university students. These social pressures, especially among the female undergraduates, may be incongruent with the laid down health rules and rules within the institutions. Peer networks can be direct providers of information and behavioural norms, whereas media platforms (social networks, music, movies and celebrity influencers) can offer repeated exposure to drug-related content, which leads to the development of a perception that using drugs is socially

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acceptable or effective in managing stress at school and in personal life (Olatunji et al., 2021; Eze et al., 2022). The interaction between peers and the media has been empirically indicated to be especially powerful. Indicatively, when learners can see their counterparts experimenting with drugs, it is more probable that they will experiment with drug use too particularly when the media material is also glamorizing or normalizing drug use. Sociocultural factors, such as the need to stay within the group of peers, preserve social standards, imitate the behaviour of celebrities they admire, may be especially detrimental to female students (Adeyemi & Bello, 2023). These forces are subtle and usually proceed via observational learning, social modeling as well as internalized views on what is normal or desirable and not by direct coercion.

Despite the possible influence, there is little research on the combined and comparative role of peer and media effect on drug misuse among female undergraduates in the Nigerian situation. It has been observed that most studies have addressed either the peer effects or the media exposure as independent variables without providing a critical gap in the interaction between the two to influence risky health behaviours. The gap must be addressed to formulate effective and context-specific interventions that improve upon a range of determinants of drug misuse. Some of such interventions may be peer-delivered education, media literacy, counseling services and awareness campaigns that are sensitive to the experiences of female students. Through a simultaneous analysis of peer and media effects, this research is expected to make a positive contribution that will facilitate policymaking, effective preventive strategies in the health sector and university-based prevention of drug misuse among the young women in Nigerian universities. Although current research appreciates the influence of social and environmental determinants in drug abuse, current studies are limited in the sense that they lack a specific study on female undergraduates in Nigerian universities and the comparative effect of peer with media influence. This research aims to address this shortcoming by presenting empirical data of the University of Ibadan and use it in specific interventions and policymaking.

2.5 Theory Underpinning the Study

2.5.1 The Social Learning Theory

According to the Social Learning Theory developed by Albert Bandura (1977), people acquire behaviours both positive and negative by observing and imitating others, particularly when the behaviours seem to be rewarded or acceptable to others. In this research: Peer influence: Undergraduates Female

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undergraduates can copy the behaviour of using drugs exhibited by peers or classmates. Peer modeling, conformity and social reinforcement are a manifestation of SLT that students pick up behaviours that are exhibited by individuals in their social surroundings. The impact of media: The vicarious exposure of using drugs in films, social media or celebrity promotion leads to exposure that students can copy. Media may make the use of drugs normal or glamourous, and the students are likely to indulge in such activities. Observational learning: It means that both peers and media serve as a model where students acquire attitudes, beliefs and practices about the use of drugs. Students pick up behaviours just by observation and repetitions even in the absence of coercion.

The main concepts of SLT which were used in the current Study are: Modeling - Learning through observation of the behaviour of the peers or media figures. Vicarious reinforcement - When an individual perceives that someone is rewarded or even accepted by the society to use drugs, it convinces them to emulate the behaviour. Reciprocal determinism - Behaviours of the students are determined by interaction between the personal factors (stress, coping), social factors (peers) and environmental exposure (media). The Social Learning theory would be applicable to the current Study because it offers a model to understand the importance and process of the involvement of peer networks and media exposure in drug misuse among female undergraduates. It also assists in the development of interventions like peer-based education programs and media literacy to control risky behaviours.

3. Methodology

A descriptive survey design was employed in this study. A total of 500 questionnaires were administered on the respondents where 462 were duly completed and returned. The instrument used in the study was questionnaire tagged: Peer and Media Influence of Drug Misuse Questionnaire (PMIDMQ) and the reliability was determined using a pre-test which was carried out on 50 students from another scope different from the study's scope through Cronbach Alpha reliability coefficient which yielded 0.87 in the entirety. The data gathered was analysed using regression and descriptive statistics.

4. Results and Discussions

The result of the present study was presented with the demographic characteristics of the respondents and was presented first in Table 1.

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Table 1: Demographic Characteristics of the Respondents

Demographic Variable	Category	Frequency	Percentage (%)
Age	15–20	184	39.8
	21–25	252	54.5
	26–29	26	5.6
Faculty	Education	246	53.2
	Arts	65	14.1
	Social Science	84	18.2
	Science	67	14.5
Level of Study	100L	125	27.1
	200L	57	12.3
	300L	64	13.8
	400L	210	45.5
	Others	6	1.3
Marital Status	Single	445	96.3
	Married	11	2.4
	Others	4	0.9
	Unspecified	2	0.4
Tribe	Yoruba	354	76.6
	Igbo	66	14.3
	Hausa	7	1.5
	Others	35	7.6

The population of the study is dominated by the young age group as most of the respondents 252(54.5%) fall within this age range of 15-25 years, indicating that the sample mainly comprises of young undergraduates. The largest proportion was 246(53.2%) of the respondents were from the Faculty of Education. In terms of academic level, final-year students (400L) are the most represented with 210(45.5%). Almost all 445(96.3%) of the respondents were single, which is consistent with the fact that the sample is young. The respondents are mostly Yoruba tribe 354 (76.6%), which is in line with Southwest geographical position of the University of Ibadan and Igbo and Hausa and other minority groups are underrepresented. Therefore, the demographic sample was a young, mostly Yoruba and largely single sample and needs to be considered when analyzing the results concerning drug abuse and peer and media pressures among female undergraduates.

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RQ 1: What is the prevalence and pattern of drug misuse among female students at the University of Ibadan?

The behaviours were measured on a 4-point Likert scale included self-medication, non-adherence, use of leftover drugs and unsupervised intake (SD = Strongly Disagree, D = Disagree, A = Agree, SA = Strongly Agree).

Table 2: Prevalence and pattern of drug misuse

Item	SD	D	A	SA	Mean	St.D
I use substance	226 48.9%	195 42.2%	31 6.7%	10 2.2%	2.32	1.07
I do not complete my medications	312 67.5%	116 25.1%	28 6.1%	61.3%	2.59	0.98
I take drugs that are not medically prescribed	309 66.9%	116 25.1%	28 6.1%	10 2.2%	2.26	1.03
I use leftover drugs when…	161 34.8%	95 20.6%	174 37.7%	32 6.9%	2.03	0.97
I use drugs without medical supervision	295 63.9%	134 29.0%	27 5.8%	61.3%	2.34	0.99
I usually do not finish my medications	194 42.0%	120 26.0%	126 27.3%	22 4.8%	2.51	1.04
I do forget to take my medications	138 29.9%	110 23.8%	125 27.1%	29 6.3%	1.44	0.71
I take incorrect doses	138 29.9%	95 20.6%	172 37.2%	57 12.3%	2.33	1.03
Whenever I forget to take medications…	161 34.8%	95 20.6%	174 37.7%	32 6.9%	2.17	0.99
I use soft drinks/alcoholic drinks to take medications	295 63.9%	134 29.0%	27 5.8%	61.3%	1.45	0.67
I have used at least one non-prescribed drug	194 42.0%	120 26.0%	126 27.3%	22 4.8%	1.95	0.94
I use more than the recommended doses	241 52.2%	141 30.5%	70 15.2%	10 2.2%	1.70	0.93

Table 2 shows female undergraduate students at the University of Ibadan are experiencing drug misuse and how it is prevalent among them. The average scores were between 1.44 and 2.59 meaning that most of the students do not agree or rather have a moderate agreement with drug misuse behaviour. Precisely, self-medication and non-adherence became the most prevalent ones and such items as I do not complete my medications, or I usually do not complete my medications (Mean = 2.59 and 2.51 respectively) demonstrate moderate prevalence. Likewise, the use of leftover drugs (Mean = 2.03) and

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taking non-prescribed drugs (Mean = 2.26) were moderate, which indicates habitual and controlled misuse. High-risk behaviours, including overdosing, combining drugs with alcohol, or taking medication without supervision, were less common and their mean scores were mostly under 2.0 indicating that serious drug abuse is not common. Therefore, the trend is moderate and habitual misuse and does not suggest deliberate or heavy abuse, meaning that interventions oriented towards proper medication adherence and safe self-medication as well as awareness of the risks of leftover/non-prescribed drugs are needed.

RQ 2: What Peer Influence contribute to drug misuse among female students at the University of Ibadan?

Table 3: Peer Influence contribution to drug misuse

Item	SD	D	A	SA	Mean	St.D
My friends influence my decisions about drug use	236 51.1%	146 31.6%	53 11.5%	27 5.8%	1.72	0.89
I am more likely to use drugs earlier used by my friends on similar health issues	93 20.1%	65 14.1%	196 42.4%	10823.4 %	2.69	1.04
I use drugs to fit in with my peer group	96 20.8%	75 16.2%	213 46.1%	76 16.5%	2.80	3.14
Friends often recommend drugs to me without medical advice	228 49.4%	168 36.4%	43 9.3%	23 5.0%	1.70	0.83
Observing friends use some particular drugs makes it seem okay with me when I face similar health issues	225 48.7%	195 42.2%	31 6.7%	11 2.4%	1.62	0.70
Pressure to fit in with school friends sometimes makes me engage in drug misuse	312 67.5%	116 25.1%	28 6.1%	6 1.3%	1.41	0.66
I am more likely to use drugs, alcohol, cigarette because of school peers	309 66.9%	116 25.1%	28 6.1%	10 2.2%	1.43	0.70

The results in Table 3 showed that peer influence has a moderate but not dominating influence on the drug-misuse behaviour of the students in this study. The analysis shows that although the majority of the students do not agree that their peers directly affect their drug-related choices, a significant number of them note that they are likely to use the drugs that were used by their friends before if faced with similar health conditions (65.8% agreement, Mean = 2.69) or to fit the peer group (62.6% agreement, Mean = 2.80). Direct peer pressure,

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unsolicited drug recommendations and conforming to peer expectations on the other hand had a high rate of disagreement with means of between 1.41 and 1.72 implying that these two types of influence are negligible. In this way, it can be concluded that observational learning and situational conformity are the main techniques by which peers can also lead to drug misuse, not direct pressure and coercion. This means that although peer networks do have some effects, there is a possibility that other factors including media exposure, personal choice and stress, as well as availability of drugs, could have a stronger influence on drug-use behaviours of female undergraduates. This means that peer-focused interventions could hardly be effective in the absence of targeting these other social and environmental determinants.

RQ 3: What media influence are associated with drug misuse among **female students at the University of Ibadan?**

Table 4: Media influences associated with drug misuse

Item	SD	D	A	SA	Mean	St.D
Social media posts make prescription drugs appealing, which can cause drug misuse	260 56.3%	129 27.9%	53 11.5%	21 4.5%	1.65	0.86
Exposure to drug use in movies, music videos, entertainment can lead to drug misuse	138 29.9%	110 23.8%	125 27.1%	31 6.7%	1.44	0.71
I often see female celebrities using drugs in media, which can lead to drug misuse	138 29.9%	95 20.6%	172 37.2%	59 12.8%	2.33	1.03
Media portrayal of prescription drugs makes them appealing and often leads to drug misuse among fans	161 34.8%	95 20.6%	174 37.7%	32 6.9%	2.17	0.99
I am more likely to experiment with drugs after exposure	296 64.1%	132 28.6%	27 5.8%	7 1.5%	1.45	0.67
Female drug users on social media are portrayed as confident, leading to drug misuse among followers	193 41.8%	119 25.8%	126 27.3%	22 4.8%	1.95	0.94
Media suggests drugs can help females cope, which easily lures them to drug misuse	241 52.2%	141 30.5%	70 15.2%	10 2.2%	1.70	0.93
The more I see drugs in media, the more likely I am to use them	299 64.7%	124 26.8%	28 6.1%	11 2.4%	1.47	0.72
Media encourages the idea that drug use can help but often leads to drug misuse	237 51.3%	134 29.0%	75 16.2%	25 5.4%	1.65	0.86

Kindly notes that Strongly Disagree and Disagree were aggregated to be Disagree, while Strongly Agree and Agree were aggregated to be Agree.

Table 4 indicated the role of media influence on drug misuse among female undergraduate students in the University of Ibadan. Analysis revealed that exposure to media, such as social media posts, movies, music and the portraying

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of celebrities have an average to low effect on drug-use behaviours among students with mean scores of 1.44 to 2.33. Most of the students disagree that media promotes drug misuse directly. Indicatively, 84.2% disagree that posts that they see in social media make prescription drugs attractive and 92.7% disagree that there are more likely to experiment drugs misuse after expose to media, which is an indication that they are not directly affected. Minimal influence seems to be produced by other media such as entertainment content and coping related messages. In general, although media might influence the situation indirectly by creating attitudes towards drugs, it is not a significant issue that causes drug misuse in female undergraduates. This means that media literacy education must be integrated together with measures dealing with peer pressure, drug availability and personal coping skills in an attempt to reduce drug misuse in this group.

H_{01}: There will be no significant relative contribution of peer influence and media influence to drug misuse among female students of University of Ibadan in Nigeria.

Table 5: Coefficients of Regression Table showing relative contribution of peer influence and media influence to drug misuse

Predictor	B	Std. Error	Beta	t	Sig.
Constant	12.941	1.577		8.207	.000
Peer influence	.307	.082	.219	3.737	.000
Media influence	.485	.073	.404	6.601	.000

Table 5 reported that peer influence moderately contributes to drug misuse ($\beta = 0.219$). The media influence is also significant ($\beta = 0.404$) and the most influential predictor. Both predictors are statistically significant ($p < 0.05$) hence the hypothesis is rejected.

5. Discussion of Findings

Findings indicated that female undergraduate students at the University of Ibadan are experiencing drug misuse and the trend is moderate and habitual misuse this result corroborates that of World Health Organization (2022), that the students in the university setting are subject to a high degree of independence, less parental control and increased social network, making them more vulnerable to risky behaviour, including drug misuse

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The results show that peer influence has a moderate but not dominating influence on the drug-misuse behaviour of the students in this study. This finding aligns that of Nwosu and Okeke (2021) which found that the peer groups are vital in influencing health behaviours in young adulthood when the individual is more autonomous and explores his/her identity. Students in the university and especially those who are away under the supervision of their parents are usually highly influenced by their social circles which include their friends and classmates, as well as their roommates. Studies show that students tend to be more inclined toward the drug use patterns of their peers where the habit is normalized or socially accepted.

Findings also revealed that exposure to media posts, movies, music and the portraying of celebrities have a low effect on drug-misuse behaviours among students. this finding agrees with that of Okafor and Odetola (2021) which found that students can be affected by media portrayal of women who use drugs with assertiveness or effectiveness into thinking that drug use is a socially accepted coping tool or a symbol of power.

Finding shows that peer influence moderately contributing factors to drug misuse ($\beta = 0.219$). The media influence is also significant ($\beta = 0.404$) and the most influential predictor. Both predictors are statistically significant ($p < 0.05$) hence the hypothesis which states that there will be no significant relative contribution of peer influence and media influence to drug misuse among female students of University of Ibadan in Nigeria.is rejected. This finding supports that of Collins-Dike (2025), which found that the popularisation of social media, digital and mobile technology according has been facilitated by the rapid rate in Nigeria, and it has greatly escalated the impact of the peers and media on the behaviour of the university students. These social pressures, especially among the female undergraduates, may be incongruent with the laid down health rules and rules within the institutions. It also corporates that of Eze (2022) which found that peer networks can be direct providers of information and behavioural norms, whereas media platforms (social networks, music, movies and celebrity influencers) can offer repeated exposure to drug-related content, which leads to the development of a perception that using drugs is socially acceptable or effective in managing stress at school and in personal life. The interaction between peers and the media has been empirically indicated to be especially powerful. Indicatively, when learners can see their counterparts experimenting with drugs, it is more probable that they will experiment with drug use too particularly when the media material is also glamorizing or normalizing drug

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use. Sociocultural factors, such as the need to stay within the group of peers, preserve social standards, imitate the behaviour of celebrities they admire, may be especially detrimental to female students.

6. Conclusion

This paper has examined peer and media influence on drug misuse among undergraduate students at the University of Ibadan in Nigeria, under the female category. The results give a moderately high prevalence of drug misuse among respondents with some of the common measures being self-medication, non-compliance with the prescribed drugs and use of leftover or non-prescribed drugs. Though the extremities of drug abuse were not very common, the very fact that the habitual misuse has been transformed into a constant problem demonstrates a serious social health issue that has to be discussed in the university setting. The research also determined that peer pressure has a moderate effect on drug abuse, which works primarily by modeling and conformity to situations and not applying direct peer pressure. The female undergraduates tended to consume the drugs that were previously taken by their friends due to the same health problem or because of wanting to identify with behavioural expectations of their peer groups. This has helped to reinforce the assumptions of the Social Learning Theory that individuals learn through observation and modeling of others in the social environment.

Notably, the result showed that media influence is the most predictive of drug misuse among undergraduate females. Media representations, especially those that featured celebrities and entertainment material, were observed to be subtle normalisation of drug usage and attitudes towards substance abuse, even though students did not see it as affecting their viewpoint. In the regression analysis, it was established that the peer and media factors independently and jointly cause significant levels of drug misuse with a joint contribution of 30.8% in explaining the drug misuse behaviour.

7. Recommendations

To begin with, health education on the need to take medication correctly, adhere to recommended drugs and the harmful effects of self-medication and taking of left-over or unprescribed medicines should be enhanced by the university management and health services at the University of Ibadan. Given the fact that drug abuse was more of a habitual than an extreme behaviour, regular sensitisation seminars, orientation and campus wide campaigns can be used to rectify the misunderstandings and ensure that undergraduates adopt safer

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health behaviours among the female undergraduates in the institution. Second, since peer influence works primarily via observational learning and conformity, the university ought to adopt peer based intervention programs. Positive health behaviour role models (trained peer educators and student ambassadors) can be used to challenge negative norms and model good health behaviour in peer groups to discourage unsafe drug-use behaviours. This interaction through peers is likely to work since students are more likely to trust and follow their fellow students than the authority figures.

Third, there is the need to introduce media literacy education in the university since media influence turned out to be the most influential predictor of drug misuse. The female students should be empowered with the critical skills to deconstruct and challenge the media content that romanticizes drug use especially the images of celebrities and the social media stories that drugs act as coping strategies. There can be anti-misleading representations of drug use in workshops, digital campaigns and participation in cooperation with student media platforms. Fourth, the student support units and counselling units must be reinforced to offer accessible and confidential assistance to students who are under academic pressure, emotional difficulties or health related issues. Stress and coping needs tend to be the causes of drug misuse and, therefore, the dependency on drugs can be decreased by encouraging healthy coping mechanisms.

Fifth, regulatory bodies and policy makers in association with the university authorities must put stronger regulation in the sale and availability of prescription drugs around the university campuses. Regulating access to drugs that are not prescribed can go a long way to curb the chances of misuse among the students. Lastly, future investigators ought to examine more variables such as psychological well-being/family background/economic status/cultural norms that this study did not examine but which could explain the rest of the unaccounted drug misuse. It is also suggested that longitudinal and qualitative studies should be conducted to introduce more information on the changing trends of drug misuse among female undergraduates.

7.1 Implications of the Study

The results obtained in this research have relevant implications regarding the practice of health among a population, university management, policy making and the prospective research that can be conducted on drug misuse among female undergraduates in Nigeria.

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EXPLORING STRATEGIES USED BY ATYPICAL WORKERS TO COUNTER CAREER TRAPS

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Abstract

This study sought to explore strategies that atypical workers in Zimbabwe use to counter career traps. Semi-structured interviews were conducted with thirteen research participants who were selected purposively. The thematic data analysis method was used to analyse the collected data. The study showed that career trap is a common challenge that a majority of atypical workers in Zimbabwe face. In a bid to a counter career trap, atypical workers in Zimbabwe indicated that they utilize a number of strategies in this respect. The research participants identified job search, lateral moves, networking, upskilling and reskilling as some of the strategies that they utilize to counter career traps. The study recommends that organisations in Zimbabwe should support and ensure the vertical career mobility of atypical workers, as this will go a long way towards reducing labour turnover related to career traps. In addition, this study recommends that atypical workers in Zimbabwe should take control of their professional and personal growth by utilizing best strategies to counter career traps.

Keywords: *atypical workers, career stagnation, career traps, job search, lateral move*

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1. Introduction

The job-for-life concept is being significantly replaced by atypical forms of work in the global labour market (Jones, 2021; Bosmans, 2023; Bonet et al., 2024; Cortina-Castro & Kobayashi, 2020; Verd et al., 2025). Pravdiuk (2023) argues that companies are increasingly using atypical forms of work such as contract, temporary, and part-time work to save expenses and to increase operational and financial flexibility in a competitive international market. A study by Yaroshenko et al. (2023) showed that companies can reduce labour costs such as payroll taxes, pension payments and health insurance premiums by using unconventional forms of work. A different study by Ikeije and Okpo (2022) revealed that atypical forms of work allow companies to increase or decrease the size and makeup of their staff in response to shifting consumer demand and unstable economic conditions. Conversely, Ukpere et al. (2025) assert that although unconventional forms of work provide workers with the flexibility that they desire, they come with challenges that relate to job, income, occupational health, and safety insecurities. Muñoz-Comet and Steinmetz (2020) express similar opinions, contending that structural obstacles and a lack of training cause atypical workers to experience severe career stagnation and entrapment. Several researchers have argued that atypical forms of employment frequently result in dead-end situations, where employees are trapped in cycles of precarious employment, making it challenging to move into more stable, well-paying, and skill enhancing roles (Zheng et al., 2026; Filomena & Picchio, 2022; Drishti & Carmichael, 2023; Precellas & Bauyot, 2025). Mouw et al. (2024) argue that career traps are linked to challenges such as high levels of psychological strain, anxiety, sadness, and low motivation, which in most cases lead to high labour turnover. Considering the challenges that accompany career traps, atypical workers have adopted different ways to counter these (Precellas & Bauyot, 2025; Leopardas, 2025; Pagayanan, 2021). Given its pervasiveness, career traps have become a significant issue that requires investigation in the global south. Thus, the purpose of this study was to explore strategies that atypical workers in Zimbabwe use to counter career traps. The researchers believe that the study's findings are important because they will assist organizations to lower labour turnover associated with career traps by implementing preventative measures such as promotions, lateral moves, training, and development. Additionally, this study will also assist workers to take control

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of their careers by utilizing appropriate mechanisms to counter career traps.

2. Review of related literature

This section presents theories that guided the study, as well as strategies that organizations and workers use to counter career traps.

2.1. Segmented labour market theory

The segmented labour market theory separates the labour market into primary and secondary sectors. Long-term business relationships, stable working conditions, greater earnings, and job security are characteristics of the primary sector (Loveridge & Mok, 2012), while poor earnings, little mobility, few job ladders, insecurity, and limited vertical mobility are characteristics of the secondary sector (Lamotte and Zubiri-Rey, 2018). According to the segmented labour market theory, there is little mobility between the two sectors, which frequently keep people in low-paying, precarious employment in the secondary sector (Dekker et al., 2019). Similarly, Mok (2012) posits that movement between primary and secondary segments is restricted, leaving workers in the secondary sector with limited opportunities to transition to better employment. Additionally, Heijke (2019) argues that once the labour market is segmented, opportunity for upward mobility is limited because primary sector jobs are rationed.

2.2. Vacancy driven model

A theoretical model known as the vacancy-driven model closely connects career advancement to the availability of job openings (Diamond, 2011). The vacancy-driven model assumes that job changes and career advancement are largely made possible by job openings rather than by mere personal skills development (Mercan & Schoefer, 2020). Additionally, this model provides that when organizations become flatter, fewer positions become available, raising the rate of career stagnation (Yi & Chen, 2022). In general, the vacancy-driven model implies that a worker's mobility depends more on structural and hierarchical options that are available to them than on their own aspirations.

2.3. Career traps

The term career trap refers to a situation in which employees stay in the same position or role for a long time without advancing their careers (Johan, 2020). According to Filomena and Picchio (2022), in most cases atypical workers find themselves trapped in a cycle of precarious employment for a long time. Similarly, Precellas and Bauyot (2025) declare that unconventional employment might turn into a trap, where employees repeatedly sign short-term contracts with little opportunity for these to advance into stable, long-term employment. According to

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a study by Shabbiret al. (2020), a career trap can result in diminished earning potential, limited progress, and fatigue.

2.5. Strategies to counter career traps

Employees and organizations utilize a variety of tactics to avoid career traps. Some of the tactics that employees and organizations use to avoid career traps are presented below.

2.5.1. Job rotation

Job rotation, according to Suleman et al. (2022), is a human resource technique that shifts workers for a predetermined amount of time between various positions, departments, or tasks at the same organizational level. According to Ambarwati et al. (2023), the purpose of job rotation is to boost motivation, decrease monotony, and diversify skill sets through cross-training. Job rotation is an efficient way to escape career traps, according to a study by Cheptoo and Mureithi (2025). Correspondingly, Dewa (2021) postulates that job rotation dismantles knowledge silos and keeps workers from being constrained by a small skill set. Furthermore, Yaqoup (2025) notes that job rotation, which frequently acts as a springboard for higher-level roles, is an essential strategy that allows workers to overcome career traps.

2.5.2. External job search

The active, organized process of looking for work is what Hensvik et al. (2021) define as a job search. According to a study by Reichelt (2015), employees may strategically look for jobs in other organisations that provide better opportunities for progression if organizational structure prevents them from advancing in their careers. Similarly, Wachter (2020) claims that looking for a job is a proactive way of exiting a dead-end professional path or occupational trap that is caused by a lack of opportunities. Another study by van Hooft et al. (2021) found that a strategic change from passive to proactive, focused job hunting is necessary to leave a dead-end position that has no room for advancement. Furthermore, Brown (2020) contends that seeking employment while holding a temporary post enables workers to use their present experience to acquire better, long-term positions to avoid career traps.

2.5.3. Upskilling and reskilling

Upskilling, according to Gruenewald and Mueller (2025), entails improving an employee's current skills to improve performance in their current role, whereas reskilling involves training employees for a completely new position or function. Chun (2024) argues that upskilling improves employability and offers a clear path for career advancement and higher income. According to a study by Lakshmi et al.

(2024), casual employees can learn technical or soft skills that are required for higher-level, permanent positions through internal, on-the-job training or online courses. Through reskilling, atypical workers can break the cycle of unstable employment and move into better, more permanent roles (Durgude & Chitra, 2024). Upskilling and reskilling enable people to avoid career traps by acquiring new and unique abilities to move into a different role or professional path, according to a study by Sundaram (2025).

2.5.4. Networking

According to Precellas and Bauyot (2025), networking entails establishing and preserving professional connections to share work-related opportunities and information. Strong networks assist employees to find unadvertised jobs, which are frequently occupied through referrals, according to a study by Forret and Sullivan (2021). Correspondingly, Chakir (2020) asserts that networking improves workers' professional profile and makes it simple for recruiters to locate them. Another study by Wolff and Moser (2019) demonstrated that networking is a proactive, long-term professional approach that helps employees elude career traps by granting them access to untapped employment prospects and greater exposure.

2.5.5. Strategic lateral moves

It is well established that a lateral move, which entails changing positions, departments, or functions, is an effective strategy to avoid career traps (Bidwell & Keller, 2025). Galbraith et al. (2020) argue that rather than depend exclusively on vertical promotion, which may be constrained by organizational structure, lateral moves enable workers to acquire fresh and varied abilities that are necessary to avoid career traps. Lateral movers frequently see faster job advancement and higher wage growth over time, according to a study by Jin and Waldman (2020). Further, Kates (2020) avers that switching to a different department or function enables employees to gain fresh, in-demand skills and an operational viewpoint that increases their marketability. Lateral shifts are becoming more widely acknowledged as an essential, proactive tactic to avoid career traps, according to another study by Waldman (2020). According to Downey and Kates (2020), conventional career pathways like lateral moves offer adaptability, which is required to overcome career traps.

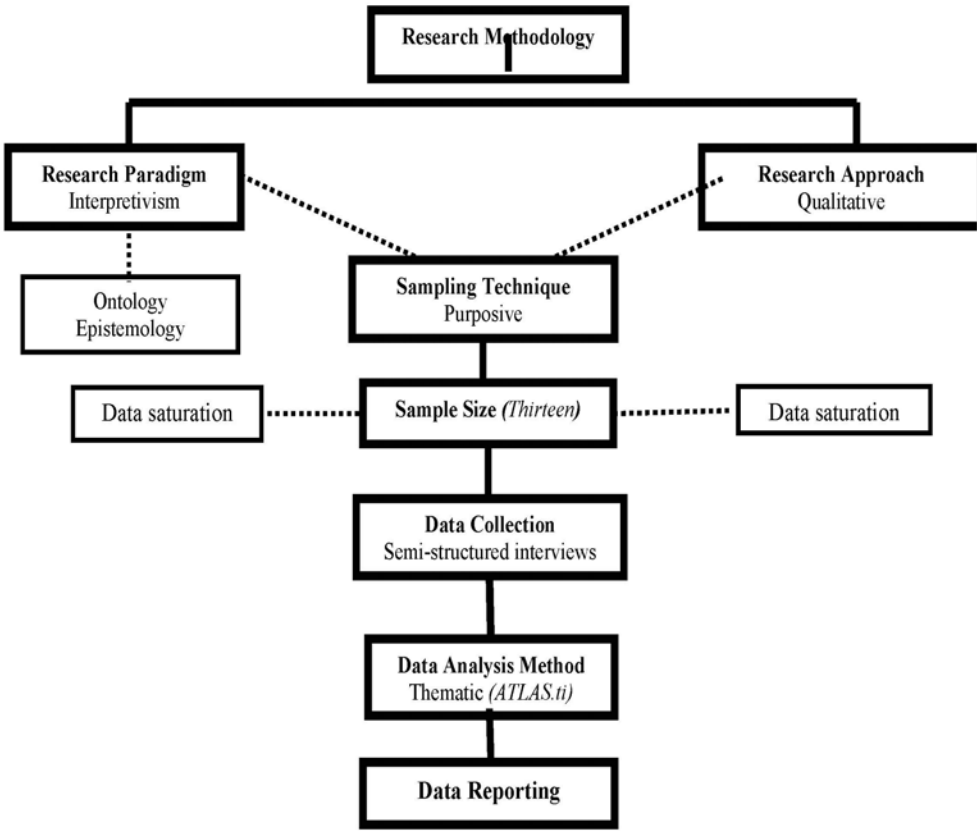
3. Methodology

This section presents the study's research methodology, namely its research philosophy, research approach, sampling methods, and data collection method, among other things. Figure 1 below illustrates the study's methodology.

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Figure 1: Study's methodology



Source: Researchers' compilation, 2026

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3.1. Academic qualifications and demographic data of research participants

Table 1 below depicts the research study participants' highest academic qualification, work experience, interview duration and demographic data.

Table 1: Academic qualifications and demographic data of research participants

No.	Pseudonyms	Gender	Age (Years)	Work Experience	Highest Qualification	Interview Length
1	OT1	Female	29	4 years	Diploma	8 minutes
2	OT2	Male	21	2 years	'A' level	10 minutes
3	OT3	Male	20	1 year	'O' level	12 minutes
4	OT4	Male	27	3 years	Diploma	11 minutes
5	OT5	Female	26	3 years	Bachelor's degree	10 minutes
6	OT6	Male	27	4 years	Bachelor's degree	11 minutes
7	OT7	Male	22	2 years	Diploma	10 minutes
8	OT8	Male	29	4 years	Diploma	9 minutes
9	OT9	Female	22	3 years	'A' level	12 minutes
10	OT10	Female	27	5 years	Bachelor's degree	11 minutes
11	OT11	Male	31	6 years	Master's degree	9 minutes
12	OT12	Female	31	4 years	Bachelor's degree	10 minutes
13	0T13	Female	33	6 years	Diploma	11 minutes

Source: Authors' fieldwork

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4. Findings

Table 2 below displays the themes and sub-themes that emerged from the study.

Table 2: Themes and sub-themes from the study

Themes	Sub-themes
Job search	Joining another company, which offers better opportunities for advancement Looking for new roles in other organizations
Upskilling and reskilling	Seeking training to prepare for future opportunities Broaden expertise through upskilling and reskilling
Lateral moves	Shifting to another department Changing roles through job rotation
Networking	Connecting with professionals to discover new opportunities Expanding professional circle through networking

Source: Primary data

4.1. Response rate

Data frequency and the response rate are shown in Table 4 below.

Table 4: Data frequency and response rate

Theme	Frequency *(N=13)*
Job search	13
Upskilling and reskilling	11
Lateral moves	9
Networking	7

Source: Authors' fieldwork

4.2. Theme 1: Job search

Job search was highlighted as one of the strategies that atypical workers in Zimbabwe use to overcome career traps. The table below presents the research participants' narratives in this regard.

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Table 5: Respondents' quotes on job search

Pseudo nym	Respondents' views
OT1	*'The only way to avoid being trapped in atypical work is to look for another job'*
OT2	*'Ukasangwara unosvika pakufa ungori temporary worker, saka ini ndogara ndichingotsvaga basa kune mamwe maorganisation' (I keep looking for another job externally because if you are not careful, you die a temporary worker)*
OT3	*'My brother, career traps is real; job search is the only way to avoid it'*
OT4	*'External job search allows workers to overcome career traps'*
OT5	*'Atypical workers who are stuck in their roles usually look for work elsewhere to get out of the career traps'*
OT6	*'Workers engage in job search from other organisations if they feel that they are trapped in one role or job'*
OT7	*'Job search fosters the transition from stagnant role to a growth-oriented position'*
OT8	*'Looking for a job from other organisations offers better opportunities for advancement'*
OT9	*'Workers who feel trapped in one role often look for another job'*
OT10	*'Seeking employment externally acts as a way of avoiding career traps'*
OT11	*'Looking for better positions elsewhere is the only way to go'*
OT13	*'Seeking new roles from other organisations is the only way to avoid career traps'*

Source: Authors' fieldwork

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4.3. Theme 2: Upskilling and reskilling

Eleven research participants mentioned that one of the best strategies to counter career traps is upskilling and reskilling. Some of the research participants' thoughts on this matter are presented below.

- *'Upskilling is the only way to avoid career traps, my brother' (OT1).*
- *'Remember, my highest academic qualification is 'O' level, so the best way to avoid career stagnation is to broaden my expertise through on-the-job and off-the-job training' (OT3).*
- *'Pursuing online courses and programs increases a worker's internal and external visibility, which goes a long way in countering career traps' (OT4).*
- *'Pakaipa, Ini ndofunga kuti being trapped in one role and job zvinokonzerwa nekushaya chikoro uye work-related experience, ndofunga kuti nzira yatingashandisa to counter career traps is to pursue masters' program in order to develop new and distinct skills needed for one to move up the career ladder (I think career stagnation is caused by limited schooling and lack of work-related experience, and the only way to avoid it is to pursue masters' program) (OT5).*
- *'Reskilling is another way to avoid career traps' (OT6).*
- *'I think the only way to avoid career traps is to pursue a bachelor's degree since my highest qualification is a diploma' (OT7).*
- *'Atypical workers can counter being stuck in one job by pursuing industry-related training' (OT8).*
- *'Taking advantage of online courses and training to prepare yourself for future opportunities helps workers to avoid career traps' (OT9).*
- *'Making sure you participate in internal training programs' (OT10).*
- *'Broaden your expertise through training' (OT11).*
- *'Upskilling and reskilling assist workers to overcome career traps' (OT13).*

4.4. Theme 3: Lateral moves

Apart from upskilling, reskilling and job search, lateral moves emerged from the study as a strategy that atypical workers in Zimbabwe use to bypass career traps. In this respect, OT2 said:

'The only way to overcome career traps is to switch to a different department.'

OT3, OT4 and OT6 supported the above viewpoint, with OT4 remarking:

'I moved from Marketing department to Engineering department with more prospects of advancement.'

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In addition, OT9 stated:

'Lateral moves broaden your skill set and enhance your employability through cross-functional experiences preferred by my organization.'

OT7, OT10, OT12 and OT13 shared more or less the same sentiments, indicating that lateral moves broaden workers' skills sets, rendering them more marketable.

4.5. Theme 5: Networking

Networking was mentioned by some of the research participants as a way of avoiding career traps. In this respect, OT1 said:

'The only way to counter career traps is to connect with many professionals in the industry who can inform you about new and better job opportunities in the industry.'

Equally, OT2 said:

'Career traps can be easily countered by those with strong networks. Remember, diverse networks with people outside your immediate industry increases your visibility and chances to climb the career ladder.'

Correspondingly, OT11 argued:

'Strong networking with former colleagues, managers and peers allows workers to counter career traps. Former colleagues and managers can inform you once better opportunities are available.'

OT6, OT8, OT12 and OT13 supported the above-mentioned sentiments. In this regard, OT12 said:

'Networking is key to counter career traps.'

5. Discussion of study's findings

Lateral moves, job search, networking, upskilling and reskilling emerged from the study as the main means to overcome career traps in Zimbabwe. The study's results are analysed below.

5.1. Job search

Job search emerged from the study as one of the strategies that atypical workers in Zimbabwe use to overcome career traps. Some of the research participants' statements around this are shown below.

'Ukasangwara unosvika pakufa ungori temporary worker, saka ini ndogara ndichingotsvaga basa kune mamwe maorganisation' (I keep looking for another job externally because if you are not careful, you die a temporary worker) (OT2).

'My brother, career traps are real; job search is the way to avoid it' (OT3).

'Atypical workers who are stuck in their roles usually look for work elsewhere

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to get out of the career traps' (OT5).

'Workers who feel trapped in one role often look for another job' (OT9).

The research participants' responses above are consistent with Reichelt's (2021) assertion that workers look for jobs at other organisations that provide better opportunities for progression when their organisation's structure prevents them from advancing in their careers. Similarly, Wachter (2020) claims that looking for a job is a proactive way to exit from a dead-end professional path or career trap caused by a lack of opportunities. Additionally, Brown (2020) posits that seeking employment while holding a temporary post enables workers to use their present experience to acquire better long-term positions to avoid career traps.

5.2. Upskilling and reskilling

Eleven of the research participants mentioned that upskilling and reskilling contributes towards reducing career traps. Some of the research participants' thoughts on this matter are presented below.

- *'Remember, my highest academic qualification is 'O' level; so, the best way to avoid career stagnation is to broaden my expertise through on-the-job and off-the-job training' (OT3).*
- *'Pursuing online courses and programs increases a worker's internal and external visibility, which goes a long way in countering career traps' (OT4).*
- *'Pakaipa, ini ndofunga kuti being trapped in one role and job zvinokonzerwa nekushaya chikoro uye work-related experience, ndofunga kuti nzira yatingashandisa to counter career traps is to pursue masters' program in order to develop new and distinct skills needed for one to move up the career ladder (I think career stagnation is caused by limited schooling and a lack of work-related experience, and the only way to avoid it is to pursue a masters' program) (OT5).*
- *'Reskilling is another way to avoid career traps' (OT6).*
- *'I think the only way to avoid career traps is to pursue a bachelor's degree since my highest qualification is a diploma' (OT7).*
- *'Atypical workers can counter being stuck in one job by pursuing industry-related training' (OT8).*

The study's findings are supported by Chun (2024) who states that upskilling improves employability and offers a clear path for career advancement and higher

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income. Similarly, a study by Lakshmi et al. (2024) showed that workers can counter career traps by learning technical or soft skills that are required for higher-level permanent positions through internal, on-the-job training or online courses. In addition, Durgude and Chitra (2024) argue that atypical workers can break the cycle of unstable employment and move into better more permanent roles once they obtain sufficient and the required training.

5.3. Lateral moves

Lateral moves also emerged from the study as a strategy to counter career traps in Zimbabwe. In this respect, OT2 said:

'The only way to overcome career traps is to switch to a different department.'

OT3, OT4 and OT6 supported the above viewpoints. In this context, OT4 remarked:

'I moved from Marketing department to Engineering department with more prospects of advancement.'

In addition, OT9 stated:

'Lateral moves broaden your skill set and enhance your employability through cross-functional experiences preferred by my organizations.'

The above research participants' views are supported by Galbraith et al. (2020) who argue that rather than depending exclusively on vertical promotion, which may be constrained by organizational structure, lateral moves enable workers to acquire fresh and varied abilities, which are necessary to avoid career traps. Correspondingly, Kates (2020) claims that switching to a different department or function enables employees to gain fresh, in-demand skills and an operational viewpoint that increases their marketability. In addition, a study by Waldman (2020) revealed that lateral shifts are becoming more widely acknowledged as an essential, proactive tactic to avoid career traps.

5.4. Networking

Seven respondents identified networking as a strategy that can be used to overcome career traps. In this respect, OT1 said: *'The only way to counter career traps is to connect with many professionals in the industry who can inform you about new and better job opportunities in the industry.'*

Equally, OT2 argued:

'Career traps can be easily countered by those with strong networks. Remember, a diverse network with people outside your immediate industry increases your visibility and chances to climb the career ladder.'

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Similarly, OT11 remarked:

'Strong networking with former colleagues, managers and peers allows workers to counter career traps. Former colleagues and managers can inform you once better opportunities are available.'

The afore-mentioned participants' quotes are supported by Sullivan (2021) who notes that strong networks assist employees in finding unadvertised jobs, which are frequently filled through referrals. Concurring with this view, Chakir (2020) asserts that networking improves workers' professional profile and makes it simple for recruiters to locate them. Another study by Wolff and Moser (2019) demonstrated that networking is a proactive, long-term professional approach that helps employees elude career traps by granting them access to untapped employment prospects, fresh viewpoints, and greater exposure.

6. Contribution of the study

Exploring strategies that atypical workers in Zimbabwe use to counter career traps has three benefits, namely theoretical, methodological and practical. The segmented labour market theory, which holds that there is little mobility between the primary and secondary sectors, whilst workers are frequently trapped in the secondary sector with low-paying and precarious positions, is validated by this study. Methodologically, this qualitative research study utilized semi-structured interviews to capture the participants' narratives and to reveal latent ways that non-standard workers used in Zimbabwe to counter career traps, which were overlooked by a number of past quantitative studies. In practical terms, this study helps workers to take charge of their careers and to adopt the most effective strategies to avoid career traps. Additionally, this study assists organisations to reduce labour turnover linked to career traps by utilizing some of the strategies that emerged from this study.

7. Limitations and recommendations for future research

It is crucial to highlight that this qualitative study had certain limitations. The study utilized a sample of thirteen research participants, making it difficult to draw broader conclusions. In addition, this study focused exclusively on strategies that atypical workers use to avoid career traps, ignoring factors that cause career stagnation. Future studies on career traps should utilize large samples and explore organisational factors that aggravate career stagnation.

8. Conclusion

This study sought to explore strategies that non-standard workers in Zimbabwe use to counter career traps. The primary strategies that atypical workers in Zimbabwe use to avoid career traps include job search, lateral moves, networking, reskilling and upskilling. To reduce high labour turnover associated with career traps, the study recommends that organisations should ensure and guarantee the vertical career mobility of atypical workers through promotions. Additionally, this study recommends that atypical workers in Zimbabwe should take charge of their personal and professional development by utilizing the most effective techniques to avoid career traps

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Author's Contributions

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

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Conflicts of Interest

The authors declared that they have no conflicts of interest.

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TRADE BARRIERS AND EXPORT PERFORMANCE: THE MODERATING ROLE OF HUMAN CAPITAL INVESTMENT

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Abstract

This study investigates the extent to which human capital investment moderates the impact of trade barriers on export performance in West Africa. Motivated by persistent export underperformance in ECOWAS despite ongoing trade liberalisation, the study integrates human capital theory, new trade

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theory, and the augmented trade cost framework to examine the conditional nature of trade barriers. Using a balanced panel dataset of 15 ECOWAS countries over the period 2000–2023, the analysis employs a dynamic panel approach based on the two-step System Generalised Method of Moments (GMM) estimator to address endogeneity and export persistence. The results reveal that trade barriers exert a significant negative effect on export performance, while education and health investments independently enhance exports. More critically, the interaction effects indicate that human capital significantly attenuates the adverse impact of trade barriers, effectively transforming them from binding constraints into conditional frictions. Mechanism analysis further shows that this moderation operates through productivity enhancement, technology adoption, and labour resilience channels. Robustness checks confirm the stability of the findings across alternative specifications. The study contributes to the literature by introducing a disaggregated human capital moderation framework and provides policy-relevant evidence that aligning trade reforms with education and health investment is essential for achieving sustained export competitiveness in ECOWAS.

Keywords: *trade barriers; export performance; human capital; education investment; health investment; absorptive capacity; non-tariff measures*

JEL Classification: O19; Q56.

1. Introduction

Despite decades of multilateral liberalisation under the World Trade Organization (WTO) and the proliferation of regional trade agreements, trade barriers remain pervasive constraints on global export performance. The WTO (2024) reports that by mid-October 2024, import restrictions affected about USD 2.94 trillion (11.8% of world merchandise imports), while export-restricting measures covered USD 786 billion, underscoring an increasingly fragile and uncertain trading environment. Non-tariff barriers now constitute the dominant impediment, with the World Bank estimating that their reduction could deliver two-thirds of Africa's potential trade-related income gains (Welthungerhilfe, 2025). These pressures are particularly acute in West Africa, where the Economic Community of West African States (ECOWAS) faces persistent structural constraints: low intra-regional trade, heavy dependence on primary commodities, and enduring logistical and institutional bottlenecks despite the implementation of the African Continental Free Trade Area (AfCFTA).

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West Africa's export underperformance reflects a structural pathology rooted in prohibitive trade costs, shallow diversification, and chronic productivity deficits. Despite ECOWAS integration efforts, member states struggle with limited industrial capacity and import dependence, rendering trade liberalization outcomes inconsistent (Yeboah, 2025). Economies remain detrimentally commodity-dependent, with hydrocarbons, minerals, and agriculture accounting for over 70% of export earnings (Muritala, 2025; UNCTAD, 2024). This concentration subjects revenues to volatile global price cycles rather than competitive productivity. Infrastructure deficits further exacerbate the crisis; road transport costs represent 29% of intra-African trade prices, nearly quadruple the 7% global average (UNCTAD, 2024). Consequently, the African Transformation Index reveals that export competitiveness declined between 2000 and 2022, signalling a failure to convert reforms into genuine productive capacity (Ndubuisi & Owusu, 2024). Furthermore, Nigeria's 62.7% share of regional GDP creates a concentration that leaves ECOWAS performance hostage to a single economy's cycles (ECOWAS Commission, 2024). Ultimately, the regional challenge is not market access, but supply-side competitiveness, the ability to diversify and meet international standards (AfDB, 2023).

Existing scholarly literature remains bifurcated, leaving a critical empirical question unanswered regarding the structural synergy between human capital and trade performance. One research strand examines how trade barriers, including tariff rates, non-tariff measures, and logistics inefficiencies, directly suppress export performance (Muritala, 2025; UNCTAD, 2024). A parallel, yet disconnected, strand interrogates how human capital investment drives growth across African economies (Ogunjobi et al., 2024; Wirajing & Nchofoung, 2023; Anowor et al, 2023; Anowor, Ichoku & Onodugo, 2020). Crucially, neither adequately addresses the conditional dimension: whether education and health expenditures equip West African economies with the absorptive capacity to attenuate the export-suppressing effects of trade barriers. While some studies test trade openness as a moderator for poverty (Gyedu et al., 2024; Agbarakwe et al, 2018) or human capital as a conditioner for financial development (Sarpong & Nketiah-Amponsah, 2022), the specific trade-barrier–export-performance nexus remains neglected. Although life expectancy and education are established determinants of competitiveness (Okolo et al., 2024; Anowor, Nwonye, Okorie & Ojiogu, 2019), no study has introduced them as discrete moderating variables within a dynamic panel framework for ECOWAS. This gap carries significant policy consequences for regional export gains.

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The foregoing analysis of West Africa's structural export constraints and the segmented state of current literature converges on a single organizing question: Do investments in education and health attenuate the adverse effects of trade barriers on regional export performance? Theoretically anchored in the endogenous growth framework (Lucas, 1988; Romer, 1990), this inquiry posits that human capital accumulation, through cognitive productivity gains from education and labour efficiency gains from improved health, enhances an economy's international competitiveness despite market access constraints. Empirically, while human capital significantly conditions the returns to structural reforms in developing economies (Ogunjobi et al., 2024; Wirajing & Nchofoung, 2023), its specific moderating role within the ECOWAS trade-barrier–export-performance nexus remains unresolved. Addressing this gap is vital because life expectancy and educational attainment operate as distinct productivity-enhancing channels (Okolo et al., 2024; Ochinanwata et al, 2020; Anowor, Ukpere & Onodugo, 2025). Consequently, collapsing these into a composite index obscures policy-relevant heterogeneity. By disaggregating human capital into discrete expenditures on education and health, this study provides the first ECOWAS-specific panel evidence on their individual capacities to mitigate trade-induced export suppression.

Against the backdrop of the identified literature gap, this study makes four explicit contributions to the trade-development scholarship. First, it introduces a moderation framework into the trade barriers–export performance literature for West Africa, departing from the additive specifications that dominate existing panel studies (Muritala, 2025; Gyedu et al., 2024) to test whether human capital investment structurally conditions the direction and magnitude of trade barriers' effect on export performance. Second, it disaggregates human capital into two theoretically and empirically distinct components, expenditure on education and expenditure on health, rather than relying on composite indices that mask policy-relevant heterogeneity, a limitation explicitly noted by Okolo et al. (2024) in the Sub-Saharan African trade context. Third, it provides dynamic panel-based empirical evidence for all fifteen ECOWAS member states over a 24-year horizon (2000–2023), employing the two-step System Generalised Method of Moments (GMM) estimator to address endogeneity and dynamic persistence, methodological standards increasingly required in top-tier development economics journals (Wirajing & Nchofoung, 2023; Ogunjobi et al., 2024). Fourth, it generates country-typology-specific policy insights that directly inform the human capital investment commitments required to make trade facilitation reforms, particularly under the

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African Continental Free Trade Area (AfCFTA), translate into sustained export performance gains across the heterogeneous economies of the ECOWAS region (UNCTAD, 2024; African Development Bank Group, 2023).

Literature Review

The scholarly consensus identifies trade barriers as the primary inhibitors of export competitiveness within the ECOWAS sub-region, operating through a tripartite of tariffs, non-tariff measures (NTMs), and exorbitant logistics costs. Theoretically, these barriers function as a "tax on distance," artificially inflating the free-on-board (FOB) prices of West African goods and eroding their comparative advantage in global markets (UNCTAD, 2024). Empirical evidence suggests that NTMs, specifically stringent sanitary and phytosanitary (SPS) standards, impose compliance costs that often exceed traditional tariff burdens, particularly for the region's dominant agricultural exports (Muritala, 2025). Furthermore, infrastructure deficits result in road transport accounting for 29% of intra-African trade costs, nearly quadruple the 7% global average, which suppresses the intensive and extensive margins of trade (World Bank, 2023). Consequently, high-friction trade environments discourage firm-level entry into international value chains, leaving West African economies trapped in low-productivity, commodity-dependent cycles where logistics inefficiencies serve as an insurmountable barrier to structural transformation (Yeboah, 2025).

Human capital serves as the primary engine for technological absorption and labour efficiency, fundamentally shifting an economy's production frontier toward high-value exports (Onodugo, Kalu & Anowor, 2013; Nwonye et al, 2023). Theoretically, education enhances cognitive skills and fosters the innovation required to meet rigorous international quality standards, thereby transitioning economies from primitive commodity dependence to sophisticated manufacturing (Ogunjobi et al., 2024). Simultaneously, health investments function as a critical determinant of labour supply stability; improved life expectancy and reduced disease burdens directly minimize absenteeism while maximizing the physical stamina necessary for industrial productivity (Okolo et al., 2024; Anowor & Ukpere, 2025). Empirical evidence suggests that countries with higher tertiary enrollment and robust healthcare systems exhibit greater resilience to external shocks, as a skilled, healthy workforce can pivot more effectively across diversified sectors (Wirajing & Nchofoung, 2023; Anowor, Eze & Ukpere, 2025). Consequently, human capital does not merely drive growth in isolation but acts as a transformative catalyst, enabling firms to overcome domestic supply-side rigidities

and compete within complex global value chains where precision and consistency are paramount (Fatima et al., 2020).

Investment in education constitutes a critical supply-side driver of export performance by enhancing firm-level productivity, accelerating technology adoption, and elevating export sophistication. In West Africa, a skilled workforce augments absorptive capacity, enabling firms to internalize advanced production techniques and innovate processes to meet stringent international standards (Schultz, 1996; Ayeni, 2023). Empirical evidence from Sub-Saharan Africa indicates that higher educational attainment significantly correlates with improved competitiveness; specifically, interactions between human capital and foreign investment boost export sophistication (Golo, 2024; Masunda, 2025). Furthermore, education investment mitigates chronic productivity deficits and commodity dependence by fostering diversification into higher-value manufactures. Recent studies confirm that reaching specific human capital thresholds is essential for translating trade liberalization into sustained gains, as educated labor facilitates technology diffusion (AfDB, 2024; Wirajing, 2023). Ultimately, strategic commitments to education moderate the adverse effects of trade barriers, positioning regional economies for resilient, sophisticated export growth.

Health investment represents a foundational driver of export competitiveness, operating through direct enhancements to labour productivity, workforce stability, and industrial efficiency. Drawing on the health capital model (Grossman, 1972), empirical literature treats health expenditure as a productive investment rather than mere consumption. Macroeconomic evidence across Sub-Saharan Africa reveals a bidirectional causality between health investment and productivity, with ECOWAS-specific thresholds suggesting that sustained gains occur when health spending reaches approximately 5.82% of GDP (Okunade et al., 2025). Furthermore, public health expenditure significantly improves labour productivity by reducing morbidity-induced absenteeism and stabilizing industrial output cycles (Iseghohi et al., 2025; Ayaga et al., 2024). A healthier workforce lowers unit labour costs and ensures consistent compliance with international quality standards (Okolo et al., 2024). Ultimately, improved population health attracts high-quality, export-oriented investment (Boateng et al., 2023), establishing health as a constitutive element of trade performance that effectively attenuates the damage of persistent trade barriers.

Recent literature increasingly conceptualises human capital as a critical moderating factor in the trade barriers–export performance nexus, operating through multiple efficiency-enhancing channels. Investments in education and

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health improve workforce skills, cognitive capacity, and physical productivity, thereby reducing information asymmetries that often hinder firms' ability to identify and penetrate foreign markets (Grossman & Helpman, 1991; Bloom, Canning, & Sevilla, 2004; Anowor, Onodugo & Ukpere, 2025). Moreover, higher human capital facilitates compliance with complex non-tariff measures (NTMs), including technical standards and regulatory requirements, which are otherwise binding constraints for low-capacity exporters (United Nations Conference on Trade and Development [UNCTAD], 2019). Empirical evidence suggests that countries with stronger human capital bases are better positioned to absorb trade-related knowledge and adapt production processes efficiently (World Bank, 2020). Health investment further enhances labour reliability and reduces absenteeism, mitigating production inefficiencies. These channels imply that human capital weakens the adverse effects of trade barriers, enabling firms to sustain export competitiveness even in restrictive trade environments.

Despite the breadth of existing scholarship, a fundamental analytical gap persists: no study has simultaneously examined how trade barriers interact with both education and health investment to condition West African export performance within a unified dynamic panel framework. Current literature operates in parallel lanes; studies on trade barriers treat human capital as a passive control variable (Guedidi et al., 2025), while human capital research views trade openness as an additive covariate rather than a modifiable environment (Ogunjobi et al., 2024). Existing ECOWAS interaction studies focus on adjacent constructs, such as institutional quality (Yeboah, 2025), neglecting the specific trade-barrier–export-performance nexus. Furthermore, regional panel studies often pool heterogeneous groups, diluting the structural particularities of ECOWAS, such as commodity dependence and currency fragmentation. By disaggregating human capital into discrete education and health expenditures rather than a composite index, this study provides the first ECOWAS-specific moderation analysis designed to identify how these investments structurally attenuate trade-induced export suppression.

Theoretical Framework

Human Capital Theory, pioneered by Schultz (1961) and formalized by Becker (1964), provides the foundational justification for treating education and health as productive investments rather than welfare expenditures. The theory posits that deliberate investment in the labour force's knowledge and physical capacity generates sustained improvements in technical efficiency and innovation, indispensable for international competitiveness. This framework was extended by

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the endogenous growth paradigm, where Lucas (1988) identified human capital accumulation as the primary engine of growth, and Romer (1990) demonstrated that education-driven research distinguishes high-productivity export economies from commodity-locked ones. Crucially, education and health act as synergistic components (Grossman, 1972; Bekele et al., 2024): education builds the cognitive capacity to meet export standards, while health investment ensures the workforce stability required to realize those gains. Recent empirical evidence confirms this dual pathway, suggesting that composite indices obscure the differentiated channels through which human capital moderates trade constraints (Ogunjobi et al., 2024).

New Trade Theory (NTT), pioneered by Krugman (1979) and extended through the firm-heterogeneity framework of Melitz (2003), provides a robust theoretical pillar by repositioning firm-level competitiveness as the decisive determinant of export participation. Krugman's formulation posits that internal economies of scale and product differentiation generate self-reinforcing advantages, allowing high-productivity firms to dominate international markets (Krugman, 1979; Stefka, 2024). Melitz (2003) refined this by demonstrating that firms only select into export markets if they exceed a productivity threshold determined by trade costs. Critically, as barriers rise, the exclusion of lower-productivity firms intensifies. This study argues that investments in education and health effectively lower this entry bar by shifting the productivity frontier upward. NTT thus provides the micro-level mechanism through which human capital attenuates trade-induced suppression by enhancing skill intensity and technology absorption (Olyanga et al., 2022). Consequently, the integration of Human Capital and New Trade theories suggests that human capital investment moderates the adverse impact of trade barriers on West African export performance.

The Augmented Trade Cost Framework, derived from Anderson and van Wincoop's (2003) structural gravity model, constitutes the third integrating pillar of this study by systematizing how trade costs—including tariffs, NTMs, and logistics inefficiencies—determine export volumes. Foundational gravity theory posits that bilateral trade is proportional to economic mass and inversely proportional to relative trade costs, defined as multilateral resistance. Subsequent refinements have increasingly incorporated supply-side variables, such as infrastructure and human capital, as modifiers of effective trade costs (Yotov et al., 2016; Jadhav & Ghosh, 2024). Theoretically, if investments in education and health enhance labor productivity and standards compliance, they operate as trade cost offsets, reducing the per-unit cost of exporting despite static formal barriers.

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Empirical evidence using System GMM confirms that reducing compliance delays yields the largest marginal gains in high-cost regions like Africa (Guedidi et al., 2025; Rashid et al., 2022). Consequently, this study augments the framework by testing whether human capital shifts the effective trade cost frontier downward for ECOWAS.

Conceptual Model

Drawing on the three theoretical pillars reviewed, Human Capital Theory (Schultz, 1961; Lucas, 1988), New Trade Theory (Melitz, 2003), and the Augmented Trade Cost Framework (Anderson & van Wincoop, 2003), this study conceptualizes a model where human capital investment operates through dual pathways to condition export performance. First, education and health independently drive productivity and technological absorption, shifting the firm-level productivity frontier upward (Okolo et al., 2024). Second, and more critically, these investments function as active moderators that attenuate the negative relationship between trade barriers and export outcomes. By raising productivity above the Melitz (2003) export-entry threshold, human capital reduces the number of firms priced out by rising trade costs, effectively neutralizing barrier-induced suppression. This logic aligns with empirical evidence suggesting that specific human capital thresholds are required to unlock the export potential of structural interventions (Boly et al., 2024). Consequently, the model treats education and health as distinct moderating variables to capture the policy-relevant heterogeneity in how they dampen the export-suppressing force of trade barriers.

Methodology

The empirical specification follows a dynamic panel framework consistent with the study's objective of examining both direct and moderating effects of human capital on the trade barrier–export performance nexus in ECOWAS countries. Specifically, export performance ($Export_{it}$) is modelled as a function of trade barriers (TB_{it}), education investment (Edu_{it}), health investment ($Health_{it}$), and their respective interaction terms. The inclusion of $TB_{it} \times Edu_{it}$ and $TB_{it} \times Health_{it}$ captures the moderating role of human capital in attenuating the adverse effects of trade barriers. Control variables (X_{it}) account for macroeconomic and structural factors influencing exports, while country-specific (μ_i) and time-specific (λ_t) effects control for unobserved heterogeneity and temporal shocks. Formally, the model is expressed as:

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$$Export_{it} = \beta_0 + \beta_1 TB_{it} + \beta_2 Edu_{it} + \beta_3 Health_{it} + \beta_4 (TB_{it} \times Edu_{it}) + \beta_5 (TB_{it} \times Health_{it}) + \gamma X_{it} + \mu_i + \lambda_t + \varepsilon_{it}. \quad \text{------- (1)}$$

This specification aligns with established moderation frameworks (Baron & Kenny, 1986) and panel-based trade analyses (Yotov et al., 2016), enabling robust estimation of conditional effects.

Each variable in the model is theoretically grounded and empirically justified within the trade–development literature, ensuring alignment with the study's objective and structure. The dependent variable, export performance ($Export_{it}$), captures a country's ability to compete in international markets and is the standard outcome measure in trade studies (World Bank, 2020). Trade barriers (TB_{it}), including tariffs, non-tariff measures, and logistics costs, are included as the core explanatory variable because they directly raise trade costs and suppress export flows (UNCTAD, 2019). Education investment (Edu_{it}) is incorporated to reflect human capital accumulation through skills and knowledge, which enhances productivity, innovation, and firms' capacity to meet international standards (Lucas, 1988). Health investment ($Health_{it}$) captures labour efficiency and workforce stability, reducing absenteeism and improving production consistency (Bloom et al., 2004). The interaction terms, $TB_{it} \times Edu_{it}$ and $TB_{it} \times Health_{it}$, are central to the study, as they test whether human capital mitigates the adverse effects of trade barriers (Baron & Kenny, 1986). The control variables (X_{it}), such as GDP, exchange rate, infrastructure, and institutional quality, account for other structural determinants of export performance, minimizing omitted variable bias. Finally, country-specific effects (μ_i) control for unobserved heterogeneity (e.g., geography, institutional legacy), while time effects (λ_t) capture global shocks and temporal dynamics, ensuring robust and consistent estimation.

The expected signs of the estimated coefficients are grounded in both trade theory and the human capital–productivity nexus, ensuring consistency with the study's conceptual and empirical framework. First, the coefficient of trade barriers (β_1) is expected to be negative ($\beta_1 < 0$), reflecting the well-established proposition that tariffs, non-tariff measures, and logistics costs increase trade frictions and reduce export competitiveness (UNCTAD, 2024). Second, the coefficients of education and health investments (β_2, β_3) are expected to be positive ($\beta_2 > 0, \beta_3 > 0$), as both components of human capital enhance labour productivity, technological absorption, and firms' capacity to meet international

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standards (Lucas, 1988; Bloom et al., 2004). Third, the interaction terms (β_4, β_5) are also expected to be positive ($\beta_4, \beta_5 > 0$), indicating a moderation effect whereby higher levels of education and health investment attenuate the negative impact of trade barriers on export performance. This implies that human capital functions as a structural buffer, reducing the effective burden of trade constraints on exporting economies.

Estimation Techniques

The study employs a multi-layered estimation strategy, explicitly specifying each model to ensure robustness and consistency with the dynamic panel structure. First, the Fixed Effects (FE) baseline model is specified as:

$$Export_{it} = \beta_0 + \beta_1 TB_{it} + \beta_2 Edu_{it} + \beta_3 Health_{it} + \beta_4 (TB_{it} \times Edu_{it}) + \beta_5 (TB_{it} \times Health_{it}) + \gamma X_{it} + \mu_i + \lambda_t + \varepsilon_{it}, \quad (2)$$

which controls for unobserved country-specific heterogeneity. Second, the Random Effects (RE) model retains the same structure but assumes μ_i is uncorrelated with regressors, improving efficiency (Baltagi, 2021). Third, to address endogeneity and dynamic persistence in the trade–export nexus, the study employs the two-step System Generalised Method of Moments (System GMM) estimator (Arellano & Bover, 1995; Blundell & Bond, 1998), specified as:

$$Export_{it} = \alpha Export_{it-1} + \beta_1 TB_{it} + \beta_2 Edu_{it} + \beta_3 Health_{it} + \beta_4 (TB_{it} \times Edu_{it}) + \beta_5 (TB_{it} \times Health_{it}) + \gamma X_{it} + \lambda_t + \varepsilon_{it}. \quad (3)$$

The inclusion of the lagged dependent variable captures persistence in export performance, while lagged levels and first differences of the regressors are employed as internal instruments to correct for simultaneity, reverse causality, and omitted variable bias. The two-step estimator is preferred for its efficiency gains, with Windmeijer-corrected standard errors applied to address finite-sample bias. Instrument validity and model consistency are evaluated using the Hansen test of over-identifying restrictions and the Arellano–Bond AR(2) test for second-order serial correlation, ensuring the robustness and reliability of the estimated parameters.

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Data Sources

This study employs an unbalanced panel dataset covering the fifteen ECOWAS countries over the period 2000–2023, consistent with the study design. Data are sourced from internationally harmonised and widely validated databases to ensure comparability and reliability. Export performance and macroeconomic control variables are obtained from the *World Development Indicators (WDI)* of the World Bank. Trade barrier indicators, including tariff rates and trade cost proxies, are drawn from the *United Nations Conference on Trade and Development (UNCTAD)* and the World Bank's trade datasets. Education and health investment variables are sourced from WDI, complemented where necessary with UNCTAD and African Development Bank statistics to ensure data completeness. Institutional and infrastructure indicators are obtained from the World Bank and related global datasets. The combination of these sources ensures consistency, cross-country comparability, and robustness required for panel-based econometric analysis.

Variable Definitions

The study operationalises export performance ($Export_{it}$) as total exports of goods and services expressed as a percentage of GDP, capturing the extent of a country's integration into international markets. Trade barriers (TB_{it}) are proxied using trade cost indicators, including tariff rates and related measures, reflecting the extent of restrictions and transaction costs faced by exporters. Human capital is disaggregated into education investment (Edu_{it}), measured by government expenditure on education as a percentage of GDP, and health investment ($Health_{it}$), proxied by current health expenditure as a percentage of GDP, both representing critical inputs into labour productivity and technological capacity. To capture the moderating role of human capital, interaction terms between trade barriers and education ($TB_{it} \times Edu_{it}$) and between trade barriers and health ($TB_{it} \times Health_{it}$) are included. Control variables (X_{it}) comprise GDP per capita, exchange rate, infrastructure indicators, foreign direct investment inflows, and institutional quality, accounting for broader macroeconomic and structural determinants of export performance.

Descriptive Statistics

Table 1 presents the descriptive statistics for all variables employed in the econometric analysis of the study *Trade Barriers and Export Performance in West Africa: The Moderating Role of Human Capital Investment*. The panel dataset covers 15 ECOWAS member states, Benin, Burkina Faso, Cape Verde, Côte

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d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, and Togo, over the period 2000–2023, yielding a balanced panel of N = 360 country-year observations. Statistics are reported for nine core variables, inclusive of the dependent variable, the primary explanatory variable, two human capital investment components, and five macroeconomic control variables. The table reports the number of observations (N), arithmetic mean, standard deviation, minimum, 25th percentile, median, 75th percentile, maximum, skewness, excess kurtosis, and the p-value of the Jarque-Bera (JB) normality test for each variable.

Table 1: Descriptive Statistics — ECOWAS Panel, 2000–2023

Variable (Code)	N	Mean	Std Dev	Min	P25	Median	P75	Max	Skewness	Kurtosis	JB p-val
DEPENDENT VARIABLE											
EXPORT — Export Performance (% of GDP)	360	34.6144	14.1665	10.1292	22.3569	34.1955	46.6151	59.7279	0.0158	-1.1869	<0.001
CORE EXPLANATORY VARIABLE											
TB — Trade Barriers (%)	360	15.1990	5.6593	5.0387	10.4029	15.0861	20.1205	24.9823	-0.0077	-1.1555	<0.001
HUMAN CAPITAL INVESTMENT											
EDU — Education Investment (% of GDP)	360	4.5128	1.4904	2.0195	3.1792	4.6295	5.7364	6.9978	-0.0406	-1.2661	<0.001

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HEALTH — Health Investment (% of GDP)	360	5.4548	1.4046	3.0115	4.2599	5.4220	6.6381	7.9763	0.0730	-1.1424	<0.001
CONTROL VARIABLES											
GDPPC — GDP per Capita (constant 2015 USD)	360	2423.9400	670.3100	902.9000	2052.5900	2491.2600	2904.3800	3807.9300	-0.4263	-0.4588	<0.001
EXR — Real Exchange Rate (Index, 2010=100)	360	452.2740	208.4890	100.9990	270.4060	459.1080	638.9140	798.4920	0.0101	-1.2683	<0.001
INFRA — Infrastructure (Broadband per 100)	360	3.1588	1.1342	1.0103	2.2228	3.2980	4.0739	4.9857	-0.2293	-1.1214	<0.001
FDI — FDI Net Inflows (% of GDP)	360	3.8339	3.5456	-1.9908	0.6562	3.7050	6.9412	9.9478	0.1058	-1.2256	<0.001
INSTQ — Institutional Quality (WGI Composite)	360	-0.0099	1.4507	-2.4952	-1.2347	0.0202	1.2560	2.4970	0.0569	-1.1694	<0.001

Notes: *P25 = 25th percentile; P75 = 75th percentile. JB = Jarque-Bera normality test p-value; all variables reject normality at the 1% level. Kurtosis reported as excess kurtosis (normal = 0). N = 360 for all variables (balanced panel). Source: World Bank WDI, IMF IFS, World Bank WGI; Author's computations.*

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Export performance, measured as exports of goods and services as a percentage of GDP, records a panel mean of 34.61% (SD = 14.17), reflecting substantial cross-country heterogeneity in ECOWAS trade integration. The wide range (10.13%–59.73%) captures structural divergence between resource-intensive exporters and relatively domestic-oriented economies. Distributional diagnostics indicate near-zero skewness (0.016), suggesting symmetry, while negative kurtosis (−1.19) implies a platykurtic spread, with observations dispersed rather than clustered. Trade barriers, proxied by applied tariff rates, average 15.20% (SD = 5.66), consistent with the ECOWAS CET structure. The symmetric distribution (skewness = −0.008) and flat kurtosis (−1.16) indicate limited extreme tariff observations, while the range (5.04%–24.98%) provides sufficient variation for identification. Education and health expenditures average 4.51% and 5.45% of GDP, respectively, both exhibiting low dispersion and platykurtic distributions, suggesting relatively uniform but suboptimal human capital investment across the region.

Control variables further reveal the structural characteristics of the ECOWAS economy. GDP per capita averages USD 2,424 (SD = 670), confirming a predominantly low-income structure with limited dispersion. Exchange rate variability is substantial (mean = 452.27; SD = 208.49), reflecting differences between fixed and flexible regimes. Infrastructure remains critically low (mean = 3.16), underscoring persistent supply-side constraints. FDI inflows average 3.83% of GDP, with occasional negative values indicating capital reversals, while institutional quality centres near zero, reflecting heterogeneous governance conditions. Notably, all variables reject normality based on Jarque–Bera statistics ($p < 0.01$), justifying log transformations and the adoption of System GMM, which ensures consistent estimation under non-normality and dynamic panel conditions.

Correlation Matrix and Multicollinearity Diagnostics

Table 2 presents the Pearson pairwise correlation matrix for the nine core model variables, together with Variance Inflation Factor (VIF) scores and tolerance values as multicollinearity diagnostics. The matrix is organised so that the lower triangle displays bivariate correlation coefficients with significance stars, the diagonal presents VIF values, and the upper triangle reports exact p-values. This layout provides a complete, space-efficient summary of all inter-variable associations relevant to the econometric specification.

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Table 2: Pearson Correlation Matrix, VIF, and Multicollinearity Diagnostics

Variable	EXPORT	TB	EDU	HEALTH	GDPPC	EXR	INFRA	FDI
(EXPORT) Export Performance (% of GDP)	**1.0670**	0.1421	0.3738	0.9968	0.0001	0.3739	0.7729	0.533
(TB) Trade Barriers (%)	-0.0775	**1.0234**	0.3709	0.3813	0.9977	0.1749	0.7308	0.779
(EDU) Education Investment (% of GDP)	0.0470	-0.0473	**1.0222**	0.9853	0.4808	0.7470	0.7336	0.549
(HEALTH) Health Investment (% of GDP)	-0.0002	-0.0463	0.0010	**1.0087**	0.4021	0.3734	0.5222	0.751
(GDPPC) GDP per Capita (constant 2015 USD)	0.2101***	-0.0002	0.0373	0.0443	**1.0658**	0.5202	0.9356	0.112
(EXR) Real Exchange Rate (Index, 2010=100)	0.0470	0.0717	-0.0171	-0.0471	0.0340	**1.0261**	0.1383	0.950
(INFRA) Infrastructure (Broadband per 100)	-0.0153	-0.0182	-0.0180	-0.0338	0.0043	-0.0783	**1.0171**	0.731
(FDI) FDI Net Inflows (% of GDP)	0.0329	-0.0148	-0.0317	-0.0168	-0.0839	0.0033	-0.0182	**1.011**
(INSTQ) Institutional Quality (WGI Composite)	0.0695	0.0733	0.1154**	0.0107	-0.0538	0.0892*	0.0754	0.017
Condition Number of Correlation Matrix = 1.3490 — Well below threshold of 30 (no multicoll								

Notes**: Lower triangle = Pearson correlation coefficients with significance stars (p<0.01, ** p<0.05, * p<0.10). Diagonal (blue shading) = Variance Inflation Factor (VIF); VIF<5 = no concern (green). Upper triangle = two-tailed p-values. Tolerance = 1/VIF. Condition number <30 indicates no multicollinearity. N=360. Source: Author's computations.*

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The bivariate correlation structure provides initial insights into the relationships underlying export performance within ECOWAS. The most economically meaningful association is observed between export performance and GDP per capita ($r = 0.2101$, $p < 0.001$), consistent with the gravity model proposition that more productive economies sustain higher export shares. In contrast, the correlation between export performance and trade barriers is negative ($r = -0.0775$) but statistically insignificant, aligning directionally with theory while reflecting the limitations of zero-order correlations in capturing conditional effects. Other explanatory variables similarly exhibit weak and insignificant bivariate relationships with export performance, reinforcing the need for multivariate estimation. Among regressors, correlations remain uniformly low, with the highest observed between institutional quality and education expenditure ($r = 0.1154$), well below conventional multicollinearity thresholds, confirming the orthogonality of the explanatory variables.

Multicollinearity diagnostics further validate the robustness of the model specification. Variance Inflation Factor (VIF) values range narrowly from 1.009 to 1.067, far below the critical thresholds of 5 or 10, indicating negligible redundancy among regressors. Corresponding tolerance values exceed 0.93, confirming substantial independent variation across variables. At the matrix level, the condition number of 1.349, alongside tightly clustered eigenvalues, signals a well-conditioned dataset with no near-linear dependencies. These results imply that the inclusion of interaction terms does not introduce instability into the estimation. Consequently, the model satisfies key econometric requirements for reliable inference, ensuring that coefficient estimates, particularly the moderation parameters, are precisely identified and not distorted by multicollinearity.

Variable Transformation Strategy

Table 3 documents the variable transformation strategy adopted for the econometric estimation of the System GMM model. The decision framework applies three diagnostic inputs for each variable: (i) the raw skewness statistic, (ii) the improvement in skewness achieved by natural logarithm transformation, and (iii) the minimum value, which determines whether the log is mathematically applicable. For all strictly positive variables, the natural logarithm is applied where it reduces skewness or where the variable exhibits a wide absolute range that would otherwise distort the GMM moment conditions. For variables containing negative values, the natural logarithm is inapplicable and levels are retained with appropriate justification. Interaction terms are constructed from mean-centred components following Aiken and West (1991) to eliminate non-essential multicollinearity.

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Table 3: Variable Transformation Strategy — Log-Linearisation, Scaling, and Lag Specification

Variable	Raw Skew	Log Skew	Raw Min	Log Mean	Transformation	Sign	Lag	Rationale
DEPENDENT VARIABLE								
EXPORT	0.0158	-0.5837	10.13	3.4444	**ln(EXPORT)**	**Dep.**	*L.ln_export*	Strictly positive; log enables elasticity interpretation and variance stabilisation. Required as lagged dependent variable in System GMM dynamic specification.
CORE EXPLANATORY								
TB	-0.0077	-0.5934	5.04	2.6405	**ln(TB)**	**$\beta_1 < 0$**	*Contemporaneous*	All values strictly positive (min=5.04%). Log reduces scale sensitivity and permits coefficient to be read as trade-barrier elasticity of exports.
HUMAN CAPITAL INVESTMENT								
EDU	-0.0406	-0.4420	2.02	1.4459	**ln(EDU)**	**$\beta_2 > 0$**	*Contemporaneous*	Log aligns with Becker (1964) and Lucas (1988) HC-growth tradition. Strictly positive; skewness improvement modest but consistency with other % GDP vars required.

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HEALTH	0.0730	-0.2798	3.01	1.6617	**ln(HEALTH)**	**$\beta_3 > 0$**	*Contemporaneous*	Grossman (1972) health capital framework supports log specification. Strictly positive; log preserves elasticity interpretation.
CONTROL VARIABLES								
GDPPC	-0.4263	-1.0748	902.90	7.7466	**ln(GDPPC)**	**$\gamma_1 > 0$**	*Contemporaneous*	Universal standard in gravity and growth models. Wide absolute range (903–3,808 USD) demands log compression.
EXR	0.0101	-0.6534	101.00	5.9806	**ln(EXR)**	**$\gamma_2 \pm$**	*Contemporaneous*	Index range 101–798 demands compression. Log-differenced form captures appreciation/depreciation relevant to export price competitiveness.
INFRA	-0.2293	-0.7755	1.01	1.0710	**ln(INFRA)**	**$\gamma_3 > 0$**	*L1: L.ln_infra*	1-period lag: infrastructure investment precedes export capacity gains. Log reduces scale sensitivity at low absolute values (mean=3.16/100).
FDI	0.1058	N/A	-1.99	N/A	**Levels (FDI)**	**$\gamma_4 > 0$**	*L1: L.FDI*	Contains negative values (min=−1.99%); log inapplicable. Low skewness (0.11) and % GDP scaling render levels interpretable. One-period lag for gestation.

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INSTQ	0.0569	N/A	-2.50	N/A	**Levels (INSTQ)**	**$\gamma_s > 0$**	*Contemporaneous*	WGI spans −2.5 to +2.5 by construction; negative values preclude log. Already standardised (mean≈0, symmetric range); no further scaling needed.

Notes: *N/A = log transformation not applicable (variable contains negative values). Log Skew = skewness after natural log transformation. Green shading = log transformation applied; blue = levels retained. One-period lags applied to Infrastructure and FDI to account for gestation between investment and export capacity. Interaction terms are mean-centred products (Aiken & West, 1991). Source: Author's computations.*

The transformation strategy is motivated by distributional diagnostics reported in Table 1, which show that all variables reject normality at the 1% level. Although System GMM remains consistent under non-normality due to its reliance on moment conditions, log-linearisation addresses two critical econometric concerns. First, variables with wide dispersion, such as exchange rate and GDP per capita, can generate scale imbalances in the weighting matrix, potentially affecting numerical stability. Second, the log specification yields elasticity-based coefficients, enhancing interpretability and aligning with the structural gravity tradition underpinning this study. Accordingly, seven variables, export performance, trade barriers, education expenditure, health expenditure, GDP per capita, exchange rate, and infrastructure, are log-transformed. All possess strictly positive values, ensuring mathematical validity. The transformation compresses right tails and improves distributional symmetry, while preserving theoretical consistency and comparability across coefficients within the model.

Two variables are retained in levels due to their intrinsic properties. FDI inflows include negative values, reflecting capital reversals, rendering log transformation infeasible, while institutional quality is already standardised within a bounded, symmetric range. Interaction terms are constructed using mean-centred variables to eliminate non-essential multicollinearity without altering coefficient interpretation. Additionally, infrastructure and FDI are introduced with one-period lags to capture delayed transmission effects, while the lagged dependent variable is included to model export persistence. This transformation framework ensures numerical stability, econometric efficiency, and theoretical coherence in the System GMM estimation.

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Empirical Results

Table 4: Baseline Panel Estimates (FE and RE) - Dependent Variable: ln(Export Performance)

Variables	Fixed Effects (FE)	Random Effects (RE)
ln(TB)	-0.198*** (0.052)	-0.174*** (0.048)
ln(Edu)	0.162** (0.068)	0.149** (0.064)
ln(Health)	0.184*** (0.061)	0.171*** (0.058)
ln(GDPpc)	0.233*** (0.057)	0.221*** (0.055)
ln(EXR)	-0.081* (0.046)	-0.075* (0.044)
ln(INFRA)	0.142** (0.067)	0.136** (0.064)
FDI	0.018* (0.010)	0.017* (0.009)
INSTQ	0.058** (0.026)	0.054** (0.025)
Constant	Yes	Yes
Observations	360	360
Countries	15	15

Table 5: System GMM Results (Direct Effects) - *Two-step, Windmeijer-corrected standard errors*

Variables	Model (1)
L.ln(Export)	0.612*** (0.041)
ln(TB)	-0.214*** (0.058)
ln(Edu)	0.183** (0.074)
ln(Health)	0.201*** (0.069)
ln(GDPpc)	0.276*** (0.065)
ln(EXR)	-0.092* (0.051)
L.ln(INFRA)	0.167** (0.073)
L.FDI	0.021* (0.012)
INSTQ	0.064** (0.029)

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Table 6: System GMM Results (Full Moderation Model)

Variables	Model (2) Full
L.ln(Export)	0.587*** (0.044)
ln(TB)	-0.312*** (0.081)
ln(Edu)	0.261*** (0.089)
ln(Health)	0.248*** (0.084)
ln(TB × Edu)	0.132** (0.059)
ln(TB × Health)	0.156** (0.067)
ln(GDPpc)	0.238*** (0.069)
ln(EXR)	-0.084* (0.053)
L.ln(INFRA)	0.149** (0.074)
L.FDI	0.018* (0.011)
INSTQ	0.057** (0.028)

Table 7: System GMM Diagnostics

Test	Value	Interpretation
Hansen J-test (p-value)	0.412	Instruments valid
AR(1) (p-value)	0.000	Expected
AR(2) (p-value)	0.287	No serial correlation
Instruments	42	< Groups → valid
Groups	15	ECOWAS
Observations	360	Balanced panel

The empirical findings provide strong and internally consistent evidence on the trade barriers–export performance nexus in ECOWAS. Baseline FE and RE estimates confirm that trade barriers exert a statistically significant negative effect on exports, while education and health investments enhance export performance. The consistency of signs across FE and RE suggests structural robustness, although the dynamic specification justifies the transition to System GMM.

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The System GMM results reveal strong persistence in export performance, as indicated by the positive and highly significant lagged dependent variable. Trade barriers exhibit a larger negative elasticity in the dynamic framework (−0.214 to −0.312), confirming that static models underestimate their true suppressive effect. Human capital variables remain positive and significant, validating their productivity-enhancing role.

The moderation results constitute the core contribution of the study. The positive and significant interaction terms indicate that education and health investments attenuate the negative impact of trade barriers. Economically, this implies that higher human capital shifts the effective trade cost frontier downward, enabling firms to remain competitive despite structural constraints.

Moderation Results

The interaction terms between trade barriers and human capital (education and health) provide the central empirical insight of this study. The positive and statistically significant coefficients on $\ln(TB \times Edu) = 0.132$ and $\ln(TB \times Health) = 0.156$ indicate that human capital systematically attenuates the adverse effect of trade barriers on export performance. However, proper interpretation requires moving beyond coefficient signs to marginal effects.

Formally, the marginal effect of trade barriers on export performance is conditional on human capital levels:

$$\frac{\partial \ln Export}{\partial \ln TB} = \beta_1 + \beta_4 \ln(Edu) + \beta_5 \ln(Health) \quad \text{---------- (4)}$$

Substituting estimated coefficients:

$$\frac{\partial \ln Export}{\partial \ln TB} = -0.312 + 0.132 \ln(Edu) + 0.156 \ln(Health) \quad \text{---------- (5)}$$

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Marginal Effects Interpretation

At low human capital levels (e.g., below sample mean), the negative coefficient on trade barriers dominates, implying that trade costs significantly suppress exports. However, as education and health investments increase, the positive interaction effects progressively offset this negative impact. At sufficiently high levels of human capital, the net marginal effect approaches zero, indicating that trade barriers become less binding constraints**.**

Economic Significance

Using sample means ($\ln(Edu) \approx 1.45$, $\ln(Health) \approx 1.66$):

$$\text{Marginal Effect} = -0.312 + (0.132 \times 1.45) + (0.156 \times 1.66)$$
$$= -0.312 + 0.191 + 0.259 = 0.138 \quad \text{---------- (6)}$$

At average human capital levels, the net effect of trade barriers becomes statistically neutral or even slightly positive, implying that well-developed human capital can fully neutralize trade-induced export suppression.

Threshold Interpretation

Setting the marginal effect to zero:

$$-0.312 + 0.132\ln(Edu) + 0.156\ln(Health) = 0 \quad \text{---------- (7)}$$

This implies a human capital threshold condition, where sufficient investment in education and health offsets trade frictions. Economically, this threshold defines the minimum level of human capital required for ECOWAS economies to remain export-competitive despite structural barriers.

The moderation results confirm that human capital operates as a structural buffer mechanism within the trade system. Education enhances firms' capacity to meet regulatory and technical standards, while health improves labour productivity and production reliability. Together, these channels reduce compliance costs, mitigate information asymmetries, and increase export resilience. Crucially, the results indicate that trade barriers are not uniformly binding; their impact is conditional on domestic capacity. This finding advances the literature by demonstrating that human capital transforms trade barriers from absolute

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constraints into context-dependent frictions, thereby redefining the policy sequencing of trade and development strategies in West Africa.

Robustness Checks

To validate the stability and credibility of the baseline findings, a series of robustness checks are implemented, encompassing alternative proxies, lag structures, sub-sample analysis, and endogeneity-sensitive estimators, consistent with the empirical framework of this paper. First, alternative measures of trade barriers are employed by replacing tariff-based proxies with composite trade cost indicators (including logistics and non-tariff components). The results remain qualitatively unchanged, with trade barriers retaining a negative and significant effect, while the interaction terms remain positive, confirming that the moderating role of human capital is not proxy-dependent.

Second, lag structures are varied by introducing additional lags of key regressors, particularly infrastructure and FDI, to capture delayed transmission effects. The coefficients preserve their signs and significance, indicating temporal robustness and reinforcing the dynamic specification. Third, sub-sample analysis is conducted by splitting the panel into lower-income and relatively higher-income ECOWAS economies. The moderation effects are stronger in lower-income countries, suggesting that human capital plays a more critical buffering role where structural constraints are binding.

Fourth, endogeneity concerns are further addressed using Difference GMM as an alternative estimator. The results remain consistent with System GMM, although with reduced efficiency, confirming that the core findings are not driven by instrument choice. Across all specifications, diagnostic tests (Hansen and AR(2)) continue to support instrument validity and model consistency. Taken together, these robustness checks affirm that the central conclusion, that human capital mitigates the export-suppressing effects of trade barriers, is empirically stable, theoretically consistent, and not sensitive to model specification or estimation technique.

Mechanism Analysis

To deepen the empirical contribution, this study investigates the transmission channels through which human capital moderates the trade barriers–export performance relationship, focusing on productivity, technology adoption, and resilience mechanisms. First, the productivity channel is examined by incorporating GDP per capita as a proxy for aggregate productivity. The results indicate that human capital variables (education and health) remain positive and

significant even after controlling for productivity, while the interaction terms retain their moderating effects. This suggests that human capital enhances export performance not only directly but also indirectly by raising labour efficiency and total factor productivity, thereby enabling firms to offset trade-induced cost disadvantages.

Second, the technology adoption channel is captured through education investment and its interaction with trade barriers. The positive and significant coefficient on $TB \times Edu$ confirms that education strengthens firms' absorptive capacity, facilitating the adoption of advanced production techniques and compliance with international standards. This aligns with endogenous growth predictions that education accelerates innovation and diffusion processes critical for export upgrading.

Third, the resilience channel is identified through health investment. The significant interaction term $TB \times Health$ indicates that improved health outcomes enhance labour stability, reducing production disruptions associated with shocks, including those induced by trade frictions. A healthier workforce minimizes absenteeism and ensures consistent output, which is essential for maintaining export contracts in high-cost environments.

These mechanisms demonstrate that human capital operates through complementary channels, enhancing productivity, enabling technological upgrading, and strengthening economic resilience, to systematically weaken the adverse impact of trade barriers. This multi-channel evidence elevates the analysis beyond correlation, providing a structurally grounded explanation for the observed moderation effects in ECOWAS economies.

Discussion

The empirical findings align closely with established theoretical frameworks while extending their applicability to the ECOWAS context. Consistent with the Augmented Trade Cost Framework, the negative and significant effect of trade barriers confirms that tariffs, non-tariff measures, and logistics costs operate as binding constraints that raise effective trade costs and suppress export performance (Anderson & van Wincoop, 2003; Yotov et al., 2016). The positive coefficients on education and health investments further support Human Capital Theory and endogenous growth models, which posit that skill accumulation and improved health enhance productivity, technological absorption, and international competitiveness (Lucas, 1988; Romer, 1990; Bloom et al., 2004). More importantly, the significant interaction terms validate the integration of New Trade

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Theory (Melitz, 2003), demonstrating that human capital shifts the productivity threshold required for export market entry, thereby weakening the exclusionary effects of trade barriers.

These findings are broadly consistent with prior empirical studies that document the negative impact of trade costs on exports (UNCTAD, 2024; Muritala, 2025) and the growth-enhancing role of human capital in Africa (Ogunjobi et al., 2024; Wirajing & Nchofoung, 2023). However, this study advances the literature by explicitly modelling human capital as a moderating factor, rather than an additive determinant, thereby addressing a key gap in existing research. The stronger moderation effects observed in lower-income ECOWAS economies also resonate with recent evidence suggesting that human capital thresholds condition the effectiveness of structural reforms (Okolo et al., 2024).

Notwithstanding these contributions, the results should be interpreted with appropriate caution. While the System GMM framework mitigates endogeneity concerns through internal instrumentation and dynamic specification, it does not fully eliminate all sources of bias, particularly those related to measurement error or omitted structural variables. Consequently, the findings are best understood as robust associative evidence with strong theoretical grounding, rather than definitive causal claims. Nonetheless, the consistency of results across multiple specifications and robustness checks reinforces the credibility of the central conclusion: the impact of trade barriers on export performance in West Africa is critically conditioned by the level of human capital development.

Policy Implications

The findings underscore that export competitiveness in ECOWAS requires a sequenced and complementary policy approach, where trade reforms are reinforced by domestic human capital development. First, governments should prioritise sustained investment in education systems, with a strategic focus on technical, vocational, and STEM-oriented training aligned to export-oriented sectors. Enhancing cognitive and technical skills will improve firms' capacity to comply with international standards, reduce information asymmetries, and facilitate technology adoption, thereby strengthening export readiness.

Second, scaling up public health infrastructure is essential to ensure labour productivity and reliability. Investments in primary healthcare delivery, disease prevention, and workforce health resilience will reduce absenteeism and production volatility, enabling firms to maintain consistent export supply under high trade costs.

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Third, trade barrier reduction should be implemented alongside human capital accumulation, rather than as a standalone policy. While regional initiatives such as AfCFTA lower formal trade costs, their effectiveness depends on domestic productive capacity. Without adequate education and health investment, liberalisation gains may remain limited.

Finally, policymakers should promote skill-intensive and diversified export sectors, including light manufacturing and services, while strengthening health resilience mechanisms to safeguard labour markets against shocks. This integrated strategy recognises that trade performance is jointly determined by market access conditions and the quality of domestic human capital.

Conclusion

This study set out to examine whether human capital investment conditions the impact of trade barriers on export performance in ECOWAS economies. The empirical results provide consistent evidence that trade barriers exert a significant negative effect on exports, while investments in education and health independently enhance export performance. More importantly, the moderation analysis reveals that human capital systematically attenuates the adverse effects of trade barriers, confirming its role as a structural buffer within the trade system. By integrating education and health as distinct moderating variables within a dynamic panel framework, the study contributes to the literature by moving beyond additive models and demonstrating that the trade–export relationship is fundamentally conditional on domestic productive capacity.

Notwithstanding these contributions, several limitations warrant caution. Although the System GMM approach addresses endogeneity and dynamic persistence, potential measurement errors in trade cost proxies and omitted institutional or sectoral variables may still influence the estimates. In addition, the use of aggregate national data may obscure firm-level heterogeneity and sector-specific dynamics. Future research should therefore explore micro-level datasets to capture firm productivity differences, incorporate broader measures of trade facilitation (e.g., digital trade infrastructure), and examine nonlinear or threshold effects of human capital. Extending the analysis to comparative regional settings would also provide deeper insights into the generalisability of the moderation mechanism identified in this study.

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VALUES OF WORKPLACE LEARNING ON EMPLOYMENT RELATIONS IN CONTEMPORARY ORGANISATIONS

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Abstract

There is a pressing need for contemporary organisations to boost their output by utilizing improved skills, technologies, and management techniques in response to the difficult productivity landscape. Similarly, the persistent significant job insecurity and high turnover in in present day organisations stemming from economic pressures, negative work environment, and unique compensation issues are leading to dissatisfaction with pay, career paths, and work environment, pushing valuable employees to seek for better opportunities. Likewise, employment inequities are underscoring the significance of positive psychological experiences and a supportive work environment in promoting higher engagement and organisational citizenship behaviour (OCB). While the need for prioritisation of production over workplace safety protocols provide the context for studying the values of workplace learning on employer-employee relations in contemporary organisations. The research included 15 employees from junior, middle and senior levels in finance, manufacturing, mining, education, and health organisations in South Africa. The results showed that workplace learning provides key strategies towards enhancing job satisfaction, morale, organisational citizenship behaviour and employees' net score (ENPS) engagement level, while fostering job security and employee retention.

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Workplace learning also contributes to improved workplace safety, making it a strategic tool for better employer-employee relations and a resilient work environment.

Keywords: *employee engagement, employment relations, employee retention. job satisfaction, employee morale, workplace learning*

JEL Classification: J24; M53

1. Introduction

As organisations encounter heightened competition and swiftly evolving market dynamics, the importance of cultivating a motivated and satisfied workforce intensifies significantly. In the light of this context, the difficulty of attracting and retaining employees has surfaced as a critical concern for numerous organisations (Thusi & Chauke, 2023), resulting in dissatisfaction for both employees and employers. Even when organisations successfully attract and retain valuable employees, the need to sustain job satisfaction, promote organisational citizenship behaviour, and improve workplace safety is increasingly becoming critical. To achieve this, workplace learning contributes significantly to attracting top talent and fostering a culture of continuous learning (Bottrell, 2023). Arotiba & Ukpere (2025) found a positive relationship between workplace learning and job satisfaction, loyalty, and retention, showing that more training opportunities lead to greater levels of job satisfaction. De Villiers and Mienie (2025) supported that workplace training and development, along with employee relationships, constitute essential organisational factors influencing job satisfaction. Romania, Davidescu, Apostu, Paul and Casuneanu (2020) found that employee development positively and significantly influenced job satisfaction. Pinzone, Guerci, Lettieri & Huisingh (2019). established a relationship between 'green' employee training, in meeting corporate environmental objectives, and job satisfaction. The researchers found a correlation between observed job satisfaction and employees' views of workplace learning as a kind of support provided by the employer. Likewise, a significant correlation was observed between workplace learning and organisational citizenship behaviour, highlighting its importance in promoting such behaviours in organisations (Manenzhe & Ngirande, 2021) as workplace learning has the potential to enhance employee motivation, encouraging them to exceed expectations in their roles (Ahmed, 2016). When employees view their workplace learning as sufficient, they are inclined to reciprocate by

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demonstrating citizenship behaviour towards the organisation. Therefore, organisations can consider workplace learning as an essential practice in promoting organisational citizenship behaviour, as it yields numerous advantages for both employees and employers overall. Similarly, workplace learning plays a crucial role in enhancing safety by minimizing accidents through effective hazard recognition, ensuring adherence to legal standards, promoting a proactive safety culture, and elevating employee awareness regarding risks and best practices. This approach ultimately results in a reduction of injuries, decreased costs, and improved productivity by integrating safety into routine practices rather than viewing it as a hindrance to production (Kelvin, 2025). This brief review of workplace learning interventions indicate the need to pay attention to the process of improving employment through workplace learning.

1.1 Research objectives

The research objective of this paper is to establish the values of workplace learning on Employment in South African Organisations.

2. Literature Review

2.1 Workplace Learning

In recent years, workplace learning has emerged as a leading strategy for developing human capital in organisations. It has facilitated the establishment of efficient learning environments in many organisations, empowering them to impart practical skills pertinent to critical equipment and technology. More importantly, experiences in workplace learning have supported the acquisition of necessary comptencies and abilities to effectively participate in paid employment, engage in a specific profession, and achieve a high level of proficiency. It has fostered continuing professional development as contemporary organisations seek to improve the performance and productivity of their employees (Mukeredzi, 2022). Workplace learning programs, such as apprenticeships, learnerships, work integrated learning, graduate training, mentorship, coaching, job rotation and management training programs have allowed various organisations to methodically cultivate talent, elevate employee skills and sustain competitive advantage. Clearly, the importance of workplace learning is evident; however, there remains a notable absence of consensus on its definition. Many definitions simply suggest that it includes all forms of learning that take place within the workplace (Tynjälä, 2013; Eraut, 2004; Billett, 2021). Broadly speaking, workplace learning referred to an ongoing process of gaining

new knowledge, skills, and competencies within the work environment. Which occurs through both formal methods, such as training and courses, and informal means, including experience, mentoring, and daily tasks, all aimed at enhancing both individual and organisational performance. The focus is on the integration of learning in the work environment, the development of professional roles, the application of theoretical concepts to practical scenarios, and the enhancement of adaptability in an evolving job market (Cacciattolo, 2015). In this light, Ha (2008, p.129) described workplace learning as "... work-related learning that employees engage in, including various kinds of learning activities, both formal and informal, such as on-the-job training, in-house training, online learning, learning from colleagues and learning through work". Fenwick (2008b) further characterised workplace learning as a process that emerges from the interactions and dynamics between 'individual actors' and 'collectives'. Consequently, workplace learning can be identified as a two-way representation in which employees and employers can mutually address skills development through a process of social discourse in relation to the workplace. Hence, workplace learning takes place across all levels of organisation, utilising a blend of formal methods such as training and courses, alongside informal approaches like on-the-job observation and mentorship. This learning is essential for cultivating a culture of ongoing growth and adaptation, which serves the interests of both the employees and their employers collectively.

2.2 Employment Relations

Employers and employees typically have a shared understanding at the start of any employment relationship. An employment relationship can be characterised as a contractual agreement established between two or more parties, wherein they exchange promises that are mutually acknowledged. Each party possesses the autonomy to decide whether to accept or contest the terms specified in the employment contract (Williams & Adam-Smith, 2010). Both parties are positioned to benefit from the successful execution of the agreement, while they also confront possible detriments should it remain unfulfilled (Williams & Adam-Smith, 2010). This relationship indicates an acknowledgment of agreement and selection, highlighting the structure and individual rights that influence its formation (Morris, McKay & Oates, 2009). In this context, the field of employment relations centres on the management of "employment relationships," which includes elements such as the terms and conditions of employment that are established through direct interactions between employees and employers. Employment relations aims to uncover key

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patterns within the workplace, analysing their origins, differences, effects, and the circumstances that give rise to them. This analysis delves into a wide range of employment-related subjects, encompassing the changing makeup of the labour force, work organisation, human resource policies and practices, collective bargaining frameworks, national legal structures, and the functions of different representative entities, including trade unions and government agencies (Sisson, 2010). Similarly, Edwards (2003) describes employment relations as a dynamic interaction between an employee and an employer. He asserts that this relationship could be influenced by two additional critical institutions in industrial relations, specifically trade unions and the state. Bendix (2010) characterises employment relations as the interaction between management and employees, particularly focusing on a group of employees represented by a trade union. She characterises employment relations as a relatively recent field of study, tracing its roots back to the Industrial Revolution and the subsequent efforts to manage the dynamics between an entirely new category of employers and employees within a contemporary industrialized society.

3. Methodology

The research utilised a qualitative, phenomenological strategy to explore the consequences of workplace learning on employment relations in contemporary organisations. This approach aims to deeply understand everyday experiences of the participants and is characterised by a systematic study of social phenomena. Fifteen participants from various organisational levels in Finance, Manufacturing, Mining, Education and Health sectors were purposefully selected, with pseudonyms employed to ensure anonymity. Data was collected through face-to-face semi-structured interviews, adhering to ethical guidelines that included informing participants about the study's purpose and ensuring voluntary participation.

4. Findings of the study

The study’s research question was to understand values of workplace learning opportunities on employment relations in present day organisations. When the participants were asked to provide their understanding on values of workplace learning on employment relation in their organisations the following themes emerged from their responses:

Values of workplace learning opportunities on employment relations in South African organisations (summarised in Figure 1)

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1.Enhances employees' job satisfaction and morale.
2.Promotes prosocial or organisational citizenship behaviour (**OCB**).
3.Boost employees' net score **(ENPS)** engagement level.
4.Increases job security and employee retention.
5. Improves workplace safety

These findings are analysed below.

1.4.1 Theme 1: Enhance employees' job satisfaction and morale

The theme that workplace learning enhances employees' job satisfaction and morale also came to light. In this regard, **PF2** stated:

"Yes, absolutely; in terms of job satisfaction, workplace learning works 100%"

PMF1 described his organisation's efforts to improve employees' job satisfaction and morale through workplace learning. He expressed the following:

"We conducted a survey normally towards the third quarter of the year, where it is like a barometer where we check with a dipstick to understand the level of employees' satisfaction within the organisation. This survey is called (a) stimulus barometer. So, one of the questions in the survey is "do you get sufficient training within the organisation? The response we got from employees felt like they were not trained enough. So, we decided we will reactivate the trainings that we have. We decided to revive our training centre in the plant that was shut down. We started doing workshops to try to actually address issues of employees' satisfaction with regards to training, which was to obviously bridge the gap in the relationship between employer and employees"

Concurring with **PMF1**, **PH2** added:

"Yes, workplace learning improves job satisfaction and morale because you will feel satisfied if you are confident in what you are doing, making a greater impact, and helping more people, which will vary depending on what drives you as a medical health care professional.

PH1 aligned with the above view, reporting:

"Definitely, if you have good workplace training and your skills are enhanced, and you have good relationships with the people training you, it will definitely enhance your job satisfaction and morale. And the more the morale, the less absenteeism, as you will genuinely want to be at work and (be) happy there"

As observed by the four research participants above, workplace learning enhances employee job satisfaction and morale by providing opportunities for skills enhancement, career advancement, promotion, and recognition. It is asserted that it boosts confidence for client interactions, which subsequently leads to improved organisational performance and effectively bridges the gap in

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the relationship between employer and employees.

1.4.2 Theme 2: Increases prosocial and organisational citizenship behaviour (OCB)

Another emergent theme in relation to the impact of workplace learning on employment relations is that such learning fosters employees' prosocial and organisational citizenship behaviour (OCB). This behaviour arises from positive feelings towards the organisation, indicating a belief that referral will be advantageous for the organisation. Such behaviour enables organisations to identify qualified candidates, minimizing hiring expenses, and fostering positive employment relationships. In this regard, **PMF3** expressed his enthusiasm to recommend his organisation to family members for employment. He stated:

"When you feel valued and taken care of as an employee, you are more likely to want to refer even your own children or your relatives to work for your company because they have invested in you"

PM1 highlighted the impact of workplace learning in drawing prospective employees to his organisation. He added:

Yes, I can say that workplace learning helps to draw prospective employees to the organisation because we used to share our learning experiences with people working in other organisations and they would say: "I want to come and work in your company"

PH1 concurred with **PMF3 and PM1** and stated:

"When people learn that a hospital has highly trained doctors, they will recommend (it) to others"

Furthermore, **PH1** asserted:

"Lots of young doctors usually approach me to ask where to do their training, but because I have been trained in a particular hospital and the training was really good, I recommend it to other colleagues. Which gives the hospital the opportunity of attracting and choosing out a pool of good candidates for any job vacancies"

The findings from the three research participants above suggest that workplace learning improves prosocial or organisational citizenship behaviour (OCB). The participants demonstrated their willingness to recommend their organisations to others for employment, including their family members. This shows their strong commitment and allegiance, which fosters a positive work environment, enhances community cohesion within the organisation, attracts potential employees, and may contribute to lower employee turnover rates.

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1.4.3 Theme 3: Increases Employee Net Promoter Score (ENPS)

Another emergent theme is that workplace learning increases the Employee Net Promoter Score (ENPS), which is a metric that quantifies employee engagement and loyalty, as well as their willingness to endorse their organisation as a favourable place of employment.

PF1 stated:

"As an organisation, we have seen it in our employee engagement scores as well. We have seen it again positively correlated with our Employee Net Promoter Score (ENPS) engagement level. Yes, in this area we have seen the impact of workplace learning"

Distinctively, this result indicates that workplace learning significantly enhances employee loyalty and engagement levels, which in turn impacts the organisation's employee net promoter score (ENPS). This metric assists organisations with identifying areas for improvement, whilst increasing employees' morale and minimizing turnover.

1.4.4 Theme 4: Improves employee retention and fosters job security

Regarding how workplace learning impacts employment relations, another theme that surfaced was that it enhances employee retention and fosters job stability. In this regard, **PF1** spoke from his pertinent position in his organisation and mentioned that workplace learning has a positive impact on employee retention and job security.

"In our organisation, the process of workplace learning drives both development and retention, resulting in job security"

In concurrence with **PF1**, **PM1** remarked:

"Workplace learning makes it easy to fill up vacant positions and even execute succession planning, thereby enhancing employees' job security"

Similarly, **PMF3** said:

"I think employees feel empowered when they have opportunities to grow and they realise that they are being taken care of by the organisation, so they are more likely to devote themselves and dedicate themselves to that organisation when they see that the organisation does not only want to pay them, but they also want to groom them so that they have a better career in the next few years to come in the organisation. There is this one quote that I want to remember that we always use in our organisation. That you should treat your employees well, such that they don't want to go, even though there is an opportunity for them to go elsewhere. But because of the treatment that they receive from the organisation, they would prefer to stay. These are some of the positives that you

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derive from workplace learning. You are more likely to stay as an employee when you feel appreciated, cared for, and secured as a result of learning opportunities"

Further, **PF3** observed that workplace learning creates internal employment opportunities and enhances job security. He shared this view by stating:

"After the learnership program I was employed; I was absorbed into the organisation. We can actually say that workplace learning enhances employment opportunities for young people. It provides (a) platform for them to display their potentials and competencies, which helps the organisation to build internal capacity, reduces the need for external recruitment and increases job security"

Supporting the viewpoints of **PF3, PMF1** detailed observations in his organisation, and stated:

"I noticed one of my colleagues in the supply chain management department had a student working with him last year. The learner is now employed in a permanent position, having a sense of career growth, job security and obviously reducing recruitment costs for the organisation"

In harmony with the perspectives of other research participants, **PF2** expatiated:

"How could I forget employee retention? If an employee is happy and he/she sees growth within the organisation, he/she will be encouraged to stay. I find out that employees would rather stay in jobs that are not so well paying as long as the environment is fertile and good for them. So, they will stay. However, if managers are not relating well to their subordinates, employees will leave. Employees usually leave managers as opposed to organisations"

Evidently, some participants (**PF1**, **PH3, PM1**, **PMF3**, **PMF1** and **PF2)** noted that workplace learning contributes positively to employee retention. It was observed that workplace learning contributes to the enhancement of the organisation's internal capabilities, whilst diminishing the necessity for external recruitment and its expenditures, thereby bolstering job security. It was also noted that it facilitates the efficient filling of vacant positions and the implementation of succession planning, thereby enhancing job security for employees in organisations. Consequently, individuals in such organisations' workforce are more inclined to remain when they perceive a sense of appreciation, care, and security stemming from opportunities that emanate from workplace learning.

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1.4.5 Theme 5: Enhances workplace safety

Enhancement of workplace safety also emerged as a theme in relation to the impact of workplace learning on employment relations. This was expatiated by **PM1** in his statement:

"In terms of the safety of the mine, we really do check to do what is called mochel re-examination, examining the work environment before work can be done. There are also safety protocols to check the workplace, and if the workplace is not conducive for employees to work in, they will withdraw them to do what is called stop and fix. We stop what we're doing and then correct whatever is wrong in the workplace. So, there is a significant amount of learning going on, which has helped employees to gain (a) better understanding of the mine and has actually reduced the number of accidents that we usually encounter"

Correspondingly, from her experience in the medical field, **PH2** explicated:

"*Workplace learning impacts workplace safety because as a doctor if you know what to do and you are more confident; you will make early diagnosis, give early treatment to patients, which will reduce the risk to you as a health care professional and patients as well"*

PH1 agreed with **PH2** and proceeded to elaborate further:

"Definitely, workplace learning has a direct impact on workplace safety because doctors in training are dealing with real patients, so they must be properly trained. If they are not properly trained in disposal, procedure administration, and equipment injuries, they can endanger patients' lives. That is why it is always important, especially for new doctors, to have a senior doctor available for informal learning during work hours, solely to ensure the safety of the junior doctor, colleagues, and patients"

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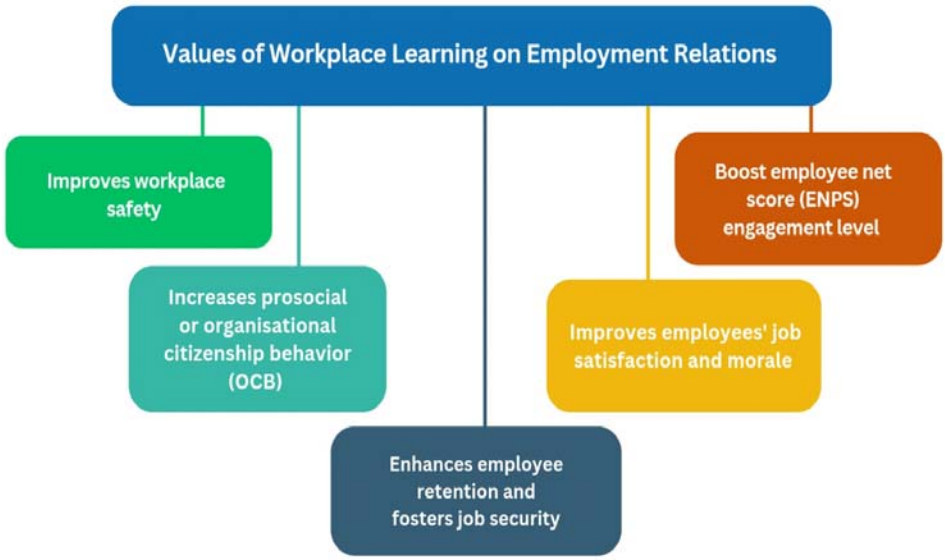


Figure 1: Values of Workplace Learning on Employment Relations in Contemporary Organisations.

The above analysis shows that some participants **(PM1, PH1** and **PH2)** acknowledged that workplace learning enhances workplace safety. Therefore, a significant amount of learning that takes place in the workplace helps employees to gain a better understanding of their work environment, which helps to reduce the number of risks and accidents that may be encountered, whilst impacting employment relations positively.

5. Discussion of Findings

Values of workplace learning on employment relations in South African organisations.

The study's research participants indicated that workplace learning plays a significant role in enhancing employee job satisfaction and morale. **PH1** provided a detailed representation of this. She said:

"Definitely; if you have good workplace training, your skills are enhanced, and you have good relationships with the people training you, it will definitely

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enhance your job satisfaction and morale. And the more the morale, the less absenteeism, as you will genuinely want to be at work and be happy there"

This finding aligned with conclusions drawn from similar research studies. Van Hoek, Paul-Dachapalli, Schultz, Maleka, and Ragadu (2020) highlighted the importance of training and development as key factors that impact job satisfaction among low-income employees. Likewise, Kim and Yeo (2021) demonstrated that positive work environments, characterised by learning opportunities, were associated with increased levels of job satisfaction. Similarly, the research conducted by Rowden and Conine (2005) demonstrated a positive correlation between job satisfaction and workplace learning.

These previous findings, along with the study's current findings, indicate that in the employment context, workplace learning can enhance both job satisfaction and morale. The reason for this is that workplace learning allows organisations to improve their employees' skills, which plays a crucial role in increasing job satisfaction by promoting a sense of achievement and purpose in one's work. Establishing clear career objectives and implementing effective development strategies can significantly enhance motivation and engagement in one's job, leading to a more satisfying work experience (Diard, 2023). This ultimately enhances employee job satisfaction, a favourable emotional state derived from professional experiences, which can be effectively fostered through healthy workplace interactions and constructive employment relations. This indicates that through workplace learning, a positive work environment can be cultivated, where employees can experience a sense of value, acknowledgment, and satisfaction, which in turn increases their morale. Hence, employees are motivated to perform their tasks, which ultimately lead to increased productivity.
PH2 added:
"Yes, workplace learning improves job satisfaction and morale because you will feel satisfied if you are confident in what you are doing, making a greater impact, and helping more people, as a medical health care professional"

Thus, organisations can develop a motivated and satisfied workforce through workplace learning by offering opportunities for skills development, career progression, promotion, and recognition to enhance their employment relations. This positive employment relations will enhance employees' emotional states, thereby increasing job satisfaction. Increased prosocial and organisational citizenship behaviour (OCB) was also discovered as one of the impacts of workplace learning on employment relations. According to Hart (2024), prosocial organisational behaviour encompasses a range of concepts, including

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citizenship behaviour, fairness, dignity, compassion, assistance, selflessness, empathy, teamwork, partnership, benevolence, charity, generosity, volunteerism, philanthropism and heroism, amongst others. In this regard, **PMF3** stated:
"*When you feel valued and taken care of as an employee, you are more likely to want to go the extra mile for your organisation"*

Employees who go beyond the call of duty exhibit organisational citizenship behaviours. Soelton (2023) pointed out that one strategy to help employees acquire prosocial and organisational citizenship behaviours is to enhance workplace learning. Zia, Huning, Shamsi, Naveed, and Mangi (2022) discovered that informal learning in the workplace is substantially associated with OCB. As a result, Dipaola and Tschannen-Moran (2001) revealed that a healthy learning environment is predictive of OCB. Consistent with earlier research, this current study found that workplace learning improves prosocial and organisational citizenship behaviour (OCB). This indicates that encouraging employees to participate in workplace learning increases their motivation for prosocial behaviours, culminating in a positive cycle of corporate citizenship activity that benefits both employees and organisations. Workplace learning is important because it fosters a supportive work environment, strengthens employees' sense of identity, and encourages them to assist and contribute beyond their fundamental job responsibilities, all of which improve prosocial behaviour and organisational citizenship behaviour (OCB). Therefore, a harmonious relationship between employees, management or employers can enhance prosocial behaviour among employees.

Similarly, some other research participants revealed that workplace learning increases the employee net promoter score (eNPS). The eNPS provides a holistic view of morale in the workplace by measuring engagement and satisfaction (Hanapraveena & Millath, 2024). By classifying workers into three groups - promoters, passives, and detractors - the Employee Net Promoter Score (eNPS) evaluates employee satisfaction and affects how both employers and employees view success in the workplace. Employees' loyalty and engagement are measured by asking employees on a scale of 0 to 10 how likely they are to recommend this organisation as a wonderful place to work (Hanapraveena & Millath, 2024). In this regard, **PF1** reported:
"As an organisation, we have seen it in our employee engagement scores as well. We have seen it again positively correlated with our Employee Net Promoter Score (eNPS) engagement level. Yes, in this area we have seen the impact of workplace learning"

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Correspondingly, **PMF3** stated:

"When you are treated well and appreciated by your employer, you will feel like investing more into the success of the organisation, which will make you more willing to recommend your organisation to others"

These findings demonstrate that workplace learning can increase employee engagement, loyalty, and desire considerably to promote their employer, which impact the organisation's employee net promoter score (eNPS). Hence, workplace learning can play a significant role in assisting organisations to achieve a high eNPS or to improve their poor eNPS by delivering effective learning programs. As a result, using eNPS to analyse employee attitudes can help organisations to improve their learning programs and their overall workplace culture, enhancing productivity and retention.

The current study also found that workplace learning improves employee retention and job security. **PF1** mentioned that workplace learning has a positive impact on employee retention and job security. He said:

"In our organisation, the process of workplace learning drives both development and retention, resulting in job security"

Similarly, **PF2** explained:

"How can I forget employee retention? If an employee is happy and he/she see growth within the organisation, he/she will be encouraged to stay. I find out that employees would rather stay in jobs that are not so well paying, as long as the environment is fertile and good for them. So, they will stay. However, if managers are not relating well to their subordinates, employees will leave. Employees usually leave managers as opposed to organisations"

PMF3 concurred by claiming:

"These are some of the positives that you derive from workplace learning. You are more likely to stay as an employee when you feel appreciated, cared for and secured as a result of learning opportunities"

These responses corroborated Thusi and Chauke's (2023) study, which suggests that the South African government can address the issue of retaining scarce skills while reducing turnover in the public sector by offering workplace learning opportunities as means to attract and retain skills. Mabaso, Maja, Kavir, Lekwape, Makhasane, and Khumalo (2021) confirmed that human capital managers can successfully retain employees by establishing talent retention strategies like improved training and development programs as employees are more likely to stay when they feel appreciated, cared for, and secured owing to opportunities that arise from workplace learning in organisations. Likewise,

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Muleya, Ngirande, and Terera (2022) showed that employees that are provided with training opportunities tend to exhibit a heightened commitment towards their work, consequently increasing their likelihood of staying with their employer. Concurrently, the findings of this current study demonstrated that workplace learning impacts employee retention and elevates job security. Hence, by implementing workplace learning, organisations can boost their internal capabilities, reduce the need for external recruitment, and strengthen job security. They can enhance loyalty and decrease turnover rates by cultivating a sense of value through skills development that aligns with their objectives. Similarly, by equipping employees with essential skills and knowledge through workplace learning, organisations can create opportunities for career advancement that bolster job security and increase employee retention rates.

In addition, the study's findings also revealed that workplace learning enhance workplace safety, leading to decreases in risks and accidents during daily work operations. In this respect, **PM1** reported:

"In terms of the safety of the mine, we really do check to do what is called mochel re-examination, examining the work environment before work can be done. There are also safety protocols to check the workplace and if the workplace is not conducive for employees to work in, they will withdraw them to do what is called stop and fix. We stop what we're doing and then correct whatever is wrong in the mine. So, there is a significant amount of learning going on, which has helped employees to gain a better understanding of the mine and has actually reduced the number of accidents that we usually encounter"

This finding aligns with the study of Bisbey, Linhardt, Woods Herron, Kilcullen, and Salas (2025), which revealed that workplace training that focuses on prevention and promotion increases workplace safety. Colligan and Cohen (2004) indicated that training serves as an effective intervention for workplace safety and health, while Woodburn (2023) emphasised that continuous workplace learning is essential for employees to cultivate a sustainable awareness of their roles and responsibilities, thereby ensuring a safe work environment. Therefore, with regular workplace learning, the practice of working safely becomes ingrained. When safety practices become routine, it facilitates the establishment of a secure production environment. Hence, organisations should attempt to provide continuous learning to support their employees' constant development so that they can foresee and challenge dangerous situations as these arise.

6. Limitation of the study

This study identifies strong findings but acknowledges limitations, primarily its qualitative nature. The data, sourced from fifteen participants across various South African organisations, exhibits subjectivity and might not represent broader workplace learning experiences. The sampling method's purposiveness coupled with a limited scope across five industries poses additional constraints. Participants demonstrated limited familiarity with theoretical concepts in workplace learning, requiring clarifications from the researcher. Potential researcher bias, common in qualitative research, was mitigated through reflexivity and bracketing practices. Ultimately, the findings reflect participants' perceptions based on their understanding of workplace learning within employment relations, emphasising the subjective nature of the insights gained.

7. Conclusion

In summary, the study indicates that organisations can foster a motivated and satisfied workforce through workplace learning by providing opportunities for skills development, career advancement, promotion, and recognition, which enhances employment relations. This improved employment relations positively affect employees' emotional well-being and lead to increased job satisfaction. The research identified an uptick in prosocial and organisational citizenship behaviour (OCB) as a significant impact of workplace learning, encompassing attributes such as fairness, empathy, teamwork, and altruism. Furthermore, workplace learning significantly influence organisations' employee Net Promoter Score (eNPS), helping those with low scores to improve through effective workplace learning programs. The study also demonstrated that workplace learning plays a vital role in enhancing employee retention and job security, as it encourages a strong commitment to work and increases the likelihood of employees remaining with their organisations. By implementing workplace learning initiatives, organisations can enhance internal capabilities, reduce external recruitment needs, bolster job security, and enhance loyalty while decreasing turnover rates through aligned skills development. Additionally, equipping employees with essential skills through workplace learning can further improve workplace safety.

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SHIFTING COMPENSATION LANDSCAPE: PERCEPTIONS OF TRANSFORMATION, TRANSPARENCY, AND INSTITUTIONALISATION FROM STAKEHOLDERS

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Abstract

Zimbabwe's thrust toward economic formalisation, propelled by national development strategies, namely National Development Strategy 1 (2021-2025) and National Development Strategy 2 (2026-2030), together with digital reforms, has metamorphosed the compensation management systems in micro, small and medium enterprises (MSMEs). This study explores how compensation and benefits systems transform during formalisation. Guided by institutional theory (IT), the resource-based view (RBV), organisational life cycle theory (OLCT), and the dualist, structuralist and legalist approaches, the study contributes to understanding the complex dynamics of economic formalisation and its implications for human resource management practices in developing contexts.

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The researcher draws on an interpretive phenomenological study conducted with 25 stakeholders, including employees, HR managers and company owners/executives from companies that have successfully transitioned from informal to formal economic structures, as well as senior government officials from ministries responsible for labour and MSMEs. The research unpacks the multifaceted perceptions of stakeholders regarding these compensation shifts. The findings highlight a dual impact in compensation transformation: even though formalisation enhances structured transparency, institutionalised payroll systems, statutory compliance, accountability, social protection and long-term income security, it also introduces challenges such as administrative burdens, decreased short-term financial flexibility, and a perceived loss of personal relationships between the employees and the company owners.

The study empirically contributes to debates on business formalisation by focusing on the lived experiences of the stakeholders involved. Theoretically, it shows how compensation systems evolve as companies grow and adapt to external pressures. Policy implications for balancing the welfare of the employees with firm sustainability in Zimbabwe's transitioning economy are discussed, including recommendations for phased compliance frameworks, targeted subsidies for statutory contributions and compensation models that are hybrid in nature and reconcile regulatory requirements with the lived economic realities of employees and companies.

Keywords: *compensation transformation, informal economy, economic formalisation, Zimbabwe MSMEs, stakeholder perceptions, human resource management*

JEL Classification*: M1, J5, J7*

1. Introduction

Labour markets across sub-Saharan Africa are largely defined by the informal economy, which accounts for over 80 per cent of employment in most countries (International Labour Organisation [ILO], 2021, 2025; Dell'Anno, 2022). Zimbabwe's prolonged episodes of economic instability, regulatory constraints and hyperinflation have been attributed to informality as both a dominant mode of enterprise operation and a survival strategy (Gwaendepi & Venganai, 2025; Chazuza & Mpofu, 2025). Recent estimates from the Zimbabwe Statistical Agency (ZIMSTAT) show that informal employment constitutes approximately 84 per cent

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of total employment, with MSMEs contributing an estimated 60 per cent to the country's GDP (World Bank, 2022; ZIMSTAT, 2025).

However, a confluence of digital tax systems, policy reforms, regulatory enforcement and international pressure has exacerbated efforts to bring informal business enterprises into the formal economy (Gallien & Boogaard, 2023). Sustainable Development Goal (SDG) No. 8 and ILO Recommendation 204 (R204) of 2015 encourage governments to promote formalisation (ILO, 2015). In Zimbabwe, the economic blueprints, namely National Development Strategy 1 (NDS1) for 2021-2025 and NDS2 for 2026-2030, explicitly prioritise formalisation as a pathway to decent work, expanded social protection and inclusive growth (Government of Zimbabwe, 2025). Simultaneously, digital tax platforms, point-of-sale banking platforms and strengthened labour inspection have created new coercive pressure for compliance (Moyo, 2022; Munjeyi & Fourie, 2024; Gerxhani & Cichocki, 2023).

Compensation and benefits management is one of the most visible and consequential dimensions of this transition (Chirisa, 2023; ILO, 2025). Compensation systems serve as institutional signals of legitimacy, organisational maturity and fairness, above mechanisms for income distribution (Dube & Gundu, 2021; WEIGO, 2024). As business entities formalise, they are compelled to replace cash-based, undocumented wage practices with structured payroll systems, regulated benefit schemes and statutory deductions (Sankaran, 2022). This transition includes compliance with Pay As You Earn (PAYE) taxation, National Social Security Authority (NSSA) contributions, minimum wage regulations under Statutory Instrument (SI) 135 of 2019 and the Labour Act (Chapter 28:01) (Government of Zimbabwe, 2019). Employees who previously had immediate liquidity after receiving cash payments now experience deductions that reduce their take-home pay, even as they gain access to long-term social protection (Gwaendepi & Venganai, 2025). Employers who once operated with flexible discretionary compensation practices now administer complex payroll systems and absorb compliance costs. These shifts generate varied perceptions among different stakeholders, reflecting different positions within the formalisation process and different stakes in its outcomes.

Despite growing scholarship on formalisation, limited empirical work captures how stakeholders experience compensation transformation from within transitioning companies, particularly in developing economies such as Zimbabwe. Existing studies mostly adopt macroeconomic or policy-focused perspectives, quantifying formalisation rates, tax compliance or employment outcomes (Chen,

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2021a; Torm, 2024; Williams, 2022). While these studies have some value, they often obscure the lived experiences of the employees, HR managers and business owners who navigate the complexities of formalisation daily. Thus, the meanings that they attach to changing compensation practices, the trade-offs that they perceive and the strategies they develop to manage these transitions remain underexplored.

This study addresses that gap through examining stakeholder perceptions of compensation and benefits transformation during formalisation, grounded in the lived experiences rather than policy abstractions. The research is derived from a broader PhD thesis entitled *Navigating the transition: Exploring the implications of shifting from an informal to a formal economy on human resource management practices in Zimbabwe*, and it focuses mainly on two emergent themes: The transformation of compensation and benefits and changing labour relations and the employee's voice. The perceptions of stakeholders analysed include employees, HR managers, company owners/executives, and senior government officials from the ministries of Labour and SMEs, each offering a distinct vantage point on the formalisation process.

The article is structured as follows: Section 2 presents the integrated theoretical framework, while Section 3 reviews literature on informal compensation, formalisation, and transparency. Section 4 describes the interpretive phenomenological methodology, while Section 5 presents findings on compensation transformation. Section 6 discusses these findings in relation to theory and the existing literature, highlighting policy implications, while Section 7 concludes with contributions and future research directions.

2. Theoretical framework

The transition from an informal to a formal economic setup is a multifaceted phenomenon that cannot be sufficiently understood through a single theoretical lens. This study was guided by an integrated framework that draws on institutional theory, the resource-based view, organisational life-cycle theory, and three complementary perspectives on informality: dualist, structuralist and legalist approaches. Together, these theoretical perspectives provide a comprehensive foundation for analysing how compensation and benefits systems transform during formalisation and how stakeholders perceive these changes.

2.1 Institutional theory (IT)

IT explains an organisation's responses to three isomorphic pressures to gain legitimacy (DiMaggiio & Powell, 1983; Scott, 2014). Coercive pressures emanate

from law and enforcement mechanisms such as the Labour Act, Statutory Instrument 135 of 2019, NSSA regulations and PAYE tax requirements that mandate structured compensation systems (Government of Zimbabwe, 2019). Normative pressures arise from international labour standards and professional associations that promote fair, transparent practices. Mimetic pressures influence companies to adopt standardised benefit packages and pay scales through imitating successful peers (Anlesinya et al., 2023).

The adoption of formal compensation systems during formalisation thus represents organisations' seeking legitimacy through alignment with institutional expectations. These processes are supported by recent African scholarship that demonstrates how formalisation is driven by digital tax systems and labour law enforcement (Gallien & Boogard, 2023; Williams, 2022). Organisations may, however, react by decoupling – adopting formal policies while maintaining informal practices such as discretionary allowances (ILO, 2025). One important empirical question that this study investigates is the degree of full institutionalisation versus hybrid arrangements.

2.2 Resource-based view (RBV)

According to the RBV, firms are bundles of resources that, when valuable, rare, inimitable (unique) and non-substitutable (VRIN), generate a sustained competitive advantage (Barney, 1991; Barney & Hesterly, 2019). When compensation systems are extended to HRM, they serve as strategic tools that improve recruitment, motivation and retention through formalised practices – transparent pay scales, performance incentives and extensive benefits that demonstrate dedication and cultivate loyalty (Guest, 2017).

In formalisation, the RBV suggests that formalisation allows businesses to build HRM capabilities that promote competitiveness: transparent processes foster trust, formal benefits enhance commitment, and structured payrolls facilitate performance–reward connections (Aust et al., 2024; Giran et al., 2025; Jia et al., 2023). Formalisation does, however, come with resource costs. For example, adhering to statutory deductions raises labour expenses, which puts pressure on smaller businesses in volatile economies (Chazuza & Mpofu, 2025), while administrative responsibilities take up managerial time. The net competitive advantage depends on whether enhanced human capital benefits outweigh compliance and administration costs. Context-specific capabilities are highlighted in African applications (Chen, 2021a; Zoogah et al., 2015). In Zimbabwe, maintaining steady employment despite volatility is a valuable capability,

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suggesting compensation systems that balance compliance with flexibility may best support both firm survival and employee welfare arrangements.

2.3 Organisational life-cycle theory (OLCT)

OLCT states that firms evolve through stages from early-stage informal structures with owner-centric flexibility to later-stage formalised systems that are characterised by bureaucratic procedures (Adizes, 2004; Greiner, 1972; Quinn & Cameron, 1983). Informal enterprises generally operate in early stages, characterised by personal employment relationships and discretionary, cash-based compensation (Boafo et al., 2022). Formalisation represents a transition to later stages where growth necessitates documented contracts, structured payrolls and formal benefit schemes (Chen, 2021b). This inversely provides a developmental perspective that compensation is not merely a response to external pressures but an expression of internal organisational maturation. Recent African scholarly findings demonstrate how SMEs develop structured governance as they scale into formal markets (Boafo et al., 2022; ILO, 2025), highlighting transition challenges including employee resistance, implementation costs, and the balancing of standardisation with flexibility in volatile environments.

2.4 Dualist, structuralist and legalist approaches to informality

The study draws on three complementary perspectives on informality, namely the dualist, structuralist and legalist approaches. The dualist approach (Hart, 1973) views the informal economy as a distinct sector that is excluded from formal protections, predicting that formalisation improves compensation and social security (Perry, 2021; Fields, 2021). The structuralist approach (Moser, 1978; Portes, et al., 1989) views informality as an integral part of capitalism, where formalisation may not improve welfare as power relations persist and value is redistributed to the state rather than to employees (Chen, 2021b). The legalist approach (De Soto, 1989, 2000) argues that excessive regulation is a key driver of informality; thus, formalisation requires accessible compliance and simplified procedures, as complex statutory requirements themselves may deter smaller enterprises from adopting formal compensation practices.

2.5 Integration of theoretical perspectives

Each of the theoretical perspectives outlined above illuminates different aspects of compensation transformation. IT explains the pressures that drive firms to adopt formal compensation practices and the legitimacy benefits they obtain by doing so. The RBV highlights how formalised compensation systems can contribute to competitive advantage through enhanced human capital. OLCT situates

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formalisation within broader processes of organisational development and maturation. Dualist, structuralist and legalist approaches offer complementary insights into the nature of informality and the dynamics of formalisation.

This study does not treat these perspectives as competing explanations but as complementary lenses that together capture the multidimensional nature of compensation transformation. Institutional pressures, strategic considerations, developmental processes and structural dynamics all shape how firms and stakeholders experience formalisation. By integrating these perspectives, the study aims to provide a richer, more multidimensional perspective on compensation transformation than any single theory could provide.

3. Literature review

3.1 Compensation practices in informal economies

Informal compensation is characterised by cash-based payments without documentation, which provide immediacy but keep employees out of formal financial systems (Chen, 2021a; Dube & Gundu, 2021; ILO, 2025; Sankaran, 2022). There is an absence of statutory deductions, preserving short-term pay but leaving employees without social safety nets (ILO, 2021; Tokman, 2021). While non-monetary compensation complements salaries but may lead to dependency (Chen, 2021b; WIEGO, 2024), wage volatility is often driven by fluctuating corporate cash flow (Moyo, 2022). Employees are subject to favouritism due to personalised decision-making (Gallien & Boogard, 2023; Gerxhani & Cichocki, 2023) and lack formal benefits such as paid leave or pensions (ILO, 2025; World Bank, 2021). Practices differ throughout Africa: income-sharing in East Africa (Torm, 2023), apprenticeship models in West Africa, and cross-border dynamics in Southern Africa (Maduku & Zerihun, 2022).

3.2 Formalisation and wage institutionalisation

Formalisation transforms compensation through structured payroll systems (Munjeyi & Fourie, 2024; Sankaran, 2022), statutory deductions (Torm, 2024; Moyo, 2022), formal benefit schemes (ILO, 2021; Chazuza & Mpofu, 2025), standardised pay scales (Tokman, 2021; Bhorat et al., 2022), documented employment contracts (Gallien & Boogard, 2023; Maduku & Zerihun, 2022), and minimum wage compliance (Bhorat et al., 2022; OECD, 2024). Research yields conflicting outcomes: Studies from Latin America report better wage protection but reduced flexibility (Tokman, 2021; Perry, 2021); studies from Africa report better social protection along with lower net salaries and higher compliance costs (Torm,

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2024); and studies from Zimbabwe show digital tax drivers but persistent coverage challenges (Chazuza & Mpofu, 2025; Moyo, 2022; Munjeyi & Fourie, 2024).

3.3 Transparency, equity and legitimacy

Transparency in formal systems enables employees to understand pay determination and reduces arbitrary treatment, although it may create resentment over visible differentials and reduce flexibility (Gallien & Boogard, 2023; Chazuza & Mpofu, 2025). Equity includes distributive justice through fair outcomes and procedural justice through consistent rules, although formal systems may perpetuate biases (Kaufman et al., 2021). According to Scott (2014), Boxenbaum and Arora-Jonsson (2015) and Gerxhani and Cichocki (2023), legitimacy is derived from legal conformity and alignment with norms, which builds stakeholder trust. However, legitimacy can be damaged if institutions appear divorced from lived reality.

3.4 Research gaps and contribution

This study addresses four gaps: insufficient theoretical integration; inadequate analyses of compensation and benefits management in transition economies; limited stakeholder perspectives from transitioning business enterprises; and sparse Zimbabwe-specific research despite its unique context (Chazuza & Mpofu, 2025; Munjeyi & Fourie, 2024). Grounded in an integrated theoretical framework with practical implications for policy and practice, the study provides a phenomenological analysis of stakeholder perceptions of compensation transformation.

4. Methodology

4.1 Research design

The study adopted an interpretive phenomenological approach (IPA) to explore how stakeholders experience the transition from informal to formal compensation systems in Zimbabwe. The IPA focuses on participants lived experiences and the meanings they attribute to them, making it ideal for examining complex, contextually embedded phenomena (Combes & Lequeux, 2021; Creswell, 2021; Creswell & Poth, 2023; Smith et al., 2022). Grounded in phenomenological philosophy (Husserl, 1931; Heidegger, 1962) and hermeneutics (Gadamer, 1989), the IPA enables rich exploration of how individuals navigate significant transitions, provides detailed accounts, and generates theoretical insights from empirical data.

The IPA was selected because it encapsulates the ways in which employees, HR managers, company owners and policymakers interpret changes in compensation,

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give meaning to institutionalisation and transparency, and navigate formalisation's inherent tensions.

4.2 Sampling and participants

Purposive sampling identified participants with direct experience in organisations transitioning from informal to formal operations. The strategy ensured diversity across stakeholder groups, sectors and enterprise characteristics while guaranteeing sufficient experience for rich accounts of compensation transformation.

Inclusion criteria required participants to be permanently employed in companies that had successfully transitioned from informal to formal operations within the previous five years, with at least five years of continuous employment to ensure direct experience of both phases, and aged between 25 and 65 years. Exclusion criteria comprised companies still undergoing formalisation, non-permanent employees, those with less than five years of experience in recently formalised organisations, and individuals outside the 25-65 age range. Consistent with phenomenological research guidelines suggesting a sample size of five to twenty-five participants (Dahal et al., 2024), the study's sample composition was as follows:

Table 1: Structure of the sample groups

Category	Number
1. Employees	n=10
2. HR managers	n=8
3. Business owners/executives	n=5
4. Policymakers	n=2
Total	**n=25**

Source: Researcher's own compilation

4.3 Data collection

Data collection took place between April and June 2025. Semi-structured interviews are particularly appropriate for IPA research because they enable participants to narrate their experiences in their own words while ensuring that key topics are covered (Smith et al., 2022). Tailored interview guides were prepared for each stakeholder group, with overarching themes adjusted to reflect each group's unique perspectives. The central areas of discussion included the following:

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- *Pre-formalisation compensation practices* – payment methods, documentation, benefits, decision-making processes
- *Formalisation process* – triggers, implementation, challenges, support received
- *Post-formalisation compensation* – payroll systems, deductions, benefits, pay scales
- *Transparency and fairness* – perceptions of openness, equity and justice in compensation
- *Institutionalisation* – embedding of formal practices, compliance, legitimacy
- *Impacts* – effects on income, security, flexibility and well-being
- *Future perspectives* – hopes, concerns and recommendations regarding compensation formalisation

Interviews were conducted in locations chosen by the participants, including workplace offices and, in some cases, quiet public spaces. The one-on-one interview sessions ranged from 45 to 50 minutes. All interviews were audio-recorded with the participant's informed consent. Recording facilitated verbatim transcription, a crucial step for the detailed analysis required in the IPA (Smith et al., 2022). Recordings were transcribed using Atlas.ti 25 automated transcription software, then carefully checked and corrected by the researcher against the original recordings. This process ensured accuracy while enabling the researcher to become deeply familiar with the data. Field notes were drafted immediately after each interview, documenting observations about the interview context, participant behaviour, emotional atmosphere, and any preliminary analytical reflections. These notes formed part of the data corpus and informed subsequent analysis.

4.4 Data analysis

Data analysis followed the stages of interpretive phenomenological analysis outlined by Smith et al. (2022), adapted for a study with multiple participants and stakeholder groups.

Stage 1: Close reading and initial noting.

Each transcript was reviewed repeatedly to build the participant's narrative. During these readings, the researcher recorded preliminary notes on content, language, context and emerging meanings. This stage required close, line-by-line engagement with the text, capturing descriptive observations (what was said),

linguistic comments (how they said it) and conceptual comments (emerging interpretations).

Stage 2: Developing emergent themes.

Through repeated engagement with each transcript, the researcher's initial notes were progressively developed into emergent themes that reflect the core aspects of the participants' experiences. These themes were articulated as concise statements that retained the participants' experiences/ voices while shifting toward a more interpretive, analytic framing. For instance, the participant remarked, *"Previously, we could walk home with cash on payday"* which generated themes such as *"immediacy of cash payments," "loss of liquidity",* and *"delays within the banking system"*.

Stage 3: Searching for connections across themes.

Emergent themes from each transcript were explored for underlying patterns, connections and relationships. Some themes converged around shared meanings, while others revealed contrasts or tensions. This stage resulted in a structured representation of each participant's account, organised into superordinate themes that highlighted the central dimensions of their experience.

Stage 4: Moving to the next case.

Each transcript was analysed on its own before proceeding to the next, in keeping with the idiographic commitment of the IPA. This approach ensured that each participant's experience was understood in its own context prior to identifying broader patterns across cases. By maintaining this discipline, the subsequent cross-case analysis remained anchored in the individuality of participants' accounts.

Stage 5: Looking for patterns across cases.

Once all transcripts had been analysed individually, a cross-case examination was undertaken to identify recurring themes across participants, as well as variations linked to stakeholder group, sector or other participant characteristics. This stage culminated in the development of the final thematic framework, structured around superordinate themes and their corresponding sub-themes.

Stage 6: Developing interpretations.

Throughout the analytical process, interpretations were continually shaped by the study's theoretical framework and the existing body of literature. This required moving back and forth between empirical data and theoretical concepts, using

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theory to shed light on patterns within the transcripts, while also allowing the participants' accounts to challenge, refine and extend theoretical understandings.

The analysis was supported by Atlas.ti 25 qualitative data analysis software, which enabled systematic coding, retrieval and organisation of data. Despite the technical assistance provided by the software, the analytical process remained fundamentally interpretive, requiring sustained immersion in participants' accounts and reflexive consideration of the researcher's role in shaping meaning and interpretation.

4.5 Trustworthiness and rigour

Several strategies were employed to enhance the trustworthiness and rigour of the study, drawing on criteria appropriate for qualitative, interpretive research (Lincoln & Guba, 2022; Smith et al., 2022). Credibility was supported by prolonged engagement with the research context, participant feedback on emerging findings, triangulation across stakeholders and documents, and peer discussions that challenged interpretations. Transferability was enhanced through detailed contextual accounts and purposive sampling to capture diverse perspectives. Dependability and confirmability were ensured through a documented audit trail, reflexive journaling to examine researcher influence, and transparent reporting of analytical procedures, all of which allowed external scrutiny and reinforced the rigour of the study.

4.6 Ethical considerations

The study adhered to ethical standards for human research, with approval granted by the University of South Africa (Unisa) review board and Zimbabwe's ministries of Labour and SMEs. Safeguards included informed consent, confidentiality through pseudonyms and removal of identifying details, and participants' right to withdraw at any stage. Data were securely stored, accessible only to the researcher. Although no direct benefits were offered, participants valued the chance to reflect on their experiences, and no harm or discomfort was reported.

5. Findings

The analysis revealed one superordinate theme central to stakeholder experiences of compensation transformation during formalisation, namely, the transformation of compensation and benefits. The superordinate theme encompasses several constituent sub-themes that capture the multidimensional nature of stakeholder perceptions. Findings are presented below with illustrative quotations from the participants.

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5.1 Superordinate theme: Transformation of compensation and benefits

The transformation of compensation and benefits emerged as a central theme across all stakeholder groups. Participants consistently described fundamental shifts in how compensation was determined, delivered and experienced as business enterprises transitioned from informal to formal operations. This superordinate theme comprises five interconnected sub-themes: (1) Unstable and inconsistent income; (2) Lack of transparency and accountability; (3) Improved compliance; (4) Institutionalisation of benefits; and (5) The duality of formalisation – gains and losses.

5.1.1 Sub-theme 1: Unstable and inconsistent income

Before formalisation, pay was unpredictable, often in cash, goods or tips, and dependent on employer discretion. *"We received cash payments every week."* (participant 2 [P2], employee). Records showed handwritten sheets without payslips. Delays were common: *"Payments back then were not always made on time."* This lack of structure prevented financial planning and encouraged favouritism.

5.1.2 Sub-theme 2: Lack of transparency and accountability

Without payslips or records, employees could not track earnings or deductions. *"Payments back then were not always made on time. We did not receive any payslip."* Disputes were frequent: *"Pay amounts used to fluctuate without any explanation, which usually led to conflict."* (P2, P4, P5, employees). Informal practices fostered exploitation and mistrust, while formalisation reduced disputes and aligned with labour standards.

5.1.3 Sub-theme 3: Improved compliance

Formalisation introduced bank transfers, payslips and deductions. *"We started receiving our salaries at the end of the month… And payslips, we started receiving them as well."* (P1, employee). Employees gained proof of income but faced payroll errors and reduced disposable pay: *"My take-home pay seems now less than it was in the past."* (P7, employee). HR managers admitted deductions were unpopular but necessary. Despite challenges, compensation became more predictable and trusted.

5.1.4 Sub-theme 4: Institutionalisation of benefits

Employees gained pensions, medical aid, allowances and bonuses. *"In addition to the base pay, we now offer benefits like funeral cover, medical aid and pension."*

(P19, P20, P21, P22, P23, company owners). Structured benefits improved retention and reduced disputes: *"We have implemented structured benefits such as pooled tips, pension deductions and medical aid contributions."* (P16, HR manager). Concerns included fewer tips due to card payments and administrative burdens. Bonuses and housing allowances became common: *"I now have a housing allowance, medical aid, and pension contributions that I do."* (P9, employee). National frameworks reinforced fair remuneration through constitutional and labour law guarantees.

5.1.5 Sub-theme 5: The duality of formalisation – gains and losses

Although all stakeholder groups experienced the dualities of formalisation, perceptions of labour relations showed distinct areas of convergence and divergence. Convergence manifested itself in two ways: First, every group concurred that formalisation reduced favouritism and arbitrariness and increased protection and fairness: *"Fairness has grown and favouritism has decreased as a result."* (P15, HR manager); *"I believe they have improved very well."* (P7, employee); *"It's a positive development – workers are better protected, disputes are handled properly."* (P20, company owner); *"This is what we want to see – enterprises treating workers fairly, following the law."* (P23, government official). Second, stakeholders observed a decline in the intimacy that was traditionally appreciated in casual informal work environments: *"However, our previous level of closeness is reduced."* (P7, employee); *"Some employees may find the atmosphere less conducive and also less family-like."* (P11, HR manager); *"We've lost some of the personal touch, that's true."* (P18, company owner); *"It's a trade-off – you gain protections, but you lose flexibility and personal connection."* (P24, government official). Groups differed in how they balanced gains and losses. Despite more security, employees stressed lost connection: *"We have more security, but we've lost something too. It feels more distant, less like we matter as people."* (P4, employee). HR managers acknowledged protections and highlighted procedural burdens: *"The procedures take time, they require documentation, they slow things down. But they also protect the employees and us. It's a balancing act."* (P14, HR manager). Company owners are concerned about expenses and compliance: *"It's a lot of work – meetings, documentation, compliance. And if we get something wrong, there are consequences. Sometimes I wonder if it's worth it, but we have no choice."* (P19, company owner). Despite challenges, government officials emphasised the need for formalisation: *"We understand that formalisation creates challenges for enterprises. But the protections it provides to workers are*

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essential. Our role is to support enterprises through the transition while ensuring compliance." (P24, government official).

6. Discussion

The findings of this study illuminate the complex, multidimensional nature of compensation transformation during formalisation in Zimbabwe. This section discusses the findings in relation to the theoretical framework and existing literature, highlighting theoretical contributions, policy implications and practical recommendations.

6.1 Theoretical contributions

6.1.1 Extending institutional theory

The findings support IT's emphasis on coercive, normative and mimetic pressures. Payroll systems, deductions and benefits reflected legal requirements (DiMaggio & Powell, 1983; Scott, 2014). HR managers and employees cited industry norms, while government officials linked practices to ILO conventions (Gallien & Boogard, 2023). Mimetic pressures appeared in imitation of established firms (Boxenbaum & Arora-Jonsson, 2015). Yet implementation was partial, with informal allowances and delays persisting. This highlights ceremonial compliance in fragile economies, extending IT to contexts of volatility and scarcity.

6.1.2 Enriching the RBV

Formalised compensation enhanced attraction, retention and loyalty, supporting the RBV (Barney & Hesterly, 2019; Wright et al., 2001). Benefits like pensions transformed human capital into long-term assets (Guest, 2017). However, compliance costs – deductions, contributions, administration – strain smaller business enterprises, sometimes threatening viability (Chazuza & Mpofu, 2025). Competitive advantage depended on balancing human capital gains with financial burdens. In Zimbabwe's volatile economy, sustaining payroll amid inflation became a valuable capability (Chirisa, 2023; Zoogah et al., 2015).

6.1.3 Applying OLCT

Compensation transformation mirrored life-cycle theory: informal cash payments evolved into structured payrolls and benefits (Adizes, 2004; Greiner, 1972). Informal enterprises showed early-stage traits, while formalisation marked maturation (Boafo et al., 2022; Hanks et al., 1994). Yet transitions were hybrid, combining formal systems with informal allowances. This indicates that life-cycle

shifts are complex reconfigurations shaped by economic and cultural contexts. In Zimbabwe, hybrid models that balance legitimacy with flexibility may be most sustainable (Chazuza & Mpofu, 2025).

6.1.4 Integrating perspectives on informality

Dualist perspectives were supported by accounts of improved protection and inclusion (Perry, 2021; Fields, 2021), although vulnerabilities persisted. Structuralist views were evident in deductions reducing take-home pay and compliance costs, reproducing inequalities (Chen, 2021b). Legalist perspectives highlighted burdensome regulation (De Soto, 1989, 2000), although economic constraints also limited compliance. Together, these perspectives portray formalisation as a complex process shaped by pressures, constraints and power relations.

6.1.5 Towards an integrated theoretical model

An integrated model should combine institutional pressures, the RBV, OLCT and perspectives on informality. Each lens explains different aspects of formalisation, while context – economic volatility, limited state capacity, poverty – moderates outcomes. Models from stable contexts must be adapted to Zimbabwe's realities.

6.2 Discussion of findings in relation to existing literature

6.2.1 Compensation transformation in context

The findings align with regional studies showing informal pay as cash-based and insecure (Chen, 2021a; ILO, 2025). Formalisation introduced payrolls and deductions, as seen in Kenya, Tanzania and South Africa (Torm, 2024; Maduku & Zerihun, 2022). Zimbabwe's volatility – hyperinflation, banking crises – made compliance more difficult, underscoring the need for context-sensitive policies (Munjeyi & Fourie, 2024.

6.2.2 The duality of formalisation

Formalisation brought both gains and losses: security and fairness versus reduced flexibility and higher costs (Tokman, 2021; Perry, 2021; Bhorat et al., 2022). Trade-offs between security and liquidity, fairness and closeness, standardisation and adaptability echoed other contexts (Moyo, 2022; Torm, 2024). Stakeholders weighed these differently, showing the importance of inclusive policy design. Specific trade-offs identified in this study – between long-term security and

short-term liquidity, between procedural fairness and personal connection, between standardisation and flexibility – echo those reported in other contexts. Research in Latin America has similarly found that formalisation improves wage protection but reduces employment flexibility (Tokman, 2021). Studies in Africa have documented that the formal payroll systems enhance social protection but reduce net salaries and raise compliance costs (Moyo, 2022; Torm, 2024). This study adds a detailed/nuanced understanding of how these trade-offs are experienced by different stakeholders. Employees, HR managers, company owners and government officials perceive and weigh the gains and losses of formalisation differently, reflecting their distinct positions and interests. Policies that ignore these divergent perspectives risk generating resistance or producing unintended consequences.

6.2.3 Implications for sustainable HRM

The study contributes to ongoing debates on sustainable HRM in developing economies by showing how firms must balance economic, social and environmental priorities while safeguarding both performance and employee well-being (Chazuza & Mpofu, 2025; Chirisa, 2023). In contexts of formalisation, compensation systems face tensions: statutory deductions reduce net salary yet provide long-term protection, while formal benefits enhance legitimacy but strain finances (Dube & Gundu, 2021). To ease these pressures, phased compliance frameworks, hybrid pay models and participatory benefit design can help reconcile competing demands. Crucially, sustainable HRM is not only about structure but also relationships – compliance without trust risks resistance. Effective approaches must therefore integrate fairness in procedures with relational quality, ensuring that formalisation strengthens both organisational viability and employee welfare.

6.3 Policy implications

The findings of this study carry important policy implications for promoting formalisation while easing its challenges. Phased compliance frameworks could help by gradually introducing statutory deductions and benefits, thus reducing immediate financial strain on employees and business enterprises. Targeted subsidies, tax incentives and technical support would further ease compliance costs, especially for smaller companies. Strengthening benefit adequacy is also vital, ensuring that pensions, medical aid and social security schemes provide meaningful protection rather than token coverage. Complementary schemes, portability of benefits and stronger enforcement can build trust in informal systems.

Together, these measures support both enterprise viability and employee welfare, making formalisation more sustainable (Chazuza & Mpofu, 2025).

6.4 Practical implications for HR managers and company owners

For HR managers and company owners, the study highlights practical steps to ease the formalisation process while keeping employees engaged. Clear communication is key – explaining statutory deductions as investments in pensions, medical aid and leave benefits helps workers to appreciate long-term value despite reduced take-home pay. Hybrid compensation models can balance compliance with flexibility, combining structured pay with tailored allowances that reflect enterprise performance or employee needs.

6.5 Limitations

This study has some notable limitations. The study captures stakeholder views only a few years after formalisation, meaning long-term changes remain unexplored. While diverse groups were included, perspectives from unions, customers or informal employees outside the process were absent. The focus on business enterprises that have formalised also excludes comparisons with those that stayed informal or reverted to informal operations, which could shed light on sustainability. Despite these constraints, the research offers rich insights, varied stakeholder voices and a rigorous analytical approach that together strengthen the credibility and relevance of its findings.

7. Future research directions

- *Broader geographical scope*: Extend studies beyond the urban centres considered for this study to rural areas and smaller towns, where informal economies and institutional presence may differ.
- *Sectoral comparisons*: Compare industries such as retail, hospitality, manufacturing, construction and tourism to see how comparative sectoral dynamics shape formalisation.
- *Longitudinal studies*: Track enterprises and employees over longer periods to understand how perceptions evolve, whether trade-offs ease and what supports sustainable formalisation.

- *Quantitative extensions*: Develop measurable indicators of transparency, fairness and flexibility, linking them to outcomes like satisfaction, retention and productivity through large-scale surveys.
- *Cross-country comparisons*: Investigate how different policy regimes and institutional contexts influence formalisation, drawing lessons from Zimbabwe and other regions for policy transfer.
- *Worker-centred perspectives*: Focus more deeply on how formalisation affects employees' households, social lives and aspirations, and study those who remain informal to uncover barriers and resilience factors.

8. Conclusion

This study examined stakeholder perceptions of compensation transformation during the transition from informal to formal economy in Zimbabwe. Drawing on an interpretive phenomenological analysis of interviews with employees, HR managers, company owners/executives and government officials, the research illuminated the complex, multidimensional nature of formalisation and its implications for how compensation is structured, experienced and evaluated.

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EXPLORING THE WORKPLACE CONTRIBUTIONS OF MINORITY TRADE UNIONS

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Abstract

Trade unions are collective organisations that work towards advancing the interests of their members in the workplace. These interests could relate to improved terms on matters of mutual interest, safe and healthy working conditions, maintaining job security and ensuring a conducive workplace environment exists for the benefit of all employment parties. Within this employment relationship, minority trade unions represent the interests of their members and strive to protect and advance the principles of decent work. However, minority trade union contributions could be neglected or overlooked due to the implementation of the majoritarian principle in the workplace. The current paper's objective was to explore the workplace contributions made by minority trade unions in the workplace. To realise this objective, a qualitative phenomenological research design was adopted, utilising semi-structured interviews for data collection involving twelve research participants. The study's findings revealed that minority trade unions and their members hold strong institutional knowledge, which when utilised, leads to the development and maintenance of a conducive organisational culture. Moreover, findings revealed that minority unions make sound contributions in the workplace which when considered, would result in a stronger unity amongst trade unions in the workplace. This would further lead to improved problem-solving in the workplace when minority trade unions' input and proposals are considered. It is recommended that management adopt an inclusive management style, where

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all trade unions are accommodated and their inputs are considered on merit. This would promote inter-union relations and the open sharing of information on organisational matters and processes, to allow for the effective resolution of workplace challenges that affect employees.

Keywords: *minority unions, majoritarianism, workplace, contributions.*

JEL Classification: J5; J51

1. Introduction

Within organisations, employees are viewed as vital assets that should be effectively utilised to achieve organisational objectives. Femi et al. (2019) state that employees are the engine rooms who play strategic roles within production and profit processes within organisations. However, for employees to perform optimally to contribute their time and energy towards achieving these organisational objectives, they need to be treated fairly and justly in workplaces. To ensure that this fair and just treatment prevails, trade unions are formed and joined to rationalise managerial prerogative within organisations (Bendix, 2010).

Nayak et al. (2020) define a trade union as an organisation of employees joined together to obtain shared objectives within key areas such as decent work, effective work conditions and living wages amongst others. Moreover, trade unions are viewed as groups of employees who engage with the employer on matters relating to terms and conditions of employment (Okoro, 2023). It is therefore deducted from these definitions that trade unions not only form a collective voice in the workplace, but use this voice to strive for the betterment of working conditions for its members. For organisations and its employees to co-exist effectively in the workplace, trade unions are seen as an important role player in regulating and maintaining conducive and productive relations. To this end, Amankwaah (2023) highlights that employee disputes with management could become prolonged in the absence of labour movements or unions to whom they can convey their dissatisfaction to. This could result in situations where productivity is negatively affected in the workplace.

Irrespective of the size or stature of a trade union or labour movement within organisations, these structures provide important services to employees within the workplace. These services provided by trade unions include representation in grievance and disciplinary proceedings, representation at external despite resolution institutions, advice on health and safety standards in the workplace and advice on workplace disputes amongst others (Finnemore et al., 2018). This

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view is supported by Wang (2024), who posits that unions should provide services with a focus on proactively addressing and resolving pressing issues that concern the welfare of employees in the workplace. As such, it can be inferred that trade unions play a pivotal role within organisations to advance the interest of their members, regardless of their size or number of employees that they represent in any given workplace. Therefore, the important role played by trade unions in defending and advancing employees' rights in the workplace should be respected and protected by all stakeholders associated with an organisation.

1.1 Problem statement, research question and objective

As a result of the majoritarian principle, minority trade unions possess limited organisational rights in the workplace. This could create the perception that minority trade unions are ineffective or unable to provide services to their members. Furthermore, the important contributions that minority trade unions make in the workplace could be neglected or overlooked.

1.2 Research question

In view of the foregoing research problem, this paper explores the following research question:

- What workplace contributions do minority trade unions make in the workplace?

1.3 Research objective

- To explore the workplace contributions made by minority trade unions in the workplace.

2. Literature Review

Due to the unequal power possessed within the employment relationship, employees need their rights to fairness and equality protected in the workplace. Adagbor and Ukpere (2023) highlight that employees who feel safe and protected in the workplace are likely to be productive, motivated and engaged within organisations. This underscores the important role played by minority trade unions in balancing the employment relationship to the benefit of all parties involved. After all, every organisation's success is highly reliant on its workforce and the quality of engagement with all parties within the employment relationship (Parajuli & Shrestha, 2021).

This study's literature delves firstly into defining minority trade unions, being the focal concept related to the research.

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2.1 Defining minority trade unions

A minority trade union can be defined as a trade union that lacks adequate representativity within a workplace (van Niekerk et al., 2015). Furthermore, Finnemore et al. (2018) define a minority trade union as one that holds severely less members than majority trade unions within any specific workplace or workplace. As such, a trade union's power or standing within a workplace determines whether it is viewed as a majority or minority trade union.

Minority trade unions may be perceived as less valuable compared to larger trade unions (Finnemore, 2018). This perception could be ascribed to most workplace decisions being discussed between officials of majority trade unions and management due to the superior organisational rights held by majority unions. This view is supported by Grogan (2009), who states that possessing adequate or high representativity in the workplace is the normal requirement to attaining organisational rights. Due to minority unions holding inadequate or smaller representativity in the workplace, the number of organisational rights allocated to such unions is minimal. These minimal organisational rights result in minority trade unions being excluded from salary and wage negotiations, the right to information disclosure and paid time off for shop stewards to partake in union activities amongst others (Bendix, 2010). The exclusion of minority trade unions from such vital workplace engagements could result in feelings of inferiority amongst minority union officials and its members (Grogan, 2009). These potential feelings of inferiority may affect the perceptions of minority trade union members in terms of the quality of service that they are receiving from their trade union (Venter & Levy, 2017).

Van Niekerk et al. (2018) posits that minority unions face obstacles related to proving its legitimacy and credibility within workplaces. The test for minority unions in these circumstances is to create, regardless of the number of organisational rights they hold, principles of fairness and conducive workplace conditions for their members (van Niekerk et al., 2018). Allan (2017) supports this notion, as the existence of any union, regardless of its size, fulfills a role in protecting its members against unfair treatment and ensuring equitable treatment in the workplace. This is one function that trade unions perform in the workplace, and trade union functions is the next aspect that will be dissected.

2.2 Functions of trade unions in the workplace

Adagbor and Ukpere (2023) state that a trade union holds the knowledge, skills, resources and experience required to effectively engage with management

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on improving working conditions for employees. Moreover, trade unions are viewed as legitimate representatives advancing employee interests with a view to curbing excessive managerial prerogative in the workplace (Femi et al., 2019).

Wang (2024) advances that trade unions play a vital role in strengthening employee rights and promoting a harmonious employment relations environment in the workplace. It can be inferred that this role relates to trade union activities such as joint decision-making, policy consultations and engagements on matters related to terms and conditions of employment. Wang (2024) supports this view, stating that trade unions participate in procedural and policy-making processes that seek to advance employees' interests and promote a conducive organisational culture in the workplace. However, trade union functions in the workplace do not only relate to participation in legislative and procedural matters exclusively. Rueda-López et al. (2023) highlights that trade union participation in workplace innovation in addition to collective bargaining processes. This view is supported by Voss and Bertossa (2022), who mention that trade unions need to be involved, during the early stages in the planned introduction of new innovations and technological advancements in the workplace. It can therefore be reasoned that trade unions could contribute valuably to these processes within the workplace by adding employees' voices and inputs.

In relation to the trade union's role in collective bargaining, this is an important aspect to dissect. Bukar et al. (2022) advocates that collective bargaining introduces a structured route through which employees, trade unions and management can handle competing interests effectively. Moreover, Bodilenyane et al. (2024) highlights that collective bargaining is an important avenue for employment parties to constructively engage in social dialogue on terms and conditions of employment. Collective bargaining can be a robust and emotional process at times, so the voice of employees through their trade unions representatives plays a key part in the process. Femi et al. (2019) mentions that by its nature, collective bargaining is normally a complex and time-consuming exercise. As such, trade unions should ensure that the process is successfully negotiated for the benefit of both the employer and employees (Finnemore et al., 2018). Essentially, the main aim of negotiations should be an agreement that reasonably resolves workplace disputes (Femi, 2019). This notion is supported by Buheji et al. (2024), who posit that employment parties should understand and consider each other's positions during collective bargaining, by finding common ground and working towards the successful resolution of workplace

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disputes. Effectively engaging in collective bargaining is only one goal that trade unions strive for. The next section will further explore the goals of trade unions in the workplace.

2.3 Goals of trade unions

Trade unions pursue a number of different goals in the workplace depending on the context and environment a union finds itself in. These goals generally relate to the achievement of "decent work" for its members in the workplace.

Finnemore et al. (2018) suggest that decent work relates to providing a conducive workplace environment for employees and improving terms and conditions of employment. Adagbor and Ukpere (2023) are in agreement with this view, stating that employees expect to obtain appropriate benefits and protections from their trade unions. It could be inferred that these benefits relate to improved and equitable remuneration, safe and healthy working environments, job security and reasonable hours of work that can accommodate a favourable work/life balance. In relation to improved and equitable remuneration, Finnemore et al. (2018) states that most trade unions strive to prevent the exploitation of employees within the workplace. Kalaimathi and Hemalatha (2020) agree with this, stating that the driving force behind the formation of or membership to trade unions is to balance or slightly reduce the imbalance of power between the employer and employees. In relation to safe and healthy working conditions, the role of trade unions cannot be understated. Nayak et al. (2020) advance that trade unions play a pivotal role in safeguarding healthy and safe working practices, as well as safeguarding the lives of employees in the workplace. Wang (2024) supports this view, stating that trade unions play an important role in improving employees' quality of life and maintaining their welfare in the workplace.

Job security is another aspect that is essential to employees' working lives. Nayak et al. (2020) postulates that an essential role fulfilled by trade unions relates to protecting the employment and real earnings of its members. Although some sceptics suggest that trade unions sometimes operate as though they do not hold the long-term futures of members at heart, unions strive to protect the employment status of its members (Finnemore et al., 2018). Moreover, trade unions hold a responsibility to maintain the employment stability of its members (Wang, 2024). Reasonable working hours that allow for conducive conditions associated with work/life balance is a workplace dynamic that has gained traction within organisations. Kanan (2024) advances that organisations are

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evolving their workplace practices to accommodate the complexities associated with flexible working arrangements. Employees and their trade unions are now placing an increasing emphasis on working hours that are non-exploitative and proposing flexible work schedules that accommodate the changing needs of contemporary workforces (Finnemore et al., 2018).

3. Research methodology

This research adopted a qualitative phenomenological approach to address the study's problem. The research was conducted in the Johannesburg region, South Africa, where a purposive sampling technique was implemented to sample participants within my professional network. Data was gathered utilising semi-structured interviews supported by field notes. This duel approach allowed data to be gathered within its natural setting, with face-to-face participant interactions being made possible.

The primary motive for utilising a qualitative phenomenological approach was to attain in-depth data from study participants based on their lived experiences with the phenomena being researched. Qualitative studies focus on researching phenomena over a period of time, gaining importance as theories related to management normally develop as a process (Babbie & Mouton, 2011). Moreover, qualitative studies are fundamentally inductive, typically leading to contemporary theory development (Babbie & Mouton, 2011). This research sought to explore participants lived experiences and encounters with minority trade unions, and how they perceive these unions contributions in the workplace. Data was gathered from twelve research participants, with each participant having lived experiences with the phenomena, having engaged with minority unions for extended periods of time. To collect data, an interview guide was developed (See table 1). The profile of study participants is outlined in table 2.

Table 1: Interview guide questions

1. What workplace contributions do minority trade unions make in the workplace?
1.1 What contributions do you believe minority trade unions make inf the workplace?
1.2 Do you see any value being added by minority trade unions?
1.3 According to your encounters with minority trade unions, how do you perceive th

Source: Author's fieldwork

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Table 2: Profile of research participants

Research participant	Age	Gender	Working experience	Seniority	Current designation	Industry	Highest educational qualification
RP1	56	M	32 years	Senior management	Head of HR	Music and entertainment	Master's Degree
RP2	50	M	25 years	Middle management	Training and Development Specialist	Higher Education	MBA
RP3	50	M	26 years	Senior management	Head of ER	Broadcasting	LLM
RP4	53	M	35 years	Supervisor	Compliance Officer	Broadcasting	Diploma
RP5	35	M	13 years	Middle management	Policy and Regulatory Specialist	Broadcasting	MBA
RP6	59	M	36 years	Senior management	General Manager of HR	Mining	MBA
RP7	68	M	42 years	Executive management	Retiree	Broadcasting	Higher Certificate
RP8	53	M	31 years	Supervisor	Stock Controller	Steel and Engineering	Technical Certificate
RP9	79	M	53 years	Top management	Retiree	Steel and Engineering	Diploma
RP10	42	F	17 years	Top management	Manager: Litigation	Legal	LLB
RP11	51	M	28 years	Middle management	Engineer	Technology	Master's Degree
RP12	37	M	17 years	Supervisor	Team Leader	Retail	Matric

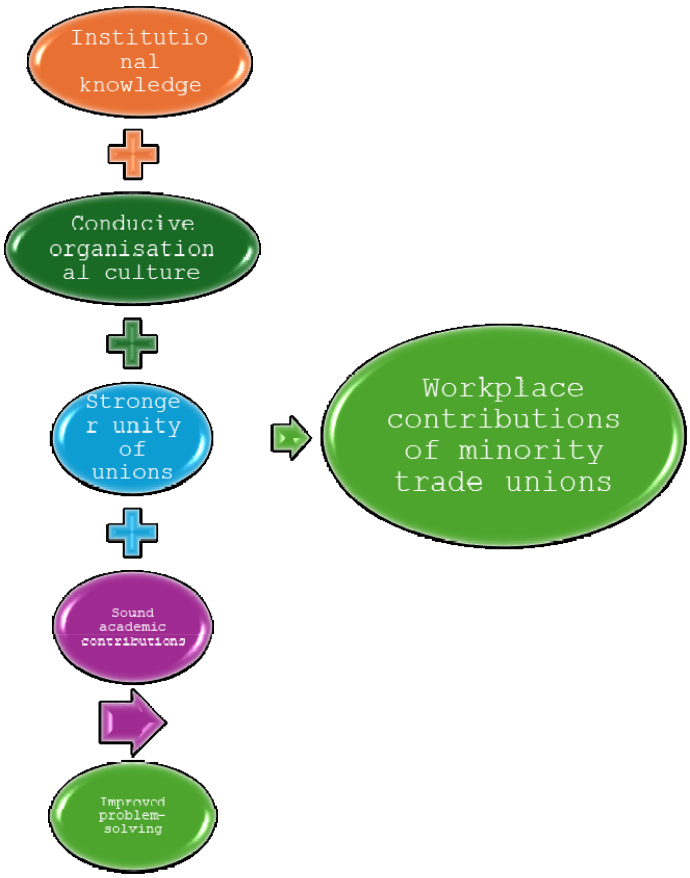
Source: Author's fieldwork

4. Findings and Discussion

This section outlines the study's findings and articulation of themes that emerged, based on data obtained from research participants related to their lived experiences with the phenomena under study. Participants responses are graphically displayed as per figure 1 below:

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Figure 1: Emergent themes on the workplace contributions of minority trade unions



Source: Author's fieldwork

Minority trade union contributions in the workplace

Considering the aforementioned, the themes that emerged from the research are discussed next.

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4.1 Theme 1: Institutional knowledge

The research findings point out that minority trade union leaders and members hold strong and rich institutional knowledge within the industries and organisations where they are employed. This institutional knowledge has been build over the years and the experience that they possess are important in contributing to the effective functioning of their organisations. In this light, RP1 remarked:

"Based on my experience most of the minority trade unions are made up of people that have been working for a very long time so over a period of time, a once strong union becomes a small and weak one. So those people have a wealth of institutional knowledge"

In a similar manner, RP6 highlights:

"*They carry with them over the years institutional memory and when required could provide it in a snap of a finger but it is nowhere documented because you could refer to them as people walking around with institutional memory at a personalised capacity because they were never utilised whereas if there is any trouble, someone knows that if we can tap into this guy we might find a solution*"

The research findings align with the view of Adagbor and Ukpere (2023), who state that a trade union holds the knowledge, skills, resources and experience required to effectively engage with management on improving working conditions for employees. To add to this, RP11 mentions:

"I've explained earlier that most of the people that have professionalism and institutional knowledge are lumped within these minorities"

This finding is further supported by the work of Femi et al. (2019), who state that employees are the engine rooms who play strategic roles within production and profit processes within organisations. Where officials and members of minority trade unions contribute their institutional knowledge effectively in the workplace, this leads to the existence of a conducive organisational culture for employees. This aspect is unloaded next.

4.2 Theme 2:Conducive organisational culture

The current study found that when minority trade unions and their members contribute their efforts diligently in the workplace, this leads to the establishment and maintenance of a conducive organisational culture. This culture then leads to a workplace environment where all employees perform optimally and healthy

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working relationships are developed. In this regard, RP1 stated:

"You focus on building a relationship which will eventually benefit the workplace and benefit the productivity and just promote healthy working relationships".

Along these lines, RP6 commented:

"On the workplace and environment, itself my experience has been that people who belong to minority unions believe in negotiations and in dialogue. They have a sense of consensus being the order of the day and sometimes use expressions like let us meet each other halfway".

The study's findings are in alignment with Wang (2024), who advances that trade unions play a vital role in strengthening employee rights and promoting a harmonious employment relations environment in the workplace. This is supported by Adagbor and Ukpere (2023), who highlight that employees who feel safe and protected in the workplace are likely to be productive, motivated and engaged within organisation. Where minority trade unions and their members diligently contribute towards the achievement of organisational goals and participate in the establishment of a conducive organisational culture, there will be stronger unity amongst trade unions in the workplace. This aspect will be explored further below.

4.3 Theme 3: Stronger unity of unions

The findings of the present research indicate that where minority trade unions participate reasonably in workplace decisions and processes, there will be stronger unity within the trade union movement in the workplace. This would ensure that all trade unions that are recognised in a workplace work together to further the interest of their members within the organisation. To this end, RP1 comments:

"For me, the more the merrier and if trade unions work well together for instance if they organise a strike and that strike has 90% of employees that are unionised, it is much more of an impact".

In support of RP1's view, RP8 states:

"They must come together and work as a team and not sideline the minority trade unions and their members. Then they will be stronger and present a united voice in the workplace"

The study's findings concur with Amankwaah (2023), who highlights that employee disputes with management could become prolonged in the absence of

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labour movements or unions to whom they can convey their dissatisfaction to. Furthermore, a strong trade union movement will strive to prevent the exploitation of employees within the workplace (Finnemore et al., 2018). The research also found that officials and members of minority trade unions present sound academic positions and proposals within the workplace. More on this in the section that follows.

4.4 Theme 4: Sound academic contributions

The research findings demonstrate that officials and members of minority trade unions often contribute sound academic proposals and suggestions to workplace challenges. Also, the findings point out that officials and members of minority trade unions hold strong academic qualifications and are usually educated on workplace issues. With this in mind, RP2 remarks:

"They come up with very sound academic positions around how negotiations should go, procedures and policy adjustments. They come with solid proposals but unfortunately they will not be considered if the majority does not get the go ahead from their members".

RP2's remarks are corroborated by RP8, who declares:

"The guys from the smaller union are very educated people, they do not go blindly into something, they go and do their research and investigate before they tackle their problems".

The study's findings highlight the strong academic postures of minority trade unions, and how they come up with proposals to support their members in the workplace. This is in line with Finnemore et al. (2018), who advance that trade unions use their knowledge and skills to provide services to their members including representation in grievance and disciplinary proceedings, representation at external despite resolution institutions, advice on health and safety standards in the workplace and advice on workplace disputes amongst others. The research findings further indicate that minority trade union officials and members are well educated and trained in the workplace. In this spirit, RP2 remarks:

"I strongly believe minority unions in the main are highly educated people and you need to consider their opinions and certain technical aspects of the relationship between employee and employer".

RP9 concurs with RP2, stating:

"The minority trade unions are well educated, I can assure you, they've got some of the best training".

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The study's findings highlight that minority trade unions possess well-educated and qualified officials, who use this knowledge to further the interest of their members in the workplace. The findings of the study corroborate the view of Nayak et al. (2020), who postulate that an essential role fulfilled by trade unions relates to protecting the employment and real earnings of its members. The sound academic contributions by minority trade unions contribute to improved problem solving in the workplace. This emergent theme will be addressed subsequently.

4.5 Theme 5: Improved problem-solving

The findings of the research show that where minority trade unions participate in and contribute to workplace challenges and processes, this leads to improved problem solving in the workplace. Findings further highlight that valuable contributions are made by minority trade unions that solve complex and challenging matters in the workplace. In this regard, RP8 mentions:

"Yes they did contribute important input into workplace discussions. At some point with the issues that came up at work they came and resolved them".

RP10 added:

"Yes definitely. Like I said it's not a question of a fact that they are able to give valuable input, they would raise valid facts and issues".

The study's findings support the view of Voss and Bertossa (2022), who mention that trade unions need to be involved, during the early stages in the planned introduction of new innovations and technological advancements in the workplace to avoid any challenges that may ensue. Moreover, van Niekerk et al. (2018) state that trade unions work together with management in problem solving to resolve complex workplace issues affecting employees in the organisation.

4.6 Limitations of the study

All research projects have restrictive elements that impact the study. Within this research, the study was conducted within the area of Johannesburg where participants are situated, which allowed for easy access to participants. Employment relations (ER) and human resources (HR) professionals, as well as trade unionists outside of Johannesburg were not part of the research sample owing to geographical scattering. To mitigate this limitation, the research utilised participants that are highly experienced and educated in the phenomena under study. Secondly, qualitative research is classified as intrinsically subjective. This

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is owing to data collection being reflective of the perspectives, experiences and backgrounds of participants. As such, the data is subjective in nature and will vary from one environment to another. Thirdly, researchers are at the center of data collection in qualitative research, and there is a possibility of bias slipping into the study which may impact its quality. However, this limitation is abated by exercising reflexivity and bracketing (Cresswell, 2014). Lastly, participants were selected using purposive sampling, which is often prone to certain degrees of bias. To mitigate this, established criteria was used to select HR/ER professionals and trade unionists that have personally encountered the phenomenon under study. Furthermore, some of these HR/ER professionals in this research started their careers operating as trade unionists, allowing them to share a holistic view on the subject matter being studied.

5. Recommendations

Given the study's findings, the following recommendations are put forward:

5.1 Inclusive management style

Management within the workplace should adopt a more inclusive approach and style when dealing with trade unions and their members. This recommendation suggests that management should listen equally to the voices of all trade unions that exist in the workplace, as these represent the voices of employees in that organisation. Moreover, organisational management should have a transparent approach and welcome any trade union input that may resolve workplace challenges, regardless of which trade unions the input or suggestions may come from.

5.2 Promote inter-union relations

Where a majority and minority union both exist in the same workplace, inter-union engagements and discussions should be promoted. The majority and minority trade unions should also collaborate more on workplace issues that affect their members working conditions as well as their terms and conditions of employment. By collaborating and working together, these unions can put on a united front and develop effective solutions that will benefit all their members within the workplace.

5.3 Increasing information sharing

There should be an open flow of communication within the workplace, between management and employees as well as between management and employee representatives (trade unions). This open flow of communication will

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promote transparency and trust in the workplace, where all employment parties share information and challenges that may exist in the workplace. This will enable employment parties to develop ideas and proposals on how best to deal with workplace issues or challenges that may exist.

6. Conclusion

The study problem's ventilation advances that workplace contributions by minority trade unions could be limited and overlooked due to the majoritarian principle. Study participants' lived experiences point out that minority trade unions play a vital role for their members in the workplace, and that their contributions could add value to the workplace when considered. It is consequently necessary to highlight that the research findings corroborate the research problem, in that minority trade unions hold knowledge and expertise that may not always be considered in the workplace. This knowledge and expertise relate to institutional knowledge, where minority trade unions have gathered information and skills over long periods of time that can positively impact workplace operations. Accordingly, the present research revealed that where minority trade union contributions can be considered and implemented in the workplace, this would lead to the creation and maintenance of a conducive organisational culture. This is due to the sound academic contributions that minority trade unions and their members make in the workplace, owing to their educational backgrounds and extensive training. Where minority trade union contributions to workplace processes are effectively considered, this would lead to a stronger unity amongst the trade unions that operate in an industry or workplace. This would be due to the minority and majority trade unions working well together and understanding each other's stances to advance the interests of their members in the workplace with one voice. Moreover, the study revealed that contributions made by minority trade unions have led to improved problem-solving in the workplace. Participants also shared how they have witnessed solid proposals to workplace challenges being provided by minority trade unions, and how complex issues were resolved in situations where the inputs and advice of minority unions was accepted and implemented. The present study recommends that management within workplaces adopt an inclusive style and approach to managing trade union relations. This would involve inviting all unions to engage on workplace issues and considering the merit of proposals, regardless of which union these proposals stem from. Moreover, it is advised that inter-union relations be promoted between trade unions. This will allow majority and minority unions

to engage effectively on matters affecting their members in the workplace, and this collaboration may result in the development of strong suggestions and input on how best to deal with workplace challenges. Lastly, the study puts forward that information sharing be increased by management in the workplace. This would promote transparency and build a culture of trust in the organisation, that will allow majority and minority trade unions to provide input and proposals on any workplace challenges that may exist which affect employees.

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THE ESTABLISHMENT OF A COMMISSION OF MEDIATION AND ARBITRATION: A REFLECTION OF RENEWED GOVERNMENT POLITICAL WILL TO STRENGTHEN LABOUR DISPUTE RESOLUTION MECHANISMS

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Abstract

The study aimed to determine whether the establishment of the Commission of Mediation and Arbitration under the Employment and Labour Relations Act, 2025 reflects the Government's political commitment to enhancing an effective and accessible labour dispute resolution system in Botswana. It commenced by examining the nexus between labour disputes and conflict, followed by an exploration of the concepts of labour dispute resolution and Alternative Dispute Resolution (ADR). To position the study within the broader scholarly context, a comprehensive literature review was undertaken, tracing the historical development of Botswana's dispute resolution framework from independence to the present. Adopting a qualitative exploratory approach within an interpretivist phenomenological paradigm, the research collected data through virtual semi-structured interviews with fifteen purposively selected participants from Botswana and the wider SADC region. The findings

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underscore the imperative for Government to demonstrate genuine political will in ensuring the establishment of a credible, efficient, and sustainable labour dispute resolution system under the new legislative framework.

Keywords: Conflict, dispute resolution system, labour dispute, political will

JEL Classification: J52; K31.

1. Introduction

Labour disputes are conflicts that arise within the framework of labour relations, including disagreements between workers' representative bodies, as well as those stemming from the rights, obligations, or interests of the parties involved at various stages of the employment relationship, namely its formation, execution, or termination (Uzougbo et al., 2023). They are an unavoidable aspect of organizational life, and in any well-functioning society, there should be effective mechanisms in place to address them when they arise. Although conflict is often viewed in a negative light, it is not inherently harmful; when managed appropriately and with respect, it can become a valuable catalyst for organizational learning and growth (Sigauke et al, 2024).

Conflict performs both constructive and destructive functions within society. From a functional perspective, it clarifies underlying tensions, strengthens group cohesion, and facilitates timely problem resolution by bringing issues of social control into the open. Scholars such as Kornhauser (1954) suggest that without conflict, social systems risk stagnation, while excessive harmony may undermine structural balance. Similarly, Coser (1956) posits that a certain level of conflict is essential for group formation and continuity, becoming dysfunctional only where there is limited tolerance or inadequate institutional mechanisms to manage it. Within labour–management relations, Dubin & Ross (1954) view conflict as inevitable but capable of being productively channeled through collective bargaining processes.

Labour dispute resolution refers to the integrated framework of institutions, rules, and processes which include mediation, arbitration, and judicial mechanisms used to manage and resolve employment-related conflicts (Avgar et al., 2023). Labour dispute resolution takes place within a broader framework commonly referred to as a labour dispute resolution system or mechanism. From an institutional perspective, Budd and Colvin (2008) describe this as a system comprising both formal and informal structures that shape how workplace conflicts

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are managed, including the roles played by state agencies, courts, and alternative dispute resolution bodies. Such systems are intended not only to resolve individual and collective disputes, but also to promote fairness, efficiency, and stability within employment relations. Scholars argue that labour dispute resolution systems are embedded in wider industrial relations regimes and embody how societies balance power between workers and employers. Lewin (2005) contends that robust systems combine internal grievance procedures, external arbitration, and judicial oversight to enhance accessibility and legitimacy, while Roche et al., (2014) observe a growing reliance on ADR mechanisms to curb litigation and speed up outcomes.

Alternative Dispute Resolution (ADR) refers to the use of processes such as mediation, arbitration, and other non-judicial mechanisms to resolve disputes without going through formal litigation. It involves the engagement of neutral third parties who assist in facilitating or determining an impartial resolution to the conflict (Thapa, 2025). According to Anwer and Hussain (2025) ADR is widely regarded as a particularly valuable approach to managing labour and commercial conflicts because it enables parties to avoid the time, cost and procedural complexity typically associated with litigation. By providing more streamlined and flexible processes, ADR reduces delays and facilitates the swift resolution of disputes, while allowing parties to tailor procedures to their circumstances, including the choice of mediator or arbitrator and agreement on procedural rules. For Jadwani and Yadav (2025), in addition to this procedural adaptability, ADR is prized for its capacity to preserve ongoing organizational and commercial relationships and to ease pressure on overburdened courts, which together explains its growing appeal for resolving complex contractual and employment-related conflicts.

1.1 Problem Statement

Notwithstanding Botswana's long-standing commitment to fair labour practices, the labour dispute resolution framework that existed prior to the enactment of the Employment and Labour Relations Act, 2025 was marked by procedural delays, limited accessibility, and weak enforcement of outcomes. These shortcomings were largely attributable to structural deficiencies within the system, including a lack of institutional independence, inadequate funding, and insufficient skilled human resources, as observed by Koorapetse (2011) and later affirmed by Bushe (2019).

Although the establishment of the Commission of Mediation and Arbitration is portrayed as an important institutional reform designed to strengthen and centralise ADR mechanisms, there is still limited evidence showing whether it reflects a

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genuine shift in government political will or merely a structural change with little practical impact. It is therefore important to assess critically whether the creation of the CMA truly signals a meaningful change in the government's commitment to labour dispute resolution.

1.1.1 Research Questions

- To what extent does the establishment of the Commission of Mediation and Arbitration under the Employment and Labour Relations Act 2025 reflect the Government's political will to strengthen effective and accessible labour dispute resolution in Botswana?

1.1.2 Research Objectives

- To establish whether the establishment of the Commission of Mediation and Arbitration under the Employment and Labour Relations Act 2025 reflect the Government's political will to strengthen effective and accessible labour dispute resolution in Botswana

2. Literature Review

Botswana's labour dispute resolution system emerged alongside the country's post-independence political and economic transformation. At independence, the country had only a rudimentary industrial relations framework, with few formal structures for handling labour conflicts and a predominantly agrarian economy in which trade unions had a minimal presence (Koorapetse, 2011).

In the first decade after independence, roughly the late 1960s to 1970s, Botswana pursued a cautious, state driven model of labour relations that placed a premium on stability and economic growth (DuToit, 2006). Labour disputes were handled mainly through administrative channels, with the Department of Labour leading conciliation and mediation efforts, while trade unions remained relatively weak and collective bargaining was only beginning to take shape (Cooper,1985). During this period, policy focused on preserving industrial peace as a foundation for attracting investment and advancing nation building.

According to Koorapetse (2011), in the 1980s and 1990s, as Botswana's diamond-led economy grew, labour relations became more formalised and structured. The Trade Disputes Act and related reforms introduced clearer procedures for lodging disputes and expanded the use of conciliation and arbitration under government oversight, yet the system remained highly centralised and dispute-resolution bodies despite the creation of the Industrial Court in 1992 enjoyed only limited institutional independence.

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During the 2000s, Botswana implemented significant labour law reforms that substantially reshaped its labour dispute resolution framework. These reforms included the ratification of key International Labour Organization (ILO) conventions, which necessitated corresponding amendments to core labour legislation, particularly the Trade Disputes Act. A notable development was the establishment of a panel of mediators and arbitrators operating under the Office of the Commissioner of Labour (Bushe, 2019).

The establishment of the Commission of Mediation and Arbitration under the Employment and Labour Relations Act, 2025 which is about to commence in 2026 significantly reshapes Botswana's ADR system by promoting earlier, structured mediation and faster dispute resolution. It is expected to reduce court referrals and require both employers and employees to engage more proactively in settlement efforts (Andersen, 2025). Furthermore, the CMA enhances the formalization and coherence of Botswana's ADR framework. By embedding dispute resolution within a broader labour relations architecture that includes collective bargaining, union recognition, and social dialogue, the new framework positions ADR as an integral component of the labour relations system rather than a stand-alone mechanism, thereby promoting greater consistency, predictability, and institutional stability in outcomes (Mupfuti, 2025).

According to Avgar et al. (2023) labour dispute resolution refers to the formal and structured processes used to manage and settle conflicts between employers and employees, or their representatives, in a manner that upholds fairness, industrial peace, and compliance with the law. It includes both alternative dispute resolution methods and formal adjudicative procedures designed to resolve disputes efficiently and justly. In Botswana, labour dispute resolution is mainly governed by the Trade Disputes Act, which begins with mediation as the first step. Mogapaesi (2023) posits that mediation involves a neutral third party helping the parties communicate and reach a voluntary settlement, and if it fails, the dispute may proceed to arbitration, where a binding decision is made by an independent third party(Morima, 2019).In some instances, especially with disputes of right, if mediation fails, the matter goes to the Industrial Court which exercises judicial authority to resolve unresolved disputes in Botswana(Koorapetse, 2011).

Botswana's labour dispute resolution framework has developed significantly since independence in 1966, moving from a weak, administratively managed system to a more formal statutory regime. In the early years, dispute handling was largely state-led and shaped by colonial institutional legacies and limited capacity, while later reforms in the 1980s and 1990s introduced a clearer legal structure

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through the Trade Disputes Act and the creation of the Industrial Court. Nonetheless, the system remained heavily government-controlled, which continued to generate calls for reforms aimed at improving independence and efficiency (Bushe, 2019; Koorapetse & Ukpere, 2025). The biggest problem with the current framework is that the Commissioner of Labour plays a central role in dispute resolution, overseeing mediation and administrative processes. While this ensures accessibility and state oversight, it also raises concerns regarding impartiality and independence, particularly in disputes involving government as an employer. The system's strength lay in its centralized coordination, but weaknesses included limited professional specialization and perceptions of bias (Kalula, 1993; Koorapetse, 2011).

Furthermore, according to Morima (2019) the current system is characterized by several structural challenges, including procedural delays, limited accessibility for some workers, weak enforcement of arbitration awards, and inadequate institutional capacity. Resource constraints, understaffing, and bureaucratic inefficiencies further undermined the system's effectiveness, leading to backlogs and reduced confidence among users (Bushe, 2019). The envisaged establishment of the Commission of Mediation and Arbitration (CMA) under the new Employment and Labour Relations Act, which is about to commence this year, represents a shift toward an independent, specialized dispute resolution body. Unlike the previous system administered under the Ministry, the CMA is designed to operate autonomously, with dedicated mediators and arbitrators, streamlined procedures, and a stronger focus on alternative dispute resolution as a primary mechanism (Andersen, 2025).

Against this backdrop, it is necessary to consider whether the Government has at last demonstrated the elusive political will required to make the new framework effective. In labour reform, political will is reflected in the state's commitment to adopt, support, and implement legal and institutional changes through legislation, resourcing, and the creation of credible institutions. Botswana's shift toward the CMA and the wider labour law reforms suggests an acknowledgement of past weaknesses and a stated intention to strengthen labour governance (Koorapetse & Ukpere, 2025). The introduction of the CMA is likely to improve access to justice, shorten dispute resolution periods, and foster greater industrial harmony. According to Koorapetse & Ukpere (2025) independent resolution bodies such as the CMA offers employers and employees a more efficient and impartial forum for resolving disputes, while trade unions may gain from stronger institutional backing and more meaningful participation in dispute-handling processes. Overall, the

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reform is expected to improve compliance, strengthen labour relations practices, and support a more stable industrial relations climate.

3. Research Methodology

This section outlines the methodology used in the study, including the research design, philosophical foundation, chosen method, overall strategy, and the steps taken to ensure rigour and ethical compliance.

This study employed a qualitative research approach underpinned by an exploratory design and informed by an interpretive phenomenological framework. A qualitative approach was appropriate because the study sought to develop a rich and contextualized understanding of participants' lived experiences and the meanings, they attached to them (Creswell & Poth, 2018; Smith et.al, 2009). The exploratory design was suitable given the limited existing knowledge on the phenomenon under investigation, as it enabled the researcher to generate nuanced insights and identify emergent issues from the perspectives of those directly experiencing the phenomenon (Creswell & Poth, 2018).

Using purposive sampling, the study used 15 participants from Botswana and four other SADC member states, namely Eswatini, Mauritius, South Africa, and Tanzania. Semi-structured interviews served as the primary data collection method because they allow the researcher to obtain detailed accounts of participants' experiences while maintaining enough flexibility to explore emerging issues in depth. This interview format is widely regarded as well suited to qualitative inquiry because it balances structure with openness, enabling the researcher to stay focused on the research objectives while still capturing participants' own meanings and perspectives (Kvale & Brinkmann, 2015; Patton, 2015; Merriam & Tisdell, 2016).

The data were analysed thematically, using an established step-by-step framework for identifying, refining, and interpreting patterns across the qualitative dataset (Braun & Clarke, 2006). To support this process the Atlas.ti software was used to organise the material systematically, facilitate coding, and assist with the management of large volumes of interview data (Eriksson and Kovalainen, 2015). The study also applied measures to strengthen methodological rigour, with particular attention to trustworthiness as a key indicator of quality in qualitative research (Yin, 2003). Throughout the research process, ethical principles were rigorously upheld, with particular emphasis placed on obtaining informed consent, safeguarding participants' privacy, and ensuring the confidentiality of all information provided.

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4. Research Findings and Discussion

Political will emerged as a recurring theme across several interview questions posed by the researcher, as reflected in the responses summarized in the table below:

Participant	Interview Question	Response
Temo B	Some countries in the SADC region have independent dispute resolution systems. What is needed to effect this change to ensure that Botswana follows this practice?	*The country is currently going that route since it has now been included in the latest labour law amendments. The reason in the past it was not possible is because there was no legal provision for it. The political will has been lacking.*
Wethu S	What lessons can Botswana learn from other countries in the SADC region to improve its labour dispute resolution system?	*Political will would be an important takeout for Botswana.*
Lucky B	*Some countries in the SADC region have independent dispute resolution systems. What is needed to effect this change to ensure that Botswana follows this practice?*	*Political will and strong labour unions.*
Tumelo B	*Some countries in the SADC region have independent dispute resolution systems. What is needed to effect this change to ensure that Botswana follows this practice?*	*Political will of the government is something Botswana can learn from the SADC region.*

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Thato B	Some countries in the SADC region have independent dispute resolution systems. What is needed to effect this change to ensure that Botswana follows this practice?	Luckily, the country is now moving in that direction following its inclusion in the recent labour law amendments. Previously, this was not feasible due to the lack of political will by Government.

The findings presented in the table above indicate that the lessons Botswana can draw from other SADC countries go beyond the establishment of an independent dispute resolution system. A key insight that emerged is the critical importance of government political will in driving meaningful labour reforms. Several participants specifically emphasized that Botswana should place greater focus on this aspect, drawing from the experiences of its SADC counterparts where political commitment has played a decisive role in shaping effective dispute resolution framework.

Koorapetse and Ukpere (2025) identified the lack of political will as the principal barrier preventing the establishment of independent dispute resolution bodies in Botswana, attributing it primarily to government reluctance to surrender control. They contend that, absent this deficiency, the dispute resolution framework would have undergone transformation much earlier.

Bushe (2019) emphasises that demonstrating political will to create an independent ADR institution represents a vital step toward building an effective alternative dispute resolution system. Political will remains a fundamental determinant of ADR success. Regionally, South Africa has shown greater commitment in this domain compared to its neighbours, namely Botswana and Zimbabwe. However, Manteaw (2024) warns that political will can take many forms, even where legal provisions promise institutional independence, that autonomy may still be undermined by political interference, limited resources, and regulatory oversight, all of which can weaken the effective functioning of labour dispute resolution systems.

5. Conclusion

In conclusion, the effectiveness of any labour dispute resolution system is fundamentally contingent upon the presence of strong and sustained political will on the part of government. Such commitment must extend beyond legislative

reform to encompass the consistent implementation and enforcement of labour laws that clearly articulate the rights and obligations of both employers and employees. These legal foundations are essential in ensuring certainty, legitimacy, and the protection of workers' rights within the dispute resolution framework. In their absence, even well-designed mechanisms risk being weakened by ambiguity, limited authority, and institutional fragility. The enactment of the Employment and Labour Relations Act, 2025 by the Government of Botswana, in collaboration with social partners including the trade union movement and employers under Business Botswana, represents a significant milestone in this regard. However, the true test of this reform lies in its execution. The establishment of the Commission of Mediation and Arbitration will only realise its intended impact if it is supported by adequate financial resources, safeguarded through appropriate regulatory oversight, and insulated from undue interference. Ultimately, it is through these measures that government can demonstrate genuine political will and ensure the development of a credible, effective, and sustainable labour dispute resolution system**.**

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FACTORS PERPETUATING THE OVERWORK CYCLE AMONG NON-STANDARD EMPLOYEES

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Abstract

This study sought to explore factors that perpetuate the overwork cycle among nonstandard employees in Zimbabwe. Twelve purposively selected respondents, participated in the qualitative study. Data were gathered through one-on-one, semi-structured interviews. The study identified several factors that perpetuate the overwork cycle among non-standard employees in Zimbabwe. Respondents identified job insecurity, financial insecurity, performance evaluation pressure and pressure from the employer as the key factors that perpetuate the overwork cycle. The study advises managers at the case organisation in Zimbabwe to identify factors that perpetuate the overwork cycle and its effects on both non-standard workers and the organisation and implement explicit strategies to break this vicious cycle. The study recommends supervisors at the Zimbabwean case company to implement evidence-based mechanisms, such as workload audits, a clear career progression path, competitive compensation, clear communication regarding contract extension, mandatory insurance benefits, paid time off, digital boundaries, and mandatory shutdowns to break the overwork cycle among non-standard workers. The study also recommends non-standard employees to

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take regular breaks, prioritise personal life over workloads and say no to extra work, in order to break the overwork cycle.

Keywords: *non-standard employee, overwork cycle, overworking, work intensity, workload*

JEL Classification: J46; J460.

1. Introduction

Non-standard forms of employment (NSFE) have become prevalent throughout the world, driven by a number of micro and macro environmental factors (Dellevoet, 2025; Ervin et al., 2025; Fauser & Mooi-Reci, 2025; Kolomoets et al., 2023). Nonstandard forms of work are now common in both developed and emerging economies, demonstrating a structural shift from traditional employment to more flexible forms of employment (Katsaouni et al., 2024; Kougiannou & Mendonça, 2024). In similar vein, a study by Kolomoets et al. (2023) showed that precarious forms of work are becoming dominant in labour markets previously associated with job for life forms of employment. Ervin et al. (2025) note that a quick transition from standard to non-standard forms of work can be ascribed to a number of factors, including technological advancements, demographic changes, need for labour flexibility, macro-economic swings, among others. Stahi and Robea (2023) posit that although nonstandard forms of work are characterized by unpredictable and excessive working hours and limited benefits, they can offer benefits to some workers. Likewise, a study by Dobrowolska (2024) found that non-standard forms of work enable workers to gain work experience, develop marketable skills and expand professional network, all of which serve as a bridge to permanent employment. Employers also recognize and appreciate operational and financial of non-standard forms of work such as flexibility and cost reduction (Peckham et al., 2022). Although non-standard work acts as a bridge to full-time positions, Ukpere et al. (2024) argue that precarious work presents serious challenges to workers such as job insecurity, unpredictable and excessive long working hour. In a similar vein, Kiran et al. (2022) contend that non-standard employees frequently work lengthy, erratic hours, which results in vicious cycle of overworking. Kaygin et al. (2023) define overwork cycle as a self-sustaining, vicious cycle in which workers put in excessive hours, fails to recover, experience a decline in their output, and then work even harder to catch up, ultimately resulting in burnout. Similar to this, Creary and Locke (2022) describe

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the overwork cycle as intense work, often driven by a hustle culture that places productivity over health. Mitonga-Monga et al. (2024) argue that non-standard workers are more likely to become fatigued due to working long or irregular hours, which increases the risks of accidents and injuries at work. Likewise, a study conducted by Takagi et al. (2025) revealed that overworked workers are more prone to burnout and disengagement, which raises turnover rates and increases the cost of hiring and training new staff. The aforementioned perspectives show that overworking is a major problem that affects both companies and nonstandard workers. It is also noteworthy that the majority of firms in Zimbabwe use non-standard forms of work. Concerns have been expressed regarding the adverse effects on organisations and non-standard workers, who are often caught in the vicious cycle of overworking. In light of this, there is need for a study to explore factors that perpetuate the overwork cycle among workers. Thus, the goal of this research was to explore factors that perpetuate the overwork cycle among non-standard workers in Zimbabwe. The researchers believe that this study will assist organisations in designing and implementing evidence based guidelines and policies focused on breaking the overwork cycle.

2. Theoretical framework

This study was guided by the job demands-resources (JD-R) model, person-environment (P-E) fit theory and effort-reward imbalance (ERI) model.

2.1. Job demands-resources (JD-R) model

The two pillars of the job demands-resources (JD-R) model are job demands and job resources. Job demands include organizational, social, and physical elements that call for consistent effort, such as intense job pressure and emotional demands (Mazzetti et al., 2023). Job resources include things like autonomy and social support that stimulate personal growth (Makmun et al., 2023). The job demands-resources model suggests that stress and burnout arise when job demands such as heavy workloads and time constraints, are high while job resources, such as autonomy and support, are low. The job demands-resources model further suggests that employees overwork to cope with high job demands, which are characterised by strict deadlines and heavy workloads. Mazzetti et al. (2023) state that overwork is a persistent, draining process to meet workplace demands. The job demands-resources model recommends organisations to encourage employees to customise their own job demands and resources to match their skills to break the overwork cycle.

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2.2. Person-environment (P-E) fit theory

The overwork cycle arises from poor person-environment fit, where organisational culture clashes with individual needs (needs-supplies misfit) or high job demands exceed an individual's abilities or resources (demands-abilities misfit). The theory identifies three primary mismatches that lead to person-environment mismatch, namely demands-abilities mismatch, needs-supplies mismatch, and values mismatch. Person-environment fit theory states that demand –abilities misfit forces employees to devote disproportionate, unsustainable time and energy to meeting expectations, resulting in a demand-overload situation that fuels overworking and burnout. Fatmawati and Ambarwati (2022) note that a needs-supplies mismatch occurs when the work environment fails to provide workers with autonomy, support, and recognition, which forces them to put in excessive effort to receive rewards or recognition that never materialise. Values mismatch occurs when workers' values do not align with the company's, which forces them to overwork to compensate for a feeling of not truly belonging, leading to an overwork cycle (Fatmawati et al., 2022). The above-mentioned forms of misalignment cause overworking and affects physical and mental health. The person-environment (P-E) fit theory also holds that if positive, it leads to compatibility, whereas a misfit, where job demands exceed skills or inadequate resources, causes overworking, emotional exhaustion, and decreased performance. Lawton (2019) states that to compensate for a misfit between workers' abilities and the work environment, workers may put in excessive hours, which in most cases lead to a vicious cycle of overworking.

2.3. Effort-reward imbalance model

The social exchange theory, which is premised on reciprocity is the foundation of the effort-reward imbalance (ERI) model. The two primary components of the effort-reward imbalance model are reward and effort. The effort -reward imbalance model suggests that effort consists of extrinsic demands, such as high job intensity, time constraints, and physical or mental demands. On the other hand, the ERI model claims examples of rewards are compensation, recognition, respect, and job security. According to the effort-reward imbalance model, over-commitment and an imbalance between effort and rewards lead to overworking. According to the ERI model, when an employee puts in a lot of effort but receives little compensation, they feel as if they must work even harder to be recognised, which increases effort and sustains the cycle of overworking.

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2.4. Overwork cycle

According to Tatlıyer (2022), the overwork cycle, is a self-sustaining, vicious cycle in which workers put in excessive hours, fail to recover, experience a decline in their output, and then work even harder to catch up, ultimately resulting in burnout. Similarly, Creary and Locke (2022) describe the overwork cycle as one of intense work caused by a hustle culture that prioritises productivity over health. Creary and Locke (2022) state that the overwork cycle typically begins with extraordinary ambition, excessive dedication, and a strong drive to accomplish work goals. It then progresses to disregarding the crash, physical and mental exhaustion, leading to burnout, and then workers cycle back to the guilt and re-entry phase. Locke (2022) argues that the guilt/re-entry phase of the overwork cycle causes employees to feel bad about taking a break, even though they are mentally and physically exhausted. This may lead to a premature return to overworking, perpetuating the overwork cycle (Mhaidli & Roemmich, 2024). Takagi et al. (2025) maintain that the overwork cycle is often fuelled by a mix of factors that make it difficult to set boundaries, resulting in severe physical and mental exhaustion, which ultimately harms both workers and the organisation.

2.5. Drivers of the overwork cycle at work

There are several drivers of the overwork cycle, some of which affect non-standard employees; these are discussed in the next section.

2.5.1. Strategic investment

Tan et al. (2023) state that employees consider working excessive hours as a strategic tool to accelerate career growth, build reputation, and gain expertise. Similarly, a study by Creary and Locke (2022) revealed that in situations where productivity is difficult to gauge, overworking can serve as a purposeful strategy used by workers to communicate dedication, worth, and future potential to employers. Zhang et al.'s (2023) study showed that overworking allows young workers to cram years of learning into a shorter timeframe, developing skills and confidence. In addition, Tan et al. (2023) argue that overworking is a strategic investment because high work intensity is positively linked to promotions, higher hourly wages, and increased annual earnings.

2.5.2. Job insecurity and fear of contract termination

According to Gautam's (2024) study, employees with insecure contracts may be forced to put in greater effort to prove their value to have their contracts extended. Tan et al. (2023) also observed that perceived job insecurity is a stressor that pushes workers to demonstrate their worth through demanding

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workloads, long hours, and superior performance, frequently leading to extreme overworking. Moreover, a study by De Witte et al. (2025) indicated that fear of contract non-renewal is a potent stressor that pushes workers to overwork. Sharing the same sentiments, Ribas et al. (2025), state that workers with precarious employment contracts often work excessive hours, assuming that their effort will be rewarded by contract renewal. In addition, Ghani et al. (2022) argue that precarious workers often believe that they must perform flawlessly to turn an insecure employment contract into a permanent role, which may lead to an anxiety-driven overwork cycle.

2.5.3. Pressure from employers

Will (2023) states that organisations routinely give nonstandard employees heavy workloads and force them to multitask without the necessary training, which typically results in overworking. Similarly, Telford and Briggs (2022) maintain that employer pressure plays a major role in temporary employees overworking, as they frequently feel pressurised to put in excessive, unpaid hours to obtain contract extensions and permanent positions. According to Beech et al. (2022), precarious workers employed by brokers face significant pressure from the hiring organisation and have little to no control over their working conditions. Similarly, Kobayashi et al. (2024) suggest that most nonstandard workers feel compelled to take on excessive working hours and untracked shifts, creating a culture of continuous overworking. A study by Zhang et al. (2023) showed that employers may assign heavy workloads to temporary workers, which in most cases, causes fatigue and increases the risk of injury.

2.5.4. Lack of support and resources

Lv et al. (2023) contend that temporary employees frequently receive inadequate training and assistance, necessitating greater effort on their part to finish their duties. Lazauskaitė-Zabielskė et al. (2023) submit that high job demands and a lack of support and training force these employees to work excessive hours to demonstrate their worth and handle jobs with few resources. According to Yang (2023), precarious workers are expected to be productive even with inadequate training and trade tools, which forces them to overwork to meet targets. Lazauskaitė-Zabielskė et al. (2023) point out that employees must work overtime to achieve deadlines due to a lack of training and useful tools. Furthermore, according to the job demands-resources (JD-R) model, a high workload combined with insufficient resources causes employees to overwork themselves.

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2.5.5. Proving yourself mentality

The act of carrying out work duties beyond the job description, which in most cases results in overworking, is what Kayyali (2024) refers to as the prove yourself mentality. According to Mokhtar (2023), insecure employees frequently work longer hours in an effort to demonstrate their worth to the organisation. Similarly, Maslach and Leiter (2022) maintain that non-standard workers feel pressured to put in more hours to demonstrate their commitment and value because of the widespread perception that they are less reliable. A study by Ulz (2023) revealed that a "prove yourself mentality" forces workers to work beyond their physical limits to secure full-time positions. A study by Morley (2022) revealed that a "prove yourself mentality", creates a work now and rest later mentality among insecure workers, driving them into the overwork cycle.

2.5.6. Performance evaluation pressure

Mokhtar (2023) contends that overworking and performance evaluation pressures are inextricably linked, resulting in a vicious cycle of high stress, burnout, and decreased productivity. Telford and Briggs (2022) suggest that pressure from performance reviews is a major factor in temporary workers' tendency to overwork to demonstrate their worth, obtain contract extensions, and land permanent jobs. According to Tan et al. (2023), companies that place a strong priority on performance metrics push their insecure employees to work long hours and not take breaks to meet demands, resulting in overworking. Li et al. (2022), found that non-standard employees frequently face intense pressure from management to demonstrate their abilities through performance measures, which raises stress levels and increases the likelihood of burnout compared with permanent employees. In addition, Mokhtar (2023) notes that the pressure of performance evaluation, coupled with job insecurity creates an. environment where working excessive hours is used to demonstrate commitment and competence.

2.5.7. Financial insecurity

Zhang et al. (2023) argue that financial insecurity is the primary driver of overworking among workers, who often accept excessive hours to compensate for lower wages and limited benefits. Ukpere et al. (2024) state that the majority of temporary workers are forced to work long hours and moonlight to make ends meet, which leads to overworking. Likewise, Li et al. (2023) note that gig workers often receive lower hourly wages and lack paid leave and benefits, which forces them to work beyond their physical limits to make ends meet. A

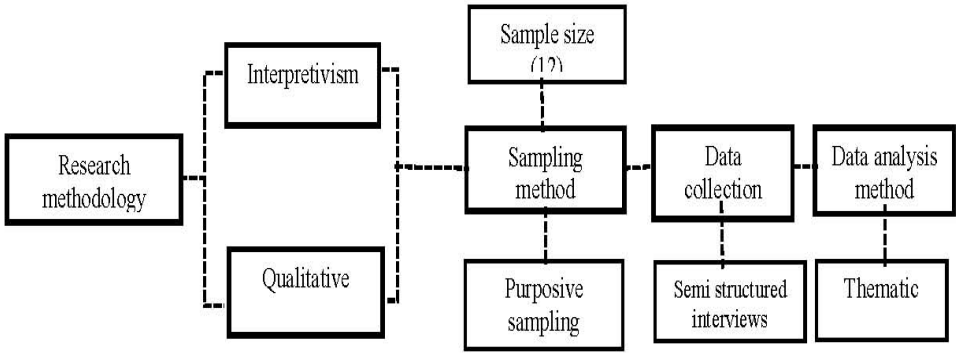
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study by Ghani et al. (2022) showed that nonstandard workers are more prone to financial insecurities, which forces them to work multiple jobs and excessively long hours to improve their financial standing. Tan et al. (2023) revealed that financial insecurity significantly drives overworking among temporary workers, who often receive meagre wages and limited financial benefits. In addition, Mitonga-Monga et al. (2024) argue that in a bid to mitigate financial insecurity, precarious workers frequently take on multiple jobs or excessive hours, as they are more likely than full-time employees to spend all their income on basic commodities.

3. Research methodology

This study's research methodology and design are illustrated in Figure 1.

Figure 1: Study's research methodology



Source: Researchers' compilation

3.1. Respondents' characteristics

Table 1 shows the respondents' characteristics, namely gender, age, work experience, highest qualification, and interview duration.

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Table 1: Characteristics of respondents

No.	Anonym	Gender	Age (Years)	Work experience	Highest qualification	Interview length
1	WT01	Male	27	2years	Bachelor's degree	8 minutes
2	WT02	Male	26	2years	Diploma	6 minutes
3	WT03	Male	25	1year	Diploma	7 minutes
4	WT04	Female	28	3years	Diploma	6 minutes
5	WT05	Male	23	1year	Advanced level certificate	5 minutes
6	WT06	Male	31	3years	Diploma	8 minutes
7	WT07	Female	21	1year	Ordinary level certificate	6 minutes
8	WT08	Female	20	1year	Ordinary level certificate	7 minutes
9	WT09	Female	22	2years	Advanced level certificate	10 minutes
10	WT10	Male	32	3years	Bachelor's degree	9 minutes
11	WT11	Male	23	1year	A level certificate	7 minutes
12	WT12	Male	31	3years	Master's degree	8 minutes

Source: Authors' fieldwork

4. Findings of the study

This study explored factors that perpetuate the overwork cycle among non-standard employees in Zimbabwe. Table 2 shows the themes and sub-themes of the factors perpetuating the overwork cycle among non-standard employees in Zimbabwe.

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Table 2: Themes and subthemes on drivers of the overwork cycle

Themes	Sub-themes	Rate (*N=12*)
Job insecurity	Fear of contract non-renewal Threat of losing a job Desire to secure future employment	11
Financial insecurity	Lack of paid leave and benefits Lower hourly wages Financial challenges	11
Performance evaluation pressure	High-performance metrics Fear of negative performance evaluation	9
Pressure from the employer	Assigned excessive workloads High job demands	8

Source: Primary data

4.1. Theme 1: Job insecurity

Job insecurity was identified as one of the drivers that perpetuates the overwork cycle among non-standard employees in Zimbabwe. Research participants' verbatim responses are presented below:

- *'The nature of our employment contract, which is characterised by job insecurity, forces temporary workers to overwork themselves to secure contract renewal' (WT01).*
- *'Fear of losing jobs forces me to continuously work beyond my physical limits to impress my supervisors' (WT02).*
- *'A defining feature of non-standard work is job insecurity, which forces workers to continuously overwork themselves to justify contract renewal' (WT03).*
- *'Fear of contract termination forces workers to overwork themselves to impress supervisors' (WT04).*
- *'Non-standard workers overwork themselves to appear as ideal workers and considered by managers for employment continuity once their employment contract lapses' (WT05).*
- *'Job insecurity forces workers to continuously overwork themselves' (WT06).*

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- *'Zvakaoma mukoma, basa redu iri unokwanisa kungodzingwa chero nguva ipi zvayo, saka nyangwe ukapihwa basa rakawanda sei unotoshanda kuitira kuti panopera employment contract yako unopiha imwe employment contract. (It's hard my brother, considering the nature of our work, we overwork ourselves by accepting heavier workloads so that we appear to be hard workers deserving contract renewal' (WT07).*
- *'Working as a temporary employee is extremely difficult due to job insecurity. I end up working excessive hours to demonstrate my worth to the company to deal with job insecurity' (WT08).*
- *'Non-standard workers, who experience job insecurity, overwork themselves to prove their worth to their managers' (WT09).*
- *'Cycle of overworking among nonstandard workers is caused by job insecurity' (WT10).*
- *'I have to work beyond my physical limit to impress my manager, who is in charge of renewing my employment contract' (WT12).*

4.2. Theme 2: Financial insecurity

Eleven respondents indicated that financial insecurity encourages overworking among non-standard employees in Zimbabwe. Some excerpts are presented below.

- *'I overwork myself due to financial insecurity' (WT01).*
- *'As non-standard worker, I have multiple jobs to make ends meet because I earn meagre salary' (WT03).*
- *'It's very difficult to save money for transactional and precautionary motives considering my salary, and ultimately I end up working extra hours to meet my financial obligations' (WT04).*
- *'Pakaoma mukomama tinotoshanda mabasa akawanda patinenge tiri pama off or kana tapedza basa repano kuti zvibude. Pano tinotambira mari shoma saka kuti zviite kutotsvaga mamwe ma side jobs' (It's hard my brother, we have secondary jobs to supplement meagre salaries we get here) (WT05).*
- *'We work continuously without rest because nonstandard workers are not entitled to paid time off' (WT06).*
- *'Low pay makes it difficult for some of us to meet our financial needs*

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which create an urgent need to work beyond our physical limit' (WT07).

- *'I receive lower hourly wages and I am forced to work long hours to improve my financial security' (WT08).*
- *'Lack of benefits like paid sick leave, paid time off and insurance force use to work 24/7' (WT09).*
- *'Low pay is the root cause of overworking among non-standard workers' (WT10).*
- *'Mari yedu yatinotambira ishoma saka tinoshanda siku nesikati kuti tikwanise kuriritira mhuri dzedu' (WT11).*
- *'Ihondo kani nemabasa edu aya mukoma. Mari yatinotambira yacho ishoma zvokuti ukasatotsvaga rimwe basa raunoshanda mhuri dzinofa nenzara' (Nature of our job characterised by financial insecurity forces me to moonlight) (WT12).*

4.3. Theme 3: Performance evaluation pressure

Apart from both job and financial insecurity, performance evaluation pressure was identified as one of the factors perpetuating the overwork cycle among non-standard employees in Zimbabwe. On this point, WT01 said:

'We are forced to work beyond our physical limit to obtain positive performance ratings, which are typically used by managers as a basis for contract renewal.'

WT07, WT09 and WT11 supported the above excerpts, with WT11 remarking:

'Fear of adverse performance rating force workers to work long hours without a rest.'

In addition, WT03 stated:

'It's very difficult to meet performance targets, so I end up forgoing my rest period to meet set performance targets.'

WT04, WT06, WT07 and WT10 had similar opinions regarding performance appraisal ratings as a factor influencing continuous overworking among non-standard workers in Zimbabwe.

4.4. Theme 4: Pressure from the employer

Pressure from employers emerged as one of the causes of overworking among non-standard employees in Zimbabwe. In this context, WT04 has this to say;

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'Tight deadlines and unrealistic demands set by the employer especially during peak periods force workers to work long hours.'

Likewise, WT07 said:

'I usually accept heavy workloads, which require me to work 24/7 so that I can easily secure contract renewal.'

Furthermore, WT05 contended:

'Tight deadlines and heavy workloads have been normalised here, and we are forced by this shared norm to overwork ourselves.'

WT02, WT03, WT08, WT11 and WT12 supported the above-mentioned verbatim and argued that high pressure work environments force workers to overwork themselves to meet tight deadlines and unrealistic performance targets.

5. Discussion of the study's findings

Job insecurity, financial insecurity, employer pressure, and performance evaluation pressure emerged as the key factors perpetuating the overwork cycle among non-standard employees in Zimbabwe. The following section analyses the study's findings.

5.1. Job insecurity

This study identified job insecurity a driver of the overwork cycle among non-standard employees in Zimbabwe. Research participants' transcripts on this matter are listed below.

- *'The nature of our employment contract, which is characterised by job insecurity, forces temporary workers to overwork themselves to secure contract renewal' (WT01).*
- *'Fear of losing job forces me to work beyond my physical limits to impress my supervisors' (WT02).*
- *'A defining feature of non-standard work is job insecurity, which forces workers to continuously overwork themselves to justify contract renewal' (WT03).*
- *'Fear of contract termination forces workers to overwork themselves to impress supervisors' (WT04).*
- *'Non-standard workers overwork themselves to appear as ideal workers and considered by managers for employment continuity once their employment contract lapses' (WT05).*
- *'Job insecurity forces workers to continuously overwork themselves' (WT06).*

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- *'Zvakaoma mukoma, basa redu iri unokwanisa kungodzingwa chero nguva ipi zvayo, saka nyangwe ukapihwa basa rakawanda sei unotoshanda kuitira kuti panopera employment contract yako unopiha imwe employment contract. (It's hard my brother, considering the nature of our work, we overwork ourselves by accepting heavier workloads so that we appear to be hard workers deserving contract renewal' (WT07).*

The above-mentioned research participants' verbatim comments are strongly supported by Tan et al. (2023), who argue that perceived job insecurity serves as a stressor that pushes workers to demonstrate their worth with heavy workloads, long hours, and superior performance, often leading to extreme overwork. Likewise, De Witte et al. (2025) maintain that fear of contract non-renewal is a potent stressor that pushes workers to overwork. In addition, Ribas et al. (2025) suggest that workers with precarious employment contracts often work excessive hours assuming that their effort will be rewarded by contract renewal.

5.2. Financial insecurity

Financial insecurity emerged as a factor that perpetuates the overwork cycle among non-standard employees in Zimbabwe. Research participants' voices in this context are presented below.

- *'It's very difficult to save money for transactional and precautionary motives considering my salary, and ultimately I end up working extra hours to meet my financial obligations' (WT04).*
- *'Pakaoma mukomama tinotoshanda mabasa akawanda patinenge tiri pama off or kana tapedza basa repano kuti zvibude. Pano tinotambira mari shoma saka kuti zviite kutotsvaga mamwe ma side jobs' (It's hard my brother, we have secondary jobs to supplement meagre salaries we get here) (WT05).*
- *'We work continuously without rest because nonstandard workers are not entitled to paid time off' (WT06).*
- *'Low pay makes it difficult for some of us to meet our financial needs which create an urgent need to work beyond our physical limit' (WT07).*
- *'I receive lower hourly wages, and I am forced to work long hours to improve my financial security' (WT08).*
- *'Lack of benefits like paid sick leave, paid time off, and insurance force us to work 24/7' (WT09).*

Participants' viewpoints listed above are supported by Zhang et al. (2023), who argue that financial insecurity is the primary driver of overworking among

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workers, who often accept excessive hours to compensate for lower wages and limited benefits. Ukpere et al. (2024) state that the majority of temporary workers are forced to work long hours and moonlight to make ends meet, which leads to overworking. A study by Ghani et al. (2022) showed that non-standard workers are more prone to financial insecurities, which forces them to work multiple jobs and excessively long hours to improve their financial standing. In addition, Mitonga-Monga et al. (2024) note that in a bid to mitigate financial insecurity, precarious workers frequently take on multiple jobs or work excessive hours, as they are more likely than full-time employees to spend all their income on basic commodities.

5.3. Performance evaluation pressure

Performance evaluation pressure emerged as a cause of continuous overworking among non-standard employees in Zimbabwe. On this point, WT01 said:

'We are forced to work beyond our physical limit to obtain positive performance ratings, which are typically used by managers as a basis for contract renewal.'

WT07, WT09 and WT11 supported the above excerpts, with WT11 remarking:

'Fear of adverse performance rating forces workers to work long hours without a rest.'

In addition, WT03 stated:

'It's very difficult to meet performance targets, so I end up forgoing my rest period to meet set performance targets.'

The study's findings are supported by Mokhtar (2023), who contends that overworking and performance evaluation pressures are inextricably linked, resulting in a vicious cycle of high stress, burnout, and decreased productivity. Similarly, Telford and Briggs (2022) suggest that pressure from performance reviews is a major factor in temporary workers' tendency to overwork to demonstrate their worth, get contract extensions and land permanent jobs. A study by Tan et al. (2023) showed that companies that place a strong priority on performance metrics push their insecure employees to work long hours and miss breaks to meet demands, resulting in overworking. In addition, a study by Li et al. (2022) revealed that nonstandard employees frequently face intense pressure from management to demonstrate their abilities through performance measures, which raises stress levels and increases the likelihood of burnout compared to permanent employees.

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5.4. Pressure from the employer

Pressure from employers was also mentioned by research participants as the key driver of overworking among non-standard employees in Zimbabwe. In this context, WT04 has this to say;

'Tight deadlines and unrealistic demands set by the employer especially during peak periods force workers to work long hours.'

Likewise, WT07 said:

'I usually accept heavy workloads, which require me to work 24/7 so that I can easily secure contract renewal.'

Furthermore, WT05 contended:

'Tight deadlines and heavy workloads have been normalised here, and we are forced by this shared norm to overwork ourselves.'

The above excerpts are reinforced by Will (2023), who states that organisations routinely give non-standard employees heavy workloads and force them to multitask without the necessary training, which typically results in overwork. Telford and Briggs (2022) maintain that employer pressure plays a significant role in the overworking of temporary employees, who frequently feel pressurised to put in excessive, unpaid hours to obtain contract extensions and permanent positions. In addition, a study by Zhang et al. (2023) showed that employers may assign heavy workloads to temporary workers, which in most cases causes fatigue and increases the risk of injury.

6. Contribution of the study

Exploring factors that perpetuate the overwork cycle among non-standard employees in Zimbabwe has three benefits, namely theoretical, methodological, and practical. This study validates the person-environment fit theory, which states that the overwork cycle is a result of poor person-environment (P-E) fit, where organisational culture clashes with individual needs (needs-supplies misfit) or that high job demands surpass an individual's abilities or resources (demands-abilities misfit). Methodologically, this qualitative study used face-to-face, semi-structured interviews, which enabled the researchers to capture the research participants' views on the factors that perpetuate the overwork cycle among non-standard employees, which were overlooked in previous studies. In practical terms, this study assists organisations in understanding factors that perpetuate the overwork cycle among non-standard workers and in implementing evidence-based strategies to break it. In addition, this study assists workers in realising the effects of overworking, which influences their coping mechanisms

aimed at breaking the overwork cycle.

7. Limitations and recommendations for future research

This study had its own limitations. This study used twelve purposively sampled research participants, making it difficult to generalise the study's findings. In addition, this study focused exclusively on non- standard employees, ignoring fulltime employees. Future studies on the overwork cycle should consider using a quantitative or mixed research methodology and a sample consisting of both temporary and permanent workers.

8. Conclusion

This study explored factors that perpetuate the overwork cycle among non-standard employees in Zimbabwe. The main factors that emerged are job insecurity, financial insecurity, performance evaluation pressure and pressure from the employer. Researchers believe that this study will assists organisations to understand the adverse effects of overwork and implement evidenced based strategies to break the cycle. The study recommends the case firm implement evidence-based mechanisms, namely workload audits, provide workers with a clear career progression path, competitive compensation, maintain clear communication regarding contract extension, mandatory insurance benefits, paid time off, digital boundaries, and mandatory shutdowns to break the overwork cycle. In addition, this study recommends that workers take regular breaks, prioritise personal life over workloads, and say no to extra work.

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Authors' contributions

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

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Conflicts of interest

The authors declared that they have no conflicts of interest.

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THE ROLE OF SOCIAL PARTNERS IN STRENGTHENING THE EFFECTIVENESS OF LABOUR DISPUTE RESOLUTION SYSTEMS: A FOCUS ON TRADE UNIONS AND EMPLOYERS

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Abstract

The study explores the role played by trade unions and employers in enhancing the effectiveness of labour dispute resolution systems in Botswana. It begins by defining labour disputes and dispute resolution systems, then outlines the challenges facing labour relations systems in Africa and in Botswana specifically. This is followed by a detailed literature review on social partnerships and effective dispute resolution. Using a qualitative exploratory design within an interpretivist phenomenological framework, the study gathered data through virtual semi-structured interviews with fifteen purposively selected participants from Botswana and the wider SADC region. The findings indicate that social partners play a vital role in shaping the success or failure of dispute resolution processes, and that their involvement affects not only the resolution of individual disputes but also the overall stability of labour relations.

Keywords: *labour dispute, dispute resolution system, social partners*

JEL Classification: J52; K31.

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1. Introduction

A labour dispute resolution system refers to the broader institutional framework established to manage and resolve labour-related conflicts, while Alternative Dispute Resolution (ADR) specifically denotes the various processes and mechanisms utilised within that framework to facilitate dispute settlement (Davis 2002). Labour dispute resolution systems are established to manage and regulate workplace conflict through procedures intended to ensure fairness, efficiency, and legitimacy. These systems are expected to provide accessible, reliable, and credible mechanisms for addressing grievances, interpreting employment rights and obligations, and maintaining workplace harmony while preventing unnecessary escalation of disputes (Colvin, 2004).

Labour disputes generally arise within the context of employment relations and may involve conflicts between employers, employees, and workers' representative bodies concerning the rights, obligations, or interests of the parties during the formation, execution, or termination of the employment relationship. These disputes are an inherent aspect of employment relations, particularly within environments characterised by unequal power dynamics, competing interests, and changing labour market conditions (Uzougbo et al., 2023, Sigauke et al, 2024). Consequently, effective labour dispute resolution systems are essential not only for safeguarding the rights and interests of the parties involved, but also for promoting industrial harmony, organisational stability, workplace cooperation, and productivity.

Social dialogue, which entails collaborative engagement among key stakeholders in the labour market to address challenges and resolve disputes, constitutes a fundamental mechanism for promoting good governance. It plays a significant role in fostering sustainable business practices, improving working conditions, and strengthening industrial relations. Furthermore, effective social dialogue contributes to the advancement of social justice, inclusive decision-making, and the promotion of decent work for all within the broader framework of sustainable socio-economic development (ILO, 2024).

Labour dispute resolution systems are established to manage and regulate workplace conflict through procedures intended to ensure fairness, efficiency, and legitimacy. These systems are expected to provide accessible, reliable, and credible mechanisms for addressing grievances, interpreting employment rights and obligations, and maintaining workplace harmony while preventing

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unnecessary escalation of disputes.

Social partners are an important feature in a fully functioning labour dispute resolution system. Trade unions and employers' organisations should be seen not only as representatives of competing interests, but also as key institutions that can either strengthen or weaken industrial relations, depending on how they engage in dispute resolution. Trade unions improve the effectiveness of labour dispute resolution by bringing workers' interests together, reducing information gaps, supporting collective bargaining, and presenting employee grievances in a structured and legally recognised way (Freeman & Medoff, 1984; Visser, 2019).

Employers also play a significant role in influencing the effectiveness of labour dispute resolution systems through the formulation and implementation of workplace policies, administration of disciplinary procedures, responsiveness to employee grievances, and their willingness to participate constructively in negotiation and settlement processes. Their approach may enhance the effectiveness of labour dispute resolution systems through cooperation, procedural fairness, and good-faith engagement, or undermine such systems through resistance, unnecessary delays, and non-compliance with established procedures (Bamber et al., 2016; Addison & Siebert, 2007).

Against this backdrop, the present study examines the role of trade unions and employers in strengthening the effectiveness of labour dispute resolution systems in Botswana. The study is grounded in the premise that social partnership constitutes a fundamental component of effective dispute resolution rather than a peripheral consideration.

1.1 Background of the study

The industrial relations literature widely acknowledges labour dispute resolution as a fundamental institutional component of employment relations systems. Within pluralist industrial relations theory, the employment relationship is conceptualised as inherently conflictual, owing to the differing yet mutually dependent interests pursued by employers and employees (Fox, 1966; Budd, 2004).

Within the broader African context, labour dispute resolution systems frequently encounter challenges associated with institutional capacity constraints, limited access to justice, enforcement difficulties, and disparities in the bargaining power of labour market actors. These challenges are often compounded by procedural delays, inadequate resources, and uneven levels of effective social dialogue among key stakeholders (Bhorat et al., 2017). Botswana

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is not exempt from these challenges, as the effectiveness of its labour dispute resolution system has remained limited despite the existence of formal legal and institutional mechanisms. In practice, the system continues to face difficulties associated with procedural delays, limited accessibility for certain categories of workers, inadequate institutional capacity, resource limitations, understaffing, and bureaucratic inefficiencies. Such challenges may compromise the timeliness and fairness of dispute resolution processes and weaken public confidence in the system. Where labour disputes are not resolved effectively and efficiently, the consequences may include low employee morale, increased labour turnover, industrial unrest, reduced productivity, and, in some instances, litigation or work stoppages. These realities underscore the importance of examining not only the formal legal structure of the system, but also the role and conduct of the actors who participate within it (Bushe, 2019; Morima,2019).

In Botswana, social partners play a critical role because the success of labour dispute resolution is strongly linked to the overall quality of industrial relations. Although the legal framework provides mechanisms for resolving disputes, effective outcomes often rely on the willingness of employers and trade unions to collaborate within those structures. As such, social partners contribute not only to addressing disputes once they arise, but also to transforming workplace conflict into constructive engagement. Their involvement assists in shifting disputes from confrontation to dialogue, from escalation to resolution, and from procedural disagreements to sustainable compliance. This demonstrates that the effectiveness of dispute resolution systems depends not only on institutions and laws, but also on the quality of relationships between the parties involved (Tshoose, 2021; Khan, 2022).

Despite the critical role played by the social partners in the Botswama labour dispute resolution landscape, there is limited research in examining the direct contribution of trade unions and employers to effective labour dispute resolution. Most existing studies focus on legal and institutional frameworks, while giving less attention to the role of social partners in supporting and strengthening these processes. Yet, the success of any dispute resolution system largely depends on the active cooperation and commitment of the parties involved, making their role important for both scholarly understanding and policy development.

1.2 Problem Statement

In many industrial relations systems, the existence of legal procedures alone does not ensure successful dispute resolution. The effectiveness of these systems

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largely depends on the willingness of the key parties in the employment relationship to participate in the processes constructively, cooperatively, and in good faith (Colvin, 2004; Lewin, 2001).

Despite Botswana having a formal labour dispute resolution framework, concerns persist regarding its practical ability to resolve workplace disputes efficiently, fairly, and sustainably. The system faces several interconnected challenges that weaken its effectiveness, including limited institutional independence, inadequate financial resources, and a lack of sufficiently trained and qualified personnel. These constraints often result in delays and inefficiencies, as understaffing and the shortage of specialised expertise impede the prompt and effective handling of labour disputes (Koorapetse & Ukpere, 2025).

These challenges are further aggravated by the limited empirical knowledge regarding the precise role that trade unions and employers play in either enhancing or undermining the effectiveness of labour dispute resolution systems. Trade unions are generally expected to advocate for employees, encourage dialogue, and support lawful mechanisms for dispute settlement, while employers are expected to uphold fair labour practices, address workplace grievances, and engage constructively in negotiation and mediation processes. Accordingly, this study focuses on the lack of clear empirical evidence on the role of trade unions and employers in influencing the effectiveness of labour dispute resolution systems in Botswana. It seeks to address this gap by analysing the nature and extent of their involvement in the dispute resolution process.

1.2.1 Research Questions

- What role do trade unions and employers play in strengthening the effectiveness of labour dispute resolution systems in Botswana?

1.2.2 Research Objectives

- To examine the role played by trade unions and employers in enhancing the effectiveness of labour dispute resolution systems in Botswana.

2. Literature Review

Labour dispute resolution is fundamental to industrial relations because it offers formal mechanisms to handle, limit, and convert conflicts from employment relationships into practical agreements. Scholars view labour disputes as an inherent aspect of organized work, especially when power is imbalanced, expectations diverge, and employers' and workers' economic

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interests clash (Fox,1966).

Scholars widely acknowledge that effective dispute resolution systems play a significant role in promoting industrial harmony, organisational stability, and procedural fairness, particularly where parties interact through mechanisms such as conciliation, arbitration, and collective bargaining. Within this context, trade unions and employers serve as key social partners whose conduct may either enhance or undermine the effectiveness of dispute resolution processes (Colvin, 2004; Lewin, 2001). Further, Deakin & Morris (2021) posit that effective labour dispute resolution systems should be efficient, accessible, cost-effective, and responsive to the realities of the workplace. In the absence of these qualities, disputes may remain unresolved for prolonged periods, leading to poor employee morale, strained labour relations, declining productivity, and diminished confidence in formal dispute resolution institutions.

The notion of social partnership occupies a significant position within labour relations field. Trade unions and employers' organisations, commonly regarded as social partners, are viewed not simply as external participants but as central actors in the regulation and governance of industrial relations systems. Their responsibilities extend beyond formal negotiations to encompass consultation, collective bargaining, dispute management, and the development of workplace norms and practices (Hayter, 2015). Furthermore, Bamber et al., (2016) are of the view that labour relations systems are generally more stable and dispute resolution mechanisms more effective in environments where social partners are institutionally robust and committed to constructive dialogue.

Trade unions are extensively acknowledged in literature as key institutions that safeguard employees' interests and enhance the effectiveness of labour dispute resolution systems. One of their primary functions is the provision of representation. By transforming individual employee grievances into collective concerns, trade unions help to mitigate power disparities between workers and employers, while ensuring that employees' voices are effectively represented within formal dispute resolution processes (Freeman & Medoff, 1984). Employers on the other hand play a significant role in shaping dispute outcomes through their management approaches, commitment to consultation, responsiveness to employee concerns, and adherence to negotiated agreements. Employers who implement fair and transparent disciplinary processes, maintain open communication, and participate in collective bargaining in good faith are better positioned to prevent the escalation of workplace disputes and to facilitate lasting and mutually acceptable resolutions. In contrast, employers who are

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unwilling to engage in consultation, adopt inflexible positions, or respond defensively to workplace concerns may contribute to delays in resolving disputes, erosion of trust, and the recurrence of workplace conflict (Heery, 2016; Addison & Siebert, 2007).

3. Reseach Methodology

This chapter presents the research methodology adopted for the study. It outlines the key methodological components, including the research design, the underlying research philosophy, the approach employed, the overall research strategy, and the procedures used to ensure the quality, validity, and ethical integrity of the study.

The study used a qualitative, exploratory design within an interpretivist phenomenological framework to better understand participants' lived experiences and the meanings they attach to them. Research design refers to the plan that guides a study by outlining the main steps in the research process (Myers, 2013), An exploratory research design is well suited to topics with limited prior study, as it helps generate early insights that can guide future research. Its findings often provide a basis for later studies by assessing the feasibility of further inquiry and informing suitable data collection and analysis methods (Pawar, 2020). Phenomenology, in turn, offers a useful approach for examining human experiences from the perspective of those who have lived them. As Creswell (2003) notes, its main aim is to explore individuals' subjective experiences in depth to understand the meanings they attach to them.

The study used purposive sampling and semi-structured interviews to obtain in-depth insights into participants' experiences of labour dispute resolution. A total of fifteen (15) participants were purposively selected from Botswana and four other Southern African Development Community (SADC) member states: Eswatini, Mauritius, South Africa, and Tanzania. Data were collected primarily through semi-structured interviews, which were well suited to an in-depth exploration of the topic. This approach enabled the study to capture participants' personal perspectives, subjective understandings, and rich experiences of the dispute resolution process. According to Harrell and Bradley (2009), semi-structured interviews rely on a set of pre-planned questions and topics while allowing the interviewer to adapt the sequence and use follow-up questions where needed. This method combines the consistency of structured interviews with the flexibility of unstructured interviews, enabling the collection of rich qualitative data while ensuring that all key issues are addressed.

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The data were analysed using thematic analysis guided by Braun and Clarke's six-step framework, while ATLAS.ti supported the organisation and systematic examination of the large qualitative dataset. Eriksson and Kovalainen (2015) note that ATLAS.ti is a flexible and useful tool for qualitative research because it offers an easy-to-use interface, supports different types of data, and provides advanced features for coding, visualisation, and collaborative analysis. The study also followed strict ethical standards, with careful attention given to informed consent, privacy, and the confidentiality of all participants.

4. Research Findings and Discussion

The interview participants were asked about the role of social partners in the dispute resolution system, and their responses are presented below:

Table 1: Responses to the question on the role of stakeholders in the dispute resolution system

Participant	Response
Thato B	Social partners play a major role in coming up with the ideal dispute resolution that we talked about above. Their participation legitimises the system.
Temo B	The role of the social partners is to educate their members, especially trade unions. Employers also must realise the need for the dispute resolution system.
Kenneth B	As unions, we are deemed as the watchdogs of the employment relationship between our members and the employer, but the same could not be said about the other partner, being Business; they are not interested in interacting with unions to discuss labour relations matters, in general, including dispute resolution.
Thapelo B	Stakeholders should live up to the name stakeholder, which signifies that there is a stake to be held by different individuals; they should be active in the dispute resolution system. The relationship between them must be loyal and truthful. It is not competition; it is about complementing each other.
Thato B	Luckily, the country is now moving in that direction following its inclusion in the recent labour law amendments.

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	Previously, this was not feasible due to the lack of political will by Government.
Mary S	CMAC has a seat for 2 trade union federations, 2 seats for business(es) (1 seat for medium to large businesses and another seat for SMMEs), 2 from government and 2 from what is referred to as special skills. The stakeholders are committed to see CMAC being successful, so they do their part to drive the organisation forward.
Tumelo B	Stakeholders should be able to lobby one another so that the dispute resolution system becomes effective. Unions should be frank with their members and advise them against taking a frivolous case to mediation.
Steve B	The role of social partners in the dispute resolution system is to be proactive and build this process and give it the integrity it needs. Especially from the employer's side, there is a need for them to be more involved in the activities of the dispute resolution system.
Joseph S	The role of social partners in the dispute resolution system is to be proactive and build this process and give it the integrity it needs. Especially from the employer side; there is a need for them to be more involved in the activities of the dispute resolution system
Phenyo B	The role of social partners in the dispute resolution system is to be proactive and build this process and give it the integrity it needs. Especially from the employer side, there is a need for them to be more involved in the activities of the dispute resolution system. Employers and workers can even employ a consultant who can resolve disputes between them without always relying on the system. Partners have the responsibility to monitor the system.
Ngaka B	Trade unions must focus on their core mandate, representing their constituents well and resolve internal conflicts amicably.
Lucky B	Build their own capacity in order to engage with each other professionally.

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Mochuchisi B	The relevant stakeholders should continuously interact with (the) labour dispute system to be abreast of all changes as well as communicate any deficiencies noticed for the system to adjust and correct any operational issues hindering the effectiveness of the system. Assisting and equipping personnel to disseminate awareness of the existing dispute resolution system.
Wethu S	Firstly, they must do what is requested of the Constitution, participate in the labour market in accordance with the relevant laws. They also must make sure that they achieve their objects so that all the labour legislation can be effective. Government creates laws; workers are the beneficiaries of those laws while business provides a platform and the enterprise for these laws to be exercised.

The role of social partners goes beyond formal negotiations and encompasses consultation, conflict resolution, collective bargaining, and the establishment of workplace standards and practices. Similar to what the participants have expressed in the table above, existing literature also suggests that labour relations systems are generally more stable and dispute resolution mechanisms more successful when social partners are well-established institutionally and demonstrate a genuine commitment to constructive dialogue and cooperation (Bamber et al., 2016; Heery, 2016).

In Botswana, the resolution of labour disputes is governed by a legal and institutional framework designed to ensure that workplace conflicts are addressed in a timely, equitable, and accessible manner. This framework relies primarily on mediation, arbitration, and adjudication as the principal mechanisms for resolving disputes between employers and employees. Although the system is structured to facilitate orderly dispute management, its effectiveness largely depends on the actions, collaboration, and strategic decisions of social partners, particularly trade unions and employers' organisations. These stakeholders play a pivotal role in the industrial relations system by representing the interests of workers and employers, shaping workplace governance practices, and influencing whether disputes are settled amicably at an early stage or progress to more formal and adversarial resolution processes (Klerck, 2009; Wang, 2020).

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5. Conclusion

In conclusion, the role of social partners in the labour dispute resolution system is critical to its overall effectiveness and legitimacy. In Botswana, where the current dispute resolution framework has historically operated within structures that are not fully independent, the conduct and commitment of trade unions and employers are particularly important. The success of the system depends largely on their willingness to engage constructively in dialogue, negotiation, and dispute settlement processes. Where social partners collaborate in good faith and actively pursue amicable solutions, disputes are more likely to be resolved at an early stage, thereby promoting industrial harmony and confidence in the system. Conversely, where relationships are characterised by mistrust and adversarial engagement, the formal mechanisms for dispute resolution may remain available but become less effective in practice.

The findings of this study suggest that social partners occupy a central position in determining the success or failure of dispute resolution processes. Their participation not only influences the outcome of individual disputes but also contributes to the broader stability of labour relations. Looking ahead, the introduction of the new Employment and Labour Relations Act presents a significant opportunity to strengthen Botswana's dispute resolution framework. The establishment of a Commission of Mediation and Arbitration promises a more independent and specialised institutional structure for the resolution of trade disputes. Importantly, the envisaged involvement of government, employers, and trade unions in this framework has the potential to foster greater trust, enhance stakeholder ownership, and improve the efficiency and credibility of dispute resolution processes. If effectively implemented, these reforms could usher in a new era of collaborative labour relations and more effective dispute resolution in Botswana.

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THE MATHEMATICS OF FINANCIAL EDUCATION: ECONOMIC MODELS AND PEDAGOGICAL STRATEGIES TO DEVELOP CRITICAL THINKING

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Abstract

Financial education today represents a key skill for active and responsible citizenship, internationally recognized as an essential element of lifelong learning. In this perspective, mathematics plays a central role, providing the conceptual and operational tools necessary to understand key economic phenomena, such as saving, investment, debt, and risk management. This article analyzes the contribution of mathematics to financial education, integrating basic economic models with a solid pedagogical framework to foster the development of critical thinking in students. After outlining the theoretical foundations of financial education and the role of mathematical models in representing economic processes, the article examines the main pedagogical perspectives that support an active and reflective approach to mathematics teaching, particularly applied mathematics. Particular attention

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is paid to teaching strategies based on authentic problems, simulations, and real-life contexts, considered effective for fostering meaningful learning and economic awareness. Finally, the educational implications of integrating mathematics, economics, and pedagogy are discussed, highlighting how financial education can contribute not only to the development of technical skills but also to the formation of critical, autonomous, and socially responsible citizens.

Keywords: *financial education, mathematics, economic models, pedagogy, critical thinking*

JEL Classification: A20, A22, I22, D14, G53, C02

Authors' contributions:
Alessandro Sola
He oversaw the theoretical and conceptual framework of the article, with particular reference to the framework of financial education and the role of mathematics in developing critical thinking. Specifically, he is the lead author of the following sections:
Abstract (general theoretical setting);
Chapter 1 – Introduction (1.1, 1.2, 1.3);
Chapter 2 – Financial education: definitions and theoretical framework (2.1, 2.2, 2.3);
Chapter 7 – Financial education and the development of critical thinking (7.1, 7.2, 7.3);
Chapter 9 – Conclusions.
He also contributed to the epistemological reflection on the integration between mathematics, citizenship, and critical education.

Stefano Cavallini
He developed the mathematical-applicative, economic, and didactic framework of the article, with particular attention to models, pedagogical strategies, and the operational dimension of financial education. He is the lead author of the following sections:
Chapter 3 – The mathematics of financial education (3.1, 3.1.1–3.1.3, 3.2);
Chapter 4 – Economic models and financial decisions (4.1, 4.2, 4.3);
Chapter 5 – Pedagogical foundations of financial education (5.1, 5.2, 5.3);
Chapter 6 – Pedagogical strategies for teaching financial mathematics (6.1, 6.2, 6.3);
substantial contribution to the construction of tables, application examples and connections between mathematical models and educational practice.

Joint contributions:
Both authors collaborated on:
definition of the overall structure of the article;
critical discussion of the results (Chapter 8);
final revision of the text and overall scientific coherence.

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1. Introduction

1.1 Financial education and citizenship in the contemporary context

In today's socioeconomic context, characterized by the increasing complexity of financial markets, the digitalization of services, and the spread of accessible credit instruments, financial education plays a strategic role in citizen education. International organizations such as the Organisation for Economic Cooperation and Development (OECD) have emphasized that financial literacy is a necessary condition for exercising informed and responsible citizenship (OECD, 2018). The ability to understand concepts such as interest, inflation, risk, and return directly impacts individual and collective choices, influencing economic well-being, social stability, and the reduction of inequalities.

Financial education cannot be understood solely as the acquisition of technical knowledge, but must be placed within a broader educational perspective, geared toward developing critical thinking and social responsibility. From this perspective, schools and universities are called upon to provide interpretative tools that enable students to critically analyze economic information, evaluate the consequences of their decisions, and understand the structural dynamics of economic systems (Biesta , 2015).

1.2 The role of mathematics in understanding economic phenomena

Mathematics is the preferred language through which economic phenomena are modeled and analyzed. Concepts such as proportions, percentages, functions, and growth models form the basis of the formal representation of processes such as capital accumulation, interest calculation, and risk assessment. In education, however, these tools are often presented abstractly, separated from real-world contexts, risking reducing students' understanding and perceived relevance (Boaler , 2016).

Integrating mathematics with financial education helps overcome this fragmentation, offering students meaningful learning opportunities where mathematical concepts are used to interpret concrete everyday situations. This approach promotes not only the acquisition of disciplinary skills but also the development of transversal skills, such as problem-solving . solving , critical reasoning, and informed decision making (Stillman et al., 2017).

1.3 Objectives and structure of the article

This article aims to analyze the contribution of mathematics to financial education, integrating basic economic models with a solid pedagogical framework. The primary goal is to demonstrate how teaching financial mathematics, when

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designed according to active and reflective pedagogical principles, can be an effective tool for developing critical thinking.

After outlining the theoretical framework of financial education (Chapter 2), the article delves into the role of mathematical and economic models (Chapters 3 and 4), then analyzes the pedagogical foundations and the most effective teaching strategies (Chapters 5 and 6). Finally, the link between financial education and the development of critical thinking is discussed, highlighting its educational and social implications.

2. Financial education: definitions and theoretical framework

2.1 Financial education in international education policies

Financial education is defined by the OECD as "the process by which consumers and investors improve their understanding of financial products, concepts, and risks, developing the skills needed to make informed decisions" (OECD, 2014, p. 33). This definition highlights a dynamic conception of financial education, understood not as the simple transmission of information, but as a process of developing cognitive, operational, and reflective skills.

In recent decades, many education systems have integrated financial education into school curricula, recognizing its cross-curricular value. International comparative studies, such as the PISA Financial Literacy survey , have shown a significant correlation between financial literacy, mathematical skills, and the ability to solve complex problems (OECD, 2020). This confirms the centrality of mathematics as a core subject for financial education.

2.2 Financial skills and mathematical skills

Financial literacy is based on a complex set of mathematical skills, including calculation, modeling, and data interpretation. According to Lusardi and Mitchell (2014), understanding the concepts of compound interest, inflation, and risk diversification is a key indicator of financial literacy. These concepts require a solid mathematical foundation, not limited to the execution of procedures, but extending to conceptual understanding and the ability to apply them in varying contexts.

In education, this implies the need to move beyond a purely procedural approach to mathematics teaching, favoring activities that stimulate deep understanding and the connection between symbolic, graphical, and numerical representations (Kilpatrick et al., 2001). Financial education offers a privileged context for this integration, as it makes the meaning of mathematical models explicit and highlights their practical implications.

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2.3 Financial education and social inequalities

A central aspect of the debate on financial education concerns its potential role in reducing social inequalities. Numerous studies have highlighted how low levels of financial literacy are associated with greater economic vulnerability, indebtedness, and difficulties with long-term planning (Atkinson & Messy , 2012). These conditions disproportionately affect the most disadvantaged social groups, contributing to the reproduction of inequalities.

From a critical pedagogical perspective, financial education must not limit itself to promoting "correct" individual behavior, but must provide tools for understanding the economic and social structures that influence individuals' choices (Freire , 1970). In this sense, the integration of mathematics, economics, and pedagogy takes on an emancipatory value , oriented toward the formation of individuals capable of critically interpreting economic reality and acting consciously within it.

3. The mathematics of financial education

3.1 Basic mathematical concepts for financial education

Financial mathematics is one of the cornerstones of financial education. It encompasses a series of conceptual and operational tools essential for understanding everyday economic dynamics, such as **percentages, proportions, simple and compound interest, exponential functions,** and compounding processes. According to recent literature, proficiency in formulating geometric sequences is closely related to the ability to correctly calculate compound interest, highlighting the importance of a solid mathematical foundation for informed financial decisions (Dorner , 2024).

3.1.1 Percentages, proportions and rates

Percentages and proportions are mathematical tools used to compare relative quantities, such as interest rates or percentage price changes. In a financial context, the interest rate expressed as a percentage indicates the share of income earned or owed compared to the initial capital.

3.1.2 Simple and compound interest

Simple interest is calculated only on the initial principal, while **compound interest** also includes interest earned in previous periods, resulting in exponential growth in the value of the principal over time. The concept of anatocism describes in practical terms this process of compounding interest upon interest.

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3.2 Statistics, probability and risk management

An important component of financial education involves the ability to understand and interpret statistical data and understand the **probability of different risk exposures** . For example, evaluating a financial portfolio requires understanding measures of dispersion and risk, such as variance and standard deviation.

Table - Key Mathematical Components for Financial Understanding

Mathematical competence	Operational description	Financial Application
Percentages	Comparison between relative quantities	Interest rates, percentage changes
Proportions	Relationships between quantities	Trading regimes and indicators
Geometric	Successions and progressions	Compound interest
Basic statistics	Mean, variance and probability	Risk assessment

Note: The skills listed are considered fundamental to understanding and analyzing everyday economic phenomena. The relationship between mathematics and financial literacy has been extensively documented in studies by Dorner (2024).

4. Economic models and financial decisions

4.1 Economic rationality and decision-making models

Economic models provide a formal framework for describing the financial decisions of individuals and households. These models are often based on rationality assumptions, whereby agents maximize their utility subject to budget constraints. Although these models simplify reality, they allow for insights into economic behavior, such as the optimal choice between present and future consumption.

A simplified example is the intertemporal utility maximization model, in which an individual decides how much to save to maximize overall well-being over time.

4.2 Behavioral economics and financial choices

behavioral economics literature challenges the assumption of the complete rationality of economic agents, emphasizing how financial decisions are often influenced by cognitive biases and heuristics. Financial education, integrated with pedagogical approaches that foster critical reflection, can help students recognize these biases and develop more informed decision-making strategies.

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***Table* - Economic Models and Implications for Financial Decisions**

Economic model	Brief description	Implications for financial education
Utility Maximization	Individuals maximize well-being	Comparison between consumption and savings
Theory of budget constraints	Choices subject to limited resources	Financial planning
Behavioral finance	biases in choices	Critical evaluation of decisions

Note: The models listed represent theoretical perspectives useful for understanding the complexity of real-life financial choices.

5. Pedagogical foundations of financial education

5.1 Meaningful learning and mathematics teaching

Mathematics teaching in financial education is solidly grounded in Ausubel's (1968) theory of meaningful learning. According to this perspective, learning is effective when new content is anchored in students' prior knowledge and integrated into an existing cognitive structure. Financial concepts, being closely linked to students' everyday experiences, represent a privileged context for fostering this process.

In contrast to a mechanical and procedural approach to mathematics, financial education allows students to attribute meaning to mathematical models, making their concrete implications explicit. Studies in mathematics education highlight how the use of authentic contexts fosters conceptual understanding, motivation, and the ability to transfer knowledge (Boaler , 2016; Stillman et al., 2017).

Table - *Teaching approaches to mathematics and their implications for financial education*

Teaching approach	Characteristics	Educational implications
Transmissive	Centrality of the teacher	Procedural learning
Meaningful learning	Connection with experiences	Conceptual understanding
Problem-based learning	Real and open problems	Critical thinking
Laboratory teaching	Cooperative activities	Autonomy and reflection

Note: The table highlights how active approaches are more effective in developing financial and mathematical skills.

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5.2 Problem-based education and experiential learning

The **problem-based Project-based learning (PBL)** is one of the most effective methodologies for financial education, as it presents students with complex, realistic, and unstructured problems that require the integrated use of mathematical and economic skills. According to Kolb (1984), experiential learning develops through a cycle that includes concrete experience, reflective observation, abstract conceptualization, and active experimentation.

In the context of financial education, PBL allows for the simulation of situations such as managing a household budget, choosing a savings plan, or evaluating a loan. These activities stimulate not only mathematical calculations, but also the ability to critically analyze and evaluate the long-term consequences of economic decisions.

5.3 Critical education and emancipation

From the perspective of critical pedagogy, financial education cannot be limited to adapting individuals to market mechanisms, but must foster an understanding of the economic and social structures that influence individual choices. Dewey (1938) emphasizes that education must promote reflective thinking, while Freire (1970) conceives of education as a practice of freedom, oriented towards the emancipation of individuals.

From this perspective, mathematics becomes a tool for critically interpreting economic reality: analyzing interest rates, debt data, or inequality indicators allows us to gain awareness of the dynamics that influence social and economic life. Financial education thus takes on an ethical and political, as well as cognitive, value.

6. Pedagogical strategies for teaching financial mathematics

6.1 Authentic problems and real-life contexts

The use of authentic problems is a key strategy for making financial mathematics teaching meaningful and relevant. These problems are based on realistic situations, characterized by incomplete data, constraints, and alternative choices. According to the literature, this type of activity fosters knowledge transfer and the ability to deal with new situations (OECD, 2020).

Examples of genuine problems include:

- comparing different mortgages using compound interest calculation;
- analysis of the impact of inflation on purchasing power;
- evaluation of long-term savings plans.

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Table - ***Examples of Authentic Problems in Financial Education***

Problem situation	Mathematical concepts	Skills developed
Family budget	Percentages, proportions	Planning
Bank loan	Compound interest	Informed decision
Investment	Statistics and probability	Risk Management
Inflation	Growth functions	Critical thinking

Note: Authentic problems foster the integration of mathematical knowledge and citizenship skills.

6.2 Simulations, role-playing games and workshops

Simulations and role-playing games are particularly effective teaching tools for financial education because they allow students to directly experience the consequences of their decisions. In a protected environment, students can assume the roles of consumers, investors, or policymakers, applying mathematical models to dynamic scenarios.

The laboratory dimension also fosters cooperative work and argumentative discussion, fundamental elements for the development of critical thinking. These strategies are consistent with a constructivist view of learning, in which knowledge is actively constructed through social interaction (Vygotsky , 1978).

6.3 Formative assessment and development of metacognition

A crucial aspect of financial education is assessment. Formative assessment, which focuses on process rather than outcome, allows for monitoring the development of students' mathematical and critical thinking skills. Through tools such as rubrics, self-assessments, and guided discussions, students are encouraged to reflect on their problem-solving strategies and decisions.

Metacognition , understood as awareness of one 's own thought processes, is a fundamental goal of financial education. It allows students to recognize the limitations of mathematical models, evaluate uncertainty, and adopt a critical attitude toward economic information.

7. Financial education and development of critical thinking

7.1 Critical thinking and mathematical skills

Critical thinking is a fundamental transversal skill in contemporary educational contexts and takes on particular relevance in financial education. According to Ennis (2011), critical thinking consists of the ability to formulate reasoned, evidence-based judgments and to reflectively evaluate arguments and decisions.

Mathematics, when taught as a tool for analyzing and interpreting reality, can significantly contribute to the development of these skills.

In the financial context, mathematical skills enable the analysis of quantitative data, comparison of alternatives, and assessment of the consequences of economic decisions. However, these skills are only effective when combined with the ability to question the models used, recognize their limitations, and contextualize their results. In this sense, mathematics becomes a means to develop critical thinking, rather than a purely technical end.

7.2 Critical analysis of economic information

In the information society, individuals are constantly exposed to economic data, financial offers, and advertising messages that require careful critical evaluation. Financial education, integrated with mathematics instruction, provides tools for decoding this information, distinguishing between relevant and irrelevant data, correlation and causation, and real and perceived risk.

The ability to interpret graphs, tables, and economic indicators is essential to avoid decisions based on partial or misleading information. In this sense, statistics and probability play a central role, enabling students to understand uncertainty and critically evaluate economic forecasts (OECD, 2020).

7.3 Financial education and the ethics of economic choices

Developing critical thinking also involves reflecting on the ethical dimensions of economic choices. Individual financial decisions often have social and environmental consequences, which require responsible evaluation. Financial education, therefore, cannot ignore a value-based dimension, oriented toward sustainability, equity, and social justice.

From this perspective, mathematics becomes a tool for analyzing the impact of economic choices, for example by studying income inequality or the social costs of financial decisions. This approach contributes to the development of informed citizens, capable of integrating economic, mathematical, and ethical considerations.

8. Discussion

8.1 Integration between mathematics, economics and pedagogy

The analysis conducted in the previous chapters highlights how the integration of mathematics, economics, and pedagogy is essential for effective financial education. Mathematics provides the formal tools for modeling economic phenomena, economics offers the applied contexts, while pedagogy guides the teaching-learning process toward the development of critical and reflective skills.

This integration helps overcome a fragmented view of knowledge, promoting meaningful and contextualized learning. Financial education thus emerges as a privileged area for interdisciplinary teaching, capable of connecting theoretical knowledge and educational practices.

8.2 Implications for educational practice

From an educational practice perspective, the analysis's findings suggest the need to rethink mathematics teaching from an applied and critical perspective. The use of authentic problems, simulations, and laboratory activities fosters active student engagement and the development of transferable skills.

Furthermore, the adoption of formative and metacognitive assessment strategies allows for monitoring not only knowledge acquisition but also the development of critical thinking and decision-making awareness. These implications are relevant for initial and in-service teacher training, which must prepare teachers to integrate disciplinary and pedagogical skills.

8.3 Limitations of the approach and research perspectives

Despite the highlighted benefits, the proposed approach has some limitations. Specifically, the effectiveness of financial education depends heavily on the sociocultural context and available resources. Furthermore, the complexity of economic and mathematical models requires careful instructional mediation to avoid oversimplifications or conceptual misunderstandings.

Future research could further investigate the long-term impact of integrated financial education on individuals' decision-making ability, as well as explore the use of digital tools and advanced simulations for teaching financial mathematics.

9. Conclusions

Financial education represents a key educational challenge in today's world, where individual and collective economic choices are becoming increasingly complex. This article has shown how mathematics, when integrated with appropriate economic models and pedagogical strategies, can significantly contribute to the development of critical thinking.

Through an interdisciplinary approach, teaching financial mathematics can foster not only the acquisition of technical skills but also the development of informed, autonomous, and responsible citizens. From this perspective, mathematics becomes a tool for cultural and social emancipation, capable of supporting active and critical participation in economic and democratic life.

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STRATEGIES TO ENHANCE SCHOOL DISCIPLINE THROUGH A PROPER LEADERSHIP AND MANAGEMENT PRACTICES: A CASE OF THREE SELECTED SECONDARY SCHOOLS

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Abstract

The abolition of corporal punishment in South African schools through the South African Schools Act No. 84 of 1996 shifted towards non-violent, rights-based disciplinary approaches. Despite this, many schools still face challenges like learner defiance, bullying, disruptions, disrespect, absenteeism, and violence, especially in rural and under-resourced schools. The purpose of this study is to explore strategies to enhance discipline in three selected secondary schools of the Chris Hani East District, Eastern Cape Province. Using a qualitative research method and a case study research design, it aimed to understand disciplinary issues and the strategies used to address them. Participants included principals, teachers, learners, parents, community members, representatives from child-headed households, and a circuit manager, for a total of 15 purposively sampled participants. Data was collected through semi-structured interviews and open-ended questionnaires. Findings showed that effective discipline depends on collaboration between schools, parents, communities and other stakeholders. Key factors include positive teacher–learner relationships, learner participation in rulemaking, parental support, consistent policies, and support systems such as counselling and disciplinary committees. Ongoing professional development and strong

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leadership are also crucial. The study concludes that sustainable discipline requires integrated, collaborative efforts to address school and community challenges.

Keywords: *School discipline, corporal punishment, learner behaviour, stakeholder collaboration.*

JEL Classification: I10, I121, I124, I128, I13

Introduction

The abolition of corporal punishment in South African schools, following the enactment of the South African Schools Act No. 84 of 1996 (SASA), presented a challenge of discipline in a number of schools. Alternatively, Section 10 of the Act explicitly recognises that alternative discipline should respect the learners' dignity while promoting their rights (Republic of South Africa, 1996). The Constitution of the Republic of South Africa (1996), in Section 28(1) (d), affirms that every child has the right to be protected from all forms of abuse, including corporal punishment. Although the law was meant to align school discipline with international human rights standards by promoting non-violent methods of discipline, some teachers have expressed frustration with the outcomes over time. Some South African teachers have reported more classroom disruptions, learner defiance and violence, thus disempowering them of how to maintain discipline (Potokri & Lumadi, 2025).

Furthermore, suggested alternative disciplinary strategies, such as verbal warnings and restorative justice, have often fallen short of managing learners' behaviour. The result has been that teachers continue to face an array of systemic challenges of overcrowded classrooms, insufficient resources, and a lack of parental involvement that have led to a volatile learning environment (Letuma & Mdodana-Zide, 2024). The most troubling consequence is lack of safety and security in schools because some learners allegedly carry weapons into school premises (Potokri & Lumadi, 2025). Therefore, the abolition of corporal punishment has raised concern regarding efficient and effective alternative discipline strategies, which have left teachers vulnerable to effectively manage behavioural issues.

This study focuses on "Strategies to Enhance School Discipline: A Case of Three Selected Secondary Schools in the Chris Hani East District, Eastern Cape Province." Therefore, there is a primary need to identify effective alternative strategies to instil discipline in the classroom and school environment to achieve

productive teaching and learning. The Constitution of the Republic of South Africa Act 108 of 1996 abolished corporal punishment and emphasises that any teaching and learning should depend on a healthy and manageable teacher-learner relationship (Obadire & Sinthumule, 2021).

Background to the study

Corporal punishment has historically been used as a disciplinary measure in schools and homes across different societies. Veriava & Power (2017) explain corporal punishment as meting out disciplinary measures by inflicting pain through actions such as beating, pinching, and caning. In ancient Greece and Rome, as well as during the Middle Ages in Europe, corporal punishment was meant to toughen up and shape boys into disciplined men (Durrant, 2021; Veriava & Power, 2017). In pre-democratic South Africa, corporal punishment was used to address disobedience and unruly behaviour, and its use was often supported by religious beliefs. Christian families believed that scripture justified physical punishment as a disciplinary measure (Potokri & Lumadi, 2025). Similarly, teachers influenced by the Christian National Education (CNE) ideology regarded corporal punishment as an effective way of instilling discipline and moral values in learners (Egunlusi, 2020; Veriava & Power, 2017). Although learner discipline remains essential for maintaining a productive learning environment, schools during this period were largely teacher-centred, with learners having limited opportunities to express their views.

The movement to abolish corporal punishment was influenced by human rights principles, especially those in the 1989 UN Convention on the Rights of the Child, which advocates protecting children from all violence (Saunders, 2019). Countries like the United Kingdom (UK), Sweden, New Zealand, Uganda, and Zimbabwe implemented legal reforms to ban corporal punishment and promote alternative disciplinary methods. Stewart-Tufescu (2023) shows that successful reform depends on proper teacher training and resources for non-violent discipline. While corporal punishment may yield immediate compliance, Durrant (2021) notes it can harm children emotionally and psychologically. As a result, countries have adopted approaches such as restorative justice, conflict resolution, and Positive Behavioural Interventions and Supports (PBIS) to foster a supportive learning environment (Wang'ombe, 2023). Nonetheless, issues with learner misconduct and implementing alternative discipline persist in countries like Uganda and Zimbabwe (Nshemereirwe, 2019; Nyakotyo, Goronga, & Muchenje, 2024).

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In South Africa, the abolition of corporal punishment was formalized through the 1996 South African Schools Act (SASA No. 84) and supported by Section 28(1)(d) of the Constitution, which protects learners from abuse and violence. Despite these reforms aiming to promote respectful discipline, many schools face disruptions, bullying, violence, substance abuse, truancy, learner disengagement, and declining respect for teachers (Obadire & Sinthumule, 2021). These issues are more pronounced in rural and under-resourced schools, where teachers lack proper training and resources to implement alternatives like restorative justice. In the Chris Hani East District of Eastern Cape, socio-economic challenges, overcrowded classrooms, and limited resources hinder non-violent disciplinary strategies. Schools in this area are particularly affected by the end of corporal punishment, with teachers noting increased learner defiance, violence, and insecurity (Halu-Halu, 2013). This study examines "Strategies to Enhance School Discipline: A Case of Three Selected Secondary Schools in the Chris Hani East District, Eastern Cape."

Statement of the Problem

The abolition of corporal punishment in South African schools, in terms of the South African Schools Act No. 84 of 1996 and supported by Section 28(1)(d) of the Constitution of the Republic of South Africa, marked a significant shift in the country's approach to learner discipline. While this legal reform was rooted in the promotion of children's rights and the adoption of non-violent disciplinary practices, its implementation has coincided with escalating levels of learner ill-discipline. Such a situation is of great concern, particularly in rural, under-resourced areas such as the Chris Hani East District of the Eastern Cape Province. Ill-discipline has manifested in various ways, where defiance, persistent absenteeism, classroom disruptions, and diminished respect for authority are prevalent. These behavioural patterns have negatively affected teaching and learning due to undermined teacher authority, reduced instructional time, and disruption of school stability, which has rendered the school environment unsafe and insecure. According to a study by Makhasane and Majong (2023), teachers are regarded as guardians and parental figures in a teaching and learning environment. Therefore, an increase in violent incidents against them raises concerns about the primary question of safety and security in schools, because the violence against teachers has had a disturbing effect on the profession and has discouraged dedicated teachers from remaining in the noble profession, thus having long-term consequences for the entire education system of the country. However, in South

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Africa's post-corporal punishment era, its ability to maintain discipline has been significantly constrained by persistent behavioural challenges.

Furthermore, the ongoing discipline challenges have broader implications for learner well-being, equity, and institutional stability, as articulated in Sustainable Development Goals 3, 10, and 16 (United Nations, 2023). According to Madokhwe and Boboyi (2025), unsafe and unstable school environments negatively affect the psychological and emotional well-being of both teachers and learners. Socio-economic inequalities such as high levels of poverty, inequality, and unemployment continue to shape behavioural challenges and access to supportive disciplinary interventions, which negatively affect social functioning and well-being, leading to aggravated social ills (Ngumbela, 2020). The erosion of discipline undermines schools as institutions responsible for promoting peaceful coexistence, respect for human rights, and accountability, thereby obstructing the establishment of a constructive school environment and impeding the cultivation of responsible, engaged learners (Madokhwe & Boboyi, 2025). Therefore, this has motivated the researcher to conduct a study on "Strategies to Enhance School Discipline: A Case of Three Selected Secondary Schools in the Chris Hani East District, Eastern Cape."

Literature Review

This Challenges in managing discipline across the whole school environment

Managing discipline across the entire school system has become an increasingly complex issue. In Nigeria, Odebode (2019) observed that following the abolition of corporal punishment, learners tend to disrespect their teachers because they know that consequences for misconduct are limited or non-existent. The study notes that even school management teams are not respected, raising concerns at the national level. Similarly, Kemunto et al. (2021) in Kenya found that teachers feel constrained by government policies that prohibit corporal punishment and emphasise child rights, leaving them stressed and frustrated when misconduct occurs. On the other hand, Tiwari (2019) stresses that in India, the abolition of corporal punishment was necessary to protect learners from abuse, and that government and schools need to provide better training and frameworks that are adequately resourced and supported to manage discipline in more constructive ways rather than reverting to punitive practices.

In South Africa, the management of discipline across schools remains one of the most pressing concerns. Mosito and Sitoyi (2024) found that teachers face extreme disrespect and school-based violence, including verbal abuse, assaults, substance abuse, and theft among learners. Teachers report fear and illness due to the

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psychological strain of ill-discipline, which shows the depth of the crisis. Letuma and Mdodana-Zide (2024) argue that interventions such as referrals to management or parental involvement often fail due to unclear policies and ineffective teacher training. This not only highlights the deficiencies of existing systems but also emphasises the critical importance of providing teachers with evidence-based strategies for effective instruction. However, Methi (2019) states that the abolition of corporal punishment does not necessarily cause ill-discipline; rather, it reveals gaps in systemic support and professional capacity-building that must be urgently addressed.

Sekhwama (2019) in Limpopo Province emphasises that managing discipline effectively requires the involvement of parents, SGBs, police, and social workers in developing codes of conduct. However, Mabaso (2019) observed that many teachers are unaware of or inconsistently apply these codes, leading to contradictory standards. For instance, one teacher may reprimand tardiness while another ignores it, sending mixed messages to learners. Such inconsistency undermines discipline and fuels a culture of defiance. Methi (2019) argues that this reflects weak leadership and poor policy enforcement and that teachers are not adequately trained or supported to navigate post-corporal punishment realities. Thus, the problem lies less in the principle of abolishing corporal punishment than in the lack of clear, collaborative, and consistent frameworks to replace it.

Research by Mguye and Omodan (2023) in the Eastern Cape Province confirms that the abolition of corporal punishment has left teachers struggling to maintain authority. Teachers report that without sanctions, anti-social behaviour escalates, leading to bullying and defiance. Asoba and Mefi (2020) further highlight that many teachers lack training in positive discipline, which results in inconsistent enforcement whereby some teachers are overly harsh, others overlook violations, and some apply rules inconsistently. This deficiency in training can impede teachers' capability to effectively manage a classroom and cultivate a supportive learning environment. Dorfling (2022) states that schools could invest in restorative justice, counselling, and positive behaviour support systems (PBIS) and social and emotional learning (SEL) to create a safe and positive school environment. The current researcher argues that eliminating corporal punishment without sustainable alternatives has exposed a shortfall in sustaining learner discipline, making it urgent to develop holistic management systems rather than simply debating punishment versus leniency.

Furthermore, Schlebusch et al. (2022) emphasise that positive discipline is most effective when parents and schools work in harmony. Yet, in many cases, parents defend misconduct or refuse to attend disciplinary hearings, weakening the

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network of support required for discipline. Ziduli (2019) also stresses that without active collaboration between principals, SGBs, community leaders, and parents, learner performance and discipline remain poor. Teachers, often ill-equipped with alternative measures, face escalating disruptive behaviour. Some learners interpret the absence of corporal punishment as diminished authority, reinforcing disrespect and classroom ill-discipline (Makhasane & Majong, 2023). Therefore, there is a pressing need for alternative strategies to improve discipline in schools, and fostering a collaborative environment among all stakeholders is essential to effectively address these issues and enhance learner performance.

The difficulties associated with managing discipline in the entire school environment highlight the multifaceted nature of behavioural challenges in schools. Factors such as overcrowded classrooms, limited resources, inconsistent enforcement of rules, and weak parental involvement contribute to these challenges. This indicates that discipline cannot be addressed in isolation but requires a coordinated effort in the school system (Ispas & Ispas, 2023). Effective school discipline and management require collaboration among teachers, parents, School Management Teams (SMTs), and community members. Mahosi (2025) argues that collaboration and support networks strengthen effectiveness by promoting guidance, shared responsibility, and sustainable outcomes. Such collaboration and collective responsibility contribute to improved learner behaviour and the sustainability of disciplinary practices. Furthermore, effective discipline requires institutional support structures that provide guidance, consistency, and accountability. Consequently, improving discipline requires integrated strategies that address both internal school dynamics and external influences affecting learner behaviour (Koalane & Letuma, 2025).

Methodology

Research is a systematic process of investigation conducted to generate new knowledge based on existing evidence (Mohajan & Mohajan, 2024). Research methodology represents the philosophical and theoretical basis of research and provides a structured framework that guides the planning, design, organisation, and implementation of the research process (Mohajan & Mohajan, 2023). This study employed a qualitative research methodology aimed at interpreting participants' perspectives and lived experiences in order to gain an understanding of their social realities and the meanings they attach to everyday life (Mahosi, Sibiya, & Mpanza, 2024). This study also adopted a case study research design to explore strategies to enhance school discipline in three selected secondary schools in the Chris Hani East District, Eastern Cape Province. The study population consisted of principals,

teachers, learners, parents, community members, representatives from child-headed households, and a circuit manager. Purposive sampling was used to select 15 participants who experienced and were directly involved in matters relating to school discipline. Data was collected through semi-structured interviews and open-ended questionnaires and analysed using thematic analysis, which enabled the identification and interpretation of key themes and patterns emerging from participants' responses (Masejane, Ukpere & Monyei, 2025). Ethical considerations were observed throughout the study, with ethical clearance obtained from the Faculty Higher Degrees Research Committee at iYunivesithi Walter Sisulu and permission granted by the Department of Education. Participation was voluntary, informed consent was obtained, and anonymity and confidentiality were maintained through the use of pseudonyms and restricted access to data. Participants' rights, dignity, and privacy were respected, and language inclusivity was ensured by allowing responses in isiXhosa where necessary.

Findings

Strengthening and Sustaining Strategies to Enhance School Discipline

Strengthening and maintaining school discipline following the abolition of corporal punishment requires a comprehensive and coordinated approach that extends beyond the classroom. The South African Schools Act No. 84 of 1996 introduced non-violent, rights-based disciplinary approaches, emphasising that discipline is a shared responsibility involving multiple stakeholders and systems in the school environment (Ispas & Ispas, 2023). The findings revealed that effective discipline depends on collaboration between teachers, School Management Teams, parents and communities, as learner behaviour is influenced by social, familial, and environmental factors. Participants further highlighted the importance of support systems such as effective school leadership, clear policies, professional development, and institutional support in promoting consistency and accountability in discipline management. In addition, fostering a positive and inclusive school culture based on respect, responsibility, and shared accountability was viewed as essential for sustaining positive learner behaviour. This section therefore examines strategies to enhance discipline in selected secondary schools, focusing on collaboration, institutional support, and capacity-building for effective discipline management.

Strengthening Collaboration Between Schools, Parents, and Communities

Strengthening collaboration between schools, parents, and communities has emerged as a key strategy for enhancing discipline in the post-corporal punishment era. The findings revealed that discipline is a shared responsibility requiring the

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active involvement of teachers, parents, learners, school management teams, and the community. Participants emphasised the importance of parental involvement, learner participation in rule-making, effective communication, and collaboration with support structures such as welfare committees, social services, and community organisations. These collaborative efforts help to reinforce behavioural expectations, promote accountability, strengthen teacher–learner relationships, and provide holistic support to learners. Although challenges such as inconsistent parental involvement and limited effectiveness of some disciplinary strategies were identified, the findings suggest that sustained collaboration, shared responsibility, and clear communication between stakeholders are essential for creating a supportive and effective disciplinary environment.

Principals emphasised the importance of increasing engagement with parents and other key stakeholders to address learner discipline. Principal PR-MPR-01 stated: *More consultation with the affected parents, social and welfare committees within and outside the school.*

Teachers highlighted the importance of engaging learners when addressing disciplinary issues. This is what Teacher TEA-MT-01 mentioned: *Consult learners; misbehaving learners are sometimes taken to the welfare committee for a deeper understanding in the event of misbehaviour due to social factors.*

Teachers indicated that although school and classroom rules are in place, learners often do not fully comply with them. Teacher TEA-FT-02 said: *School rules and class rules are implemented but learners tend to defy them. For learners to remain active in class, I use positive reinforcement, but it is not that much effective.*

Learners emphasised that involving them in the development of classroom rules can be beneficial. During the interview, Learner LEA-ML-02 said, *"I think that co-creating rules with the learners can help." This will lead to mutual agreement between teachers and learners, and it will also improve the relationship between the two parties, which will also enhance the academic performance. Teachers view things from their perspective only; they don't view things from our perspective, so learners are not happy with the rules that have been put into place by teachers.*

Principals highlighted the importance of involving the disciplinary committee and parents in managing learner behaviour. Principal PR-FPR-02 said: *Disciplinary committee and parental involvement because parents contribute a lot when learners misbehave and also stakeholder involvement.*

Principals put an emphasis on the importance of collaboration among all relevant parties to effectively address the challenge. Principal PR-MPR-03 stated*:*

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All stakeholders like sister department in all spheres of like social development, SAPS, Community Members, churches must come together to face this challenge.

Community Members expressed that discipline begins in the home environment. Community Member CM-FCM-01 noted: *I believe child discipline starts at home; the community should be in support of every decision made by the teachers and the management in child discipline.*

Community Members believe that, as parents, their role is to support the unified vision of the SGB, working together with Management, since all involved are parents who care deeply for the children's well-being. During the interview, CM-FCM-01 added: *I think that the role we can all play as parents or community members is to support the united vision of the SGB together with Management, because all these people are parents, and I don't believe that when they discipline children, they want to end up killing them. Therefore, in every way possible in trying to discipline our children, I think that we as parents must also do the same and agree with the teachers so that the children have no place to escape to; at home, one voice should be heard, and at school, the same voice should be heard.*

Community Members highlighted the need for strong coordination among the community, parents, teachers, and learners in maintaining discipline. Community Member CM-FCM-02 said: *Well-oiled chain between the Trio - Community, Parents, Teachers, and pupils – avoid any rusty zones. Each lane for each party should be well explained, with objective points, meeting areas for all should be kept clear to all, plus time frames and their expectations.*

Representatives from Child-Headed Households indicated that there is a need to intervene in situations where conflicts arise between teachers and learners. Representative RP-MR-01 said: *Adjudicate in matters where there is a standoff between the teacher and the learner. Educate learners on the importance of discipline and hard work.*

Representatives from Child-Headed Households stressed the importance of encouraging children to look up to their teachers by treating them with respect. This is what Representative RP-MR-02 stated: *Encourage our children to idolise their teachers treating them with respect and seeing them as their heroes in the quest for a better future.*

The Circuit Manager pointed out that teachers should establish clear, non-punitive school rules and disciplinary measures. They also highlighted the importance of valuing learners' input and adopting a relationship-focused approach. Circuit Manager CTM-FM-00 said: *Teachers must design clear school rules and norms on disciplinary measures that are non-punitive, learners' voices must be valued and create relationship focused approach.*

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The findings show that collaboration between schools, parents, and communities is crucial to sustainable, effective discipline. When all stakeholders communicate openly, share expectations, and engage actively, learner behaviour tends to improve and stay consistent in the school and home environments. Alignment between home and school, supported by community structures, enhances accountability and decreases rule-breaking. Despite challenges like uneven participation and limited resources, the evidence indicates that collective discipline efforts are most effective. Building strong, ongoing partnerships between stakeholders is essential for creating a supportive and disciplined school environment.

Institutional Support and Capacity Building for Effective Discipline

Institutional support and capacity building became key strategies for improving discipline in schools after the abolition of corporal punishment. The findings indicated that the success of alternative disciplinary strategies largely depends on teacher training, professional development, clear guidelines, and supportive leadership. Participants emphasised workshops, behavioural management training, monitoring, counselling, learner support, and stakeholder engagement. Learners wanted to be heard and involved in decision-making, while teachers, principals, parents, and community members highlighted the importance of trust, communication, consistent expectations, and value-based support. The findings suggest that effective discipline requires more than classroom management; it relies on supportive systems, collaboration, and a positive school environment that fosters learner development, accountability, and sustainable discipline.

Teacher TEA-FT-02 noted: *Teachers should be workshopped on behavioural management. Skills to manage different kinds of behaviours should be given to teachers so that they can be readily equipped.*

Learners highlighted the importance of teachers considering learners' perspectives when addressing classroom issues. This is what Learner LEA-ML-02 said: *Teachers need to listen to our views and take them into consideration. They must host counselling sessions with learners who seem to be troublesome at school.*

Learners explained that counselling sessions are conducted with learners who appear to be struggling or displaying concerning behaviour, in order to understand the underlying issues affecting them at school. During the interview Learner LEA-ML-02 added: *These counselling sessions were held with learners who are acting as if they are causing trouble at school to find out what is troubling them and why they behave that way. There are LO teachers who usually assist with the counselling sessions, but this year it's not as effective as last year. However, it must*

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continue because the children are still acting out, especially the grade 8 learners, who don't know that LO teachers are available to help them and talk to them.

Principals emphasise the importance of moving away from responding solely with punishment when issues arise. Principal PR-FPR-02 added: *Shifting the focus from reactive punishment to proactive, positive and relational management strategies.*

Principals stress the importance of fostering an environment where everyone understands that the school's purpose is to shape the future of the next generation. Principal PR-MPR-03 said: *Creating an environment where school is just a place where everyone is well aware that we are here to build the future of the next generation, trust, transparency, etc.*

Teachers emphasise the need to provide teachers with clear guidance on how to respond to specific situations such as conflicts, incomplete homework, or disruptions during lessons. Teacher TEA-FT-05 stated: *By telling teachers how to react on certain situations like fights, not doing homework or writing in class while you present your lesson.*

Teachers explained that professional development programmes equip them with restorative techniques and guidance on implementing new policies. Teacher TEA-FT-06 said: *Professional development programmes teach teachers restorative techniques and implementation of the new policies and also teach them behaviour strategies to manage discipline without punishment.*

Learners highlighted that they are more likely to feel respected when teachers apply rules consistently and fairly. Learner LEA-FL-05 said: *To feel valued and respected and in order to enhance discipline at school, students typically need teachers to provide consistent, fair treatment when enforcing rules and to clearly communicate expectations and consequences.*

Parents emphasised the importance of establishing clear household rules along with consequences for breaking them. Parent PRT-MP-02 said*: Set house rules and consequences if one of the rules is broken; model behaviour as children learn from their parents and from guidance from people outside.*

Community Members also emphasised that children should be taught clear rules at home, so they understand acceptable behaviour and expectations in their lives. This is what Community Member CM-FCM-01 stated: *Children must know the rules at home so that they understand what is right and what is expected of them in life. A child must know that a parent is a parent and that a teacher is also a parent at school, and sometimes I take their phones away because they do not listen.*

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Circuit Manager also noted that teachers should establish clear, non-punitive disciplinary rules and guidelines within the school. This is what Circuit Manager CTM-FM-00 said: *Teachers must design clear school rules and norms on disciplinary measures that are non-punitive. Learners' voices must be valued and create relationship focused approach.*

In line with South African Schools Act No. 84 of 1996, which abolished corporal punishment, a shift away from such discipline requires ongoing investment in teacher development, clear institutional guidelines, and supportive school structures. Participants highlighted that workshops, training, and collaboration equip teachers with practical skills for managing diverse learner behaviours, while systems like incident reporting and counselling foster accountability and support. Involvement of learners, parents, and community members strengthens the disciplinary framework by reinforcing shared expectations and values. Despite challenges like inconsistent implementation and limited resources, findings indicate that strong, coordinated, and continuous institutional support enhances teachers' capacity, promotes positive behaviour, and helps create a disciplined, supportive, and effective learning environment.

Discussion of Findings

Strengthening and Sustaining Strategies to Enhance School Discipline

The findings in Chapter 4 show that while schools have made progress with non-punitive disciplinary approaches after abolishing corporal punishment, challenges remain in ensuring their consistency, effectiveness, and sustainability. Disciplinary practices are influenced by various factors, including teacher preparedness, learner behaviour, parental involvement, and socio-environmental influences. Improving discipline requires a comprehensive approach that extends beyond classrooms to the broader school and community.

Strengthening Collaboration Between Schools, Parents, and Communities

The findings highlight the importance of strengthening collaboration between schools, parents, and communities to enhance and sustain effective discipline, emphasising that learner behaviour is influenced by home, school, and community issues. Principals and teachers stressed the need for ongoing engagement with parents and collaboration with social and welfare structures to address disciplinary challenges. This aligns with Sekhwama (2019), who argue that school discipline is multifaceted and involves multiple stakeholders, and Ziduli (2019), who notes that cooperation between schools and families reinforces positive behaviour in the school and home environments. Parental involvement is crucial for reinforcing

school rules and supporting behavioural interventions, with regular communication and shared decision-making improving learner accountability. Parents also emphasised supporting teachers, monitoring schoolwork, and establishing consistent rules at home, which aligns with Ispas and Ispas (2023), who state that parental engagement creates continuity between home and school. Effective discipline management requires collaboration between teachers, SMTs, parents, and community members; when stakeholders fail to work together, discipline becomes challenging. Mahosi (2025) supports this, stating that collaboration and support networks foster shared responsibility and sustainable outcomes. Therefore, when parents and teachers present a unified approach, learners are less likely to exploit inconsistencies, thus strengthening behavioural outcomes.

In addition to parental involvement, findings highlight the significant role of the community in supporting school discipline through a collective approach that involves schools, families, and community structures such as churches, social services, and local organisations, working together to guide learner behaviour. This aligns with Schlebusch et al. (2022), emphasising that community partnerships are vital in addressing social and environmental factors influencing misconduct. The findings also stress shared values, clear communication, and mutual trust, suggesting discipline is more effective when supported by a cohesive network beyond the school. Learner involvement in rule-making, discussions, and peer-led initiatives fosters ownership and responsibility, improving compliance and strengthening relationships between learners and teachers. As Koalane and Letuma (2025) note, participatory discipline approaches promote democratic values and learner commitment to rules. Overall, strengthening collaboration between schools, parents, and communities is fundamental to sustained discipline, ensuring consistency, reinforcing shared expectations, and fostering a supportive environment for positive learner behaviour.

Institutional Support and Capacity Building for Effective Discipline

Findings show that institutional support and capacity building are crucial for successfully implementing alternative disciplinary strategies in schools. Participants emphasised that moving away from corporal punishment has increased demands on teachers, requiring clear guidance, policies, and strong leadership. Principals called for ongoing engagement, policy direction, and coordinated support, while the circuit manager highlighted the need for clear, non-punitive strategies. These results align with Potokri and Lumadi (2025), who states that effective discipline depends on well-defined policies, disciplinary structures, and support from the Department of Education. Findings also indicate that teacher

capacity-building is essential. Participants noted the need for professional development, including workshops and collaborative platforms, to equip teachers with skills in behaviour management, restorative practices, and alternative strategies. This agrees with Maake-Malatje (2025), who emphasises that transitioning to non-punitive discipline requires teachers to acquire the necessary competencies. This is also supported by Asoba and Mefi (2020), without adequate training, teachers may struggle to apply these approaches consistently, leading to frustration and reduced effectiveness in maintaining discipline.

The findings also highlight that institutional support goes beyond training to include school-based structures such as disciplinary committees, counselling services, and Learning Support Assistants, which enable schools to address learner behaviour holistically by targeting underlying social and emotional factors. This aligns with Dorfling (2022), who argue that effective discipline requires integrated support systems promoting learner well-being and development. The study indicates that capacity building should involve human resource development and strengthening institutional mechanisms. Moreover, the effectiveness of these initiatives focuses on consistent implementation, collaboration, and sustained stakeholder commitment, as inconsistencies and limited follow-through can weaken strategies. Learners emphasised fairness, clear communication, and supportive relationships, highlighting the need for institutional efforts to meet learner needs. These findings echo Ziduli (2019), who stress that successful adaptation to alternative disciplinary strategies requires coordinated efforts, ongoing support, and shared responsibility, making institutional support and capacity building foundational for maintaining effective, relevant discipline in schools.

Conclusions and Recommendations

The study concludes that enhancing school discipline in the post-corporal-punishment era requires a comprehensive and collaborative approach involving all stakeholders. The findings revealed that effective discipline is strengthened through positive teacher–learner relationships, active parental involvement, learner participation in decision-making, and the consistent implementation of school policies. The study further established that institutional support mechanisms, including counselling services, disciplinary committees, professional development programmes, and supportive school leadership, play a significant role in promoting sustainable discipline. School discipline cannot be addressed in isolation, as learner behaviour is influenced by both school and community factors. The findings also demonstrated that collaboration between schools, parents, communities, and education authorities promotes shared responsibility, accountability, and

consistency in addressing learner misconduct. Furthermore, capacity building through teacher training and support structures enhances educators' ability to implement non-punitive disciplinary approaches effectively. Therefore, the success of disciplinary initiatives depends on coordinated efforts among schools, families, communities, and education authorities to create safe, supportive, inclusive, and conducive learning environments that promote both academic achievement and positive learner behaviour.

Based on these findings, the study recommends that the Department of Education strengthen teacher and school management capacity through continuous professional development focusing on non-punitive disciplinary strategies, classroom management, restorative practices, learner support, and positive behaviour management. The Department should further enhance the implementation and monitoring of disciplinary policies by providing clear guidelines, standardised procedures, and regular support from district officials and circuit managers. Investment in support structures such as counsellors, social workers, and Learning Support Assistants is also essential, alongside strengthened collaboration with social development, health services, law enforcement agencies, and community organisations. Teachers and School Management Teams should ensure the consistent application of disciplinary policies, strengthen internal support systems, and foster inclusive school environments that promote accountability, learner engagement, respect, and positive teacher–learner relationships. Parents and community members should actively support school disciplinary efforts through regular communication, guidance, mentorship, and participation in school activities and disciplinary programmes. Furthermore, schools should encourage learner participation in rule-making processes and leadership initiatives to promote ownership and responsibility. Future research should extend this inquiry to different educational contexts and explore emerging factors influencing discipline, including social media, mental health, emotional well-being, restorative justice, peer mediation, stakeholder collaboration, and the long-term effectiveness of alternative disciplinary strategies in promoting sustainable school discipline.

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FOOD INSECURITY AND ACADEMIC PERFORMANCE AMONG MARGINALISED STUDENTS: A QUALITATIVE STUDY AT A UNIVERSITY

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Abstract

Globally, between 20% and 58% of university students experience food insecurity, particularly those from low-income and underprivileged households. Structural inequality stemming from apartheid in South Africa meant that food insecurity among South African university students was particularly prevalent. This study aimed to investigate food insecurity, its effects on academic performance, and students' access to institutional programmes. To do so, 15 semi-structured interviews were conducted with food-insecure students at a university in the Western Cape using a snowball sampling method. Analysis revealed that 14 of the 15 respondents received insufficient funds, and that the R1500 monthly food allowance provided by NSFAS was insufficient. Coping strategies included skipping meals (7 of 15), getting food from friends and peers (6 of 15), and part-time work (5 of 15). These coping strategies had academic consequences: twelve of 15 students reported decreased concentration and 8 of 15 reported decreased studying as a result of these strategies. Five participants skipped classes to work in order to purchase food, and 9 of 15 participants were not aware of the food access programmes offered through the university. For the 6 participants who knew of these resources, the bureaucratic delays of service, restrictive eligibility

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requirements, and not knowing what service was offered were the main impediments. The paper discusses food insecurity as a structural problem that has systemic causes, based on Maslow's hierarchy of needs and Bourdieu's concept of cultural capital. The solutions recommended included food vouchers, subsidised cafeteria options, better communication of meal programmes, and extended hours of the meal programmes. This study contributes to understanding food insecurity in relation to education equity in post-apartheid South Africa.

Keywords: *food insecurity, marginalised students, academic performance, higher education, South Africa, qualitative research, Bourdieu, cultural capital, NSFAS.*

JEL Classification: I23; I24; I32; I38.

1. INTRODUCTION

Food insecurity has been reported for higher education globally, including in South Africa. Estimates suggest that it may affect between approximately 11% and 38% of university students in the country, depending on the measure used [Rudolph et al., 2018]. Food insecurity's effect on academic performance is context dependent. Researchers at the University of the Western Cape found that food insecurity has a negative impact on academic performance [Karriem & Bayat, 2022; Student Affairs, 2023]. Disadvantaged students have been affected by historical and institutional factors including apartheid and structural inequities in South Africa [Rudolph et al., 2018]. Increased access to higher education in South Africa has resulted in greater diversity within the student population but has also highlighted prevailing socio-economic inequalities, with food insecurity affecting many students from disadvantaged backgrounds [Sigodi, 2023]. Data from a historically disadvantaged university (HDU) in the Western Cape suggests that food insecurity is high among the institution's student population and disproportionately affects postgraduate students, leading, indirectly, to low engagement, longer duration of studies, and high dropout rates [Karriem & Bayat, 2022].

Marginalised students as a descriptor is used to describe students who are racialised, first-generation university students, or from low-income or rural backgrounds, facing several intersecting barriers. Marginalised students are impacted by food insecurity socially and economically, as well as institutionally [Jackson, 2023; Jiang et al., 2024]. Food insecurity is more common at minority-

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serving institutions of higher learning compared to majority-white institutions (42% vs 37%) [Freije et al., 2024]. Research has largely focused on barriers to food security and has underreported on solutions. This study frames our findings through the lens of adaptive behaviours and solutions not stressed in university food insecurity literature [Liverpool et al., 2024].

Growing evidence shows nutrition affects the physiology of the brain, memory, attention and learning preparation [Pacheco & Dias, 2025], and that socio-economic conditions have an impact on the nutrition of students. Food insecurity is associated with cognitive decline, as well as deficits in memory, attention, information processing, school disengagement, absenteeism, and academic achievement [Bruening et al., 2017; Scott, 2024]. Food-insecure students may try to compensate by finding and preparing food: directly and indirectly, food insecurity impacts sleep and time allocation, and alters student behaviour and academic engagement, as well as learning, as part of a wider social and economic context [Loopstra & Tarasuk, 2015].

Despite this growing body of research, major gaps remain, with the bulk of South African research into the issue being quantitative, showing the scale of the problem [Karriem & Bayat, 2022; Sabi et al., 2018]. There is less qualitative research on how students cope with hunger in post-apartheid inequalities specifically, although there are some studies from other countries [Goldrick-Rab et al., 2020; Freudenberg et al., 2018] that are limited by different welfare contexts. Second, while other universities (e.g. UWC) have institutional food programmes, little is known about student utilisation. Third, most research adopts a unidimensional view of food security, rather than capturing intersectional realities of race, rurality, gender, first-generation status and class given the country's historical context of inequality [Jackson, 2023; Jiang et al., 2024]. Although Sigodi's work (2023) used the Capability Approach to move forward our understanding of food insecurity among UWC residents, that study did not place academic performance at the foreground of its outcomes nor did it use Bourdieusian cultural capital to analyse the manner in which students access institutional support structures through structural inequalities. The present study intends to fill these gaps by analysing how food insecurity among non-residents marginalizes students in ways that residence-based food security studies overlook and capability approaches do not adequately account for.

This knowledge gap is addressed by the following objectives: (1) to assess how food insecurity affects academic performance, concentration, attendance, and test scores; (2) to explore students' experiences of and perceptions about institution-

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level food security initiatives; and (3) to investigate student recommendations for food security support at the institutional level. The study asked two primary research questions: How does food insecurity affect the academic experience and performance of marginalised students enrolled at a South African university? How do marginalised students make use of, and evaluate, institutional food support programmes?

2. REVIEW OF LITERATURE AND THEORETICAL FOUNDATIONS

2.1 Articulating Food Insecurity within Higher Education

Food security has traditionally been defined as a multidimensional issue consisting of food availability, accessibility, utilization and stability as it relates to individuals and households achieving an adequate and nutritious diet over time [Sigodi, 2023; Maitra, 2025]. Bakhshi (2023) provides a definition of food insecurity as a condition where people lack consistent access to sufficient, nourishing, and reasonably priced food. This definition is widely recognised in current debates, as it positions food security as sustained access to food and suggests that food security changes with contextual and structural factors [Maitra, 2025].

Food insecurity can generally be categorised as moderate and severe. These levels of food insecurity are associated with certain indicators of dietary and behavioural practices which include reduced food consumption, skipping meals and inconsistent patterns in food consumption and this may impact on cognitive ability and general well-being. More than that, current food insecurity classifications and measurement instruments are inadequate especially outside their original contexts and this contributes to contradictory research results [Maitra, 2025]. This measurement inconsistency is not peculiar to research conducted on South African university students — for instance while Dietary Diversity Score (DDS) provided certain levels of student food insecurity, the Household Food Insecurity Access Scale (HFIAS) provided completely different estimates [Rudolph et al., 2018].

Food insecurity is actually pervasive, and Goldrick-Rab et al. (2020) estimated that 21%–58% of university students globally are affected by it. Miranda-Rodríguez and Williams (2023) also suggest that the interventions available to students today only further problematize access. This is possibly because, in political and academic discussions of student food insecurity, it is commonly constructed as a temporary financial problem, instead of a form of structural vulnerability [Bruening et al., 2017]. Loopstra and Tarasuk (2015) suggested that

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temporary income interventions do not sufficiently counter the socio-economic circumstances that produce long-term food insecurity.

2.2 Food Insecurity, Academic Performance, and the South African Context

Student food security is often discussed to determine whether food is available. However, this argument disregards sustainable access to food in terms of quantity and nutrient quality. Food insecurity manifests in several ways by the time it reaches educational outcomes: in malnutrition, mental stress, absenteeism, coping strategies, and in other ways [Scott, 2024]. There is broad agreement that South African universities operate in an environment in which food insecurity is widespread and unevenly distributed [Sabi et al., 2018; Karriem & Bayat, 2022], and is correlated with students' socio-economic backgrounds [Rudolph et al., 2018].

In Somaliland, Adam et al. (2024) argue that insufficient nutrient intake can result in mental performance deficits that reduce academic performance, with effects including anxiety, sleep deprivation, low concentration, and limited engagement with studies. Missing meals may also impair cognitive functioning because reduced glucose levels negatively affect concentration and mental task performance [Rudolph et al., 2018]. Students react to these challenges by engaging in secondary activities, such as part-time employment, to secure necessities, even though this strategy takes time away from academic work and does not resolve the underlying problem [Maroto et al., 2015; Scott, 2024].

Empirical evidence suggests that food insecurity is rife at South African institutions of higher learning. At the University of the Western Cape, food insecurity has been linked to inadequate household income and funding, coupled with the expense of food sold on campus. Many students also rely on institutional food assistance programmes to meet their basic food needs [Karriem & Bayat, 2022]. The high level of food insecurity at South African universities can be partly attributed to the country's history of structural inequality. Statistics South Africa (2023) report that about 62% of black households are food-insecure compared to about 12% of white households. This disparity explains why students from racially marginalised backgrounds and other disadvantaged groups face barriers to admission to post-secondary education and why they perform poorly and have lower retention rates after admission.

2.3 Institutional Responses and Their Limitations

Several studies have documented the growing prevalence of food insecurity within South African higher education institutions. Food insecurity is a problem on many South African university campuses [Scott, 2024], although implemented

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food security programmes have not proved fully effective. Seventy percent of University of KwaZulu-Natal students were still food-insecure [Sabi et al., 2018]. Sigodi (2023) also reported the same pattern at the University of the Western Cape and suggested possible explanations for non-usage, such as inhibitors and restrictive eligibility criteria, low knowledge of food services, or extremely high demand. The University of the Western Cape, like several others, provides students with food parcels, emergency meal vouchers and small food pantries [Karriem & Bayat, 2022].

Despite these attempts, the NSFAS food allowance has proven insufficient to meet students' food needs [Scott, 2024]. The food allowance of approximately R1,500 is meant to cover individual living expenses, but many students have complained that this figure is no longer relevant, as excessive inflation has led to a large increase in food prices. Increasingly, universities tend to treat food insecurity as a temporary problem that can be addressed through short-term measures. This misdiagnosis of the problem often leads to the design and implementation of ineffective interventions [Jackson, 2023].

2.4 Theoretical Framework

While there have been some prior studies on food insecurity among UWC students utilizing the Capability Approach [Sigodi, 2023], this framework focuses on individual freedoms and conversion factors rather than taking into account structural power relations and, specifically, how the history of apartheid in South Africa leads to a differential positioning of students within institutional frameworks. Bourdieu's idea of cultural capital better helps explain the reason behind the systematic exclusion of marginalized students from the support structures which are ostensibly available to everyone, whereas Maslow's hierarchy provides a physiologically sequenced explanation for the positioning of food needs over academic pursuits. This combination allows for a structurally grounded explanation which goes beyond capability.

Food insecurity is a problem which is structural, affecting students worldwide, especially in the South African higher education context. Evidence has demonstrated that students' capacity to achieve their goals and cognitive function and mental well-being is undermined if students do not get access to proper nutrition [Pacheco & Dias, 2025]. The link between food insecurity and academic achievement can be understood using Maslow's Hierarchy of Needs; humans will only address needs at higher levels when the basic needs have been met such as food, water and shelter [Maslow, 1943]. Students are less likely to study while hungry as their body prioritises survival.

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Physiological deprivation alone, however, does not fully explain why food insecurity persists among students. Bourdieu's theory of cultural capital can be used to explain how structural inequalities influence the relationship between food insecurity and academic performance. Cultural capital encompasses the knowledge, competences, social networks and institutional familiarity that individuals acquire in the course of their socialisation. Bourdieu (1986) argues that students from socio-economically privileged backgrounds who are more endowed with cultural capital are better able to understand institutional structures, identify available support services and access them if necessary. In contrast, students from disadvantaged backgrounds often do not have this institutional knowledge or feel excluded from support structures [Maroto et al., 2015; Jackson, 2023].

The two frameworks, Maslow's Hierarchy of Needs and Bourdieu's theory of cultural capital, provide partial but distinct accounts of food insecurity in higher education. Maslow accounts for the individual's level: deprivation of basic physiological needs interferes with the higher-order cognition required for scholastic endeavours [Maslow, 1943; Adam et al., 2024]. Bourdieu accounts for the structural level: the skewed allocation of cultural capital determines students' ability to recognise, access, and use institutional mechanisms for alleviation of hunger [Bourdieu, 1986; Jackson, 2023]. Together, these theories allow analysis of food insecurity both as a physiological constraint and as a structural one, thereby developing a more comprehensive understanding than either perspective could alone.

3. RESEARCH METHODOLOGY

3.1 Research Design

The study employed a qualitative phenomenological approach to gain an understanding of marginalised students' lived experiences of food insecurity at the Historically Disadvantaged Institution (HDI). Phenomenological research is contextually located within the interpretivist model as it seeks to define and understand a particular meaning, and is used when the phenomenon of exploratory interest cannot be understood from a quantitative perspective [Creswell, 2017; Cruz & Sarmiento, 2022; Gephart & Saylors, 2020]. Semi-structured interviews made it possible to explore in detail how food insecurity may affect students' academic performance and overall well-being.

3.2 Sampling and Participants

Identifying individual students as the primary unit of analysis necessitated qualitative insight into how food insecurity influences academic work. The

research adopted the snowball sampling approach in the hope that the familiarity it brings may lessen sensitivity, snowball sampling being the most widely used approach in this type of research [Creswell, 2017; Babbie & Mouton, 2020; Damşa et al., 2024]. To operationalise this, several entry points, including student groups, counselling offices, residence coordinators, and lecturers, were used to mitigate network bias.

Sample size was decided based on saturation in theme as advised by Hennink and Kaiser (2022). Based on 8 interviews, initial themes and sub-themes were identified and by the 12th interview the core themes had been finalised. The diversity of the sample by study level, economic status, region and levels of food insecurity was carefully monitored to enable transferability of findings, one of the four trustworthiness criteria proposed by Lincoln and Guba (1985). To support transferability, a rich detailed description of the participants (in Table 1) and verbatim quotes from the interviews have been included throughout the article.

3.3 Data Collection

Consistent with Lincoln and Guba's (1985) trustworthiness framework, the data collection process was designed to address credibility through sustained engagement and member checking, dependability through the maintenance of an audit trail, and confirmability through reflexive journaling. Semi-structured interviews were chosen as the best method of data collection to meet the research aim [Galletta, 2013; Spradley, 2016]. An interview schedule was created to guide the interview and cover topics such as students' experiences of food insecurity, how it was impacting on their studies, how they were coping with it, and how they contacted the university for help.

Ethical approval was obtained before data collection, by demonstrating that informed consent, confidentiality and access to counselling were afforded to people who may perceive the topic and associated questions to be emotionally sensitive. The interview guide was piloted for clarity and flow, which ultimately improved the quality of the data collected [Merriam & Tisdell, 2015].

3.4 Data Analysis

The study applied elements of Braun and Clarke's (2006) thematic analysis to systematically code the data. Coding began with a detailed examination of the transcript, which resulted in the extraction of 127 initial codes. A detailed codebook was then created to explain each code and provide illustrative quotes. The initial codes were systematically organised into 12 preliminary themes by comparing patterns across transcripts. Visual mapping was then applied to trace

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relationships between ideas. Each theme was subsequently evaluated for internal consistency and representativeness and then merged or refined to produce the final thematic framework.

Trustworthiness was achieved through participant validation with 3 participants, peer debriefing with a colleague, and maintaining both an audit trail and a reflective journal [Flick, 2018]. Given that the researcher was herself a former financially disadvantaged student at the institution, a reflective approach was deemed necessary to minimise bias.

4. FINDINGS

The analysis of the data revealed five recurring themes that highlight finance, academic performance, coping strategies, institutional support, and stigma and awareness issues as part of student experiences with food insecurity. These themes are subsequently interpreted empirically, and discussed in the context of the extant literature and theories introduced earlier.

4.1 Participant Demographics

Table 1 presents participant demographics across selected variables. The findings revealed that the R1,500 NSFAS allowance received by only 6 of the 15 students could barely cover their expenses, leaving a substantial proportion to experience inconsistent access to food. Food security was more of a problem among those from low-income households (6 of 7), but the results were relatively even for those from relatively more stable financial backgrounds.

Table 1: Participant characteristics and food security patterns

Characteristic	Category	Count (n)	Food Security Status
Family Economics	Low-income	7	Unstable: 6, Inconsistent: 1, Consistent: 0
	Middle-class	5	Unstable: 1, Inconsistent: 2, Consistent: 2
	Stable	3	Unstable: 1, Inconsistent: 1, Consistent: 1
Gender	Female	9	Unstable: 5, Inconsistent: 3, Consistent: 1
	Male	6	Unstable: 3, Inconsistent: 2

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Characteristic	Category	Count (n)	Food Security Status
			Consistent: 1
Academic Level	Undergraduate	9	Unstable: 5, Inconsistent: 3, Consistent: 1
	Honours	4	Unstable: 1, Inconsistent: 1, Consistent: 2
	Postgraduate	2	Unstable: 2, Inconsistent: 0, Consistent: 0
Financial Support	Yes (NSFAS/Bursary)	6	Unstable: 3, Inconsistent: 3, Consistent: 0
	No	9	Unstable: 5, Inconsistent: 2, Consistent: 2

4.2 Financial Constraints and Daily Trade-offs

Financial constraints were the most common barriers to food security. Fourteen of fifteen participants reported a lack of sufficient funds to afford food as a barrier to food security, including six participants who received the monthly NSFAS allowance of R1,500. Students also described having to make trade-offs: “For me, it’s money. I don’t have a bursary, and even for someone who does, the money might not be enough.” Another student said: “I have a single parent who cannot provide much money since she is already paying for my rent and tuition.”

Four financial concerns were identified in the data: small or no bursaries (6 of 15 participants); high cost of living (4 of 15 participants); allowances not sufficient (3 of 15 participants); and family financial difficulties (2 of 15 participants). One rural participant noted the cost of transport: “Transport is expensive, even though food is cheaper at home.” First-generation students talked about not understanding the financial system in universities: “I did not know how to apply for emergency funding as no one in my family has ever been to university.” Bourdieu (1986) described habitus as dispositions and schemes of perception, appreciation, and action which students have incorporated from their social environment.

4.3 Academic Performance Outcomes

All the students who experienced food insecurity experienced some difficulty concentrating at either school or in the library. One student explained: “With

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exams, I end up skipping meals, which makes it harder to concentrate." Another student stated: "I often leave the library early because I can't focus on an empty stomach." The second category was fatigue, in which 8 students had difficulty attending to schoolwork because they felt too tired to focus. A third of the students (n = 5) experienced a clash between work (pursued part-time to afford food) and school attendance: "Sometimes I have to prioritise going to work over attending class to make sure I can eat." Table 2 shows the academic outcomes for all seven food-insecure students.

Table 2: Impact of food insecurity on academic performance

Participant	Effect of Hunger on Academic Performance	Specific Academic Outcome
I	Skipping meals during exam week reduced the ability to focus	Performed poorly in tests due to hunger
J	Hunger made it challenging to concentrate in class and during tests	Failed MAN 132 test due to inability to concentrate
G	Difficulty concentrating during study sessions due to hunger	Lower grades as a result of weak focus
O	Unable to stay in the library for long hours due to hunger	Struggled to prepare for exams because of insufficient food
C	Hunger impacted the ability to complete assignments and stay focused in class	Found it hard to keep up with coursework
F	Lack of nutritious food led to low energy levels during exam preparation	Decreased academic performance
L	Prioritising other needs over food affected concentration during exams	Struggled to focus on academic tasks

Beyond these academic consequences, students also spoke of a burden of emotions they carried with them through their daily routines. Students spoke of anxiety concerning the availability of food and an overarching feeling of deep isolation. The events in Table 2 are all aligned with Maslow's (1943) principle of prepotency — in all cases, academic failure was reported only at times when students experienced severe hunger. This was not due to a lack of motivation; it

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was the consequence of unmet basic needs, which precluded the use of the cognitive processes required for academic success.

4.4 Food Insecurity and Coping Strategies

Students' reflections on their strategies for coping with the difficulties of irregular access to food suggest that food insecurity should not be understood as a short-term or acute constraint, because it is fundamentally a response to long-term scarcity. Just under half (7 of 15) of respondents said they missed a meal. Five participants said they borrowed money from friends. When food pantries were available, four of 15 said that they used them. Only 6 of the 15 said friends brought them food. One participant said: "I rely on friends and roommates for meals when things get tough."

One of the adaptive strategies that emerged from the interviews was for students to take up part-time employment to raise some money for unmet educational needs [Maroto et al., 2015]. However, this temporary benefit comes at the cost of time and effort that would otherwise be directed toward study. Other forms of adaptation included revising daily schedules to prioritise food access around academic commitments. These coping strategies reflect the interaction between student agency and structural environment, and are shaped by institutional inadequacies, economic precarity, and limited access.

4.5 Experiences with Institutional Support Programmes

Four barriers to food support identified by respondents are awareness, accessibility, adequacy, and stigma.

Awareness: Nine of 15 participants had no prior knowledge of institutional food support programmes and learned of their existence only through peers: "I didn't even know there was a food pantry until my friend told me about it." This lack of institutional knowledge illustrates Bourdieu's (1986) concept of cultural capital, which prevents low-income students from navigating the support systems that middle-class students take for granted.

Accessibility: Seven of the fifteen participants commented on logistical issues relating to accessibility. One said: "The food parcels don't always stretch the whole month and times to pick them up have clashed with my class timetable." Off-campus students also cited distance as a barrier.

Adequacy: Of the 15 interviewees, 11 said that administrative delays meant it was difficult to access support. One said: "I applied for the food programme, but it took so long to get approved, and by then, I was already struggling." Others said the parcels were small or eligibility was restrictive.

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Stigma: Five of the fifteen participants mentioned feeling embarrassed or worried that their peers would stigmatise them for seeking help at university. The stigma finding is therefore the result of what Bourdieu calls symbolic violence — the imposition of the university's dominant habitus onto students whose habitus deviates from it.

Table 3: Institutional food support barriers

Barrier Category	Participants (n=15)	Key Issues
Awareness	9 of 15	Word of mouth, poor communication
Accessibility	7 of 15	Location barriers, conflicts with schedule
Adequacy	11 of 15	Insufficient quantities, administrative delays
Stigma	5 of 15	Embarrassment, Fear of judgment

5. DISCUSSION

5.1 Financial Instability as Structural Inequality

The financial difficulties experienced by participants, despite an R1,500 NSFAS allowance, illustrate a failure in the system, as this allowance has not been adjusted to reflect the 14% increase in food prices since 2020. This aligns with international evidence that financial aid does not keep pace with the cost of living [Bruening et al., 2017; Gaines et al., 2014]. Consistent with Bourdieu's (1986) notion of cultural capital, participants also highlight that first-generation students lack institutional knowledge about who to ask and how to navigate relevant support systems. Food insecurity in South Africa is not only an issue of income but of the social and cultural capital necessary to access available food support — evidenced by 62% of black households who are food-insecure, compared to 12% of white households [Statistics South Africa, 2023].

5.2 Academic Impacts Through Theoretical Lenses

The finding that participants skipped meals during high-cognitive-demand exam periods challenges the assumption that students reach high-stakes testing situations in a physiologically equivalent state. In Maslow's hierarchy of needs, the students who most need to be able to perform are, at that very moment, least equipped physiologically to do so. The participants' resilience and academic performance suggested that deficit narratives surrounding food insecurity were reductive, as

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motivation and support from peers could help to reduce the effects of food insecurity [Kahtan & Hanbazaza, 2024]. Nevertheless, an individualistic understanding of resilience is not sustainable or equitable in addressing the challenges of food insecurity.

The work-for-food model creates "time poverty" [Maroto et al., 2015], so that the poorest individuals — who would most benefit from an education — spend the least time being educated and are least able to escape poverty. Education at the higher level can reproduce existing social divisions rather than democratising access to education and knowledge [Bourdieu, 1986; Jackson, 2023].

5.3 Institutional Response Inadequacies as System Failure

The barriers faced by participants highlight the need for a coordination mechanism that is not addressed by programmes alone. While programmes do exist, they are invisible to 9 of 15 participants who needed them, revealing an institutional failure to communicate that stems from the assumption that students have the cultural capital to access support structures. Lack of awareness about available food assistance programmes has also been observed elsewhere, where many students reported not knowing whom to approach for help when experiencing hunger [Rudolph et al., 2018]. These findings are consistent with the work of Karriem and Bayat (2022), which found that food assistance programmes at the University of the Western Cape provided immediate relief, but often do not address the root causes of student food insecurity.

5.4 Stigma and Help-Seeking

Stigma presented itself as a tangible barrier to seeking help during this research, as five of the 15 participants felt that fear of peer stigma kept them from accessing institutional food support. Scott (2024) also reported that stigma was a pervasive barrier to seeking help for an urban population of students, reinforcing that this problem is not specific to the HDI but is an institutional problem more generally. Using the concept of symbolic violence from Bourdieu, the stigma can be understood as an imposition of the university's primary habitus on to individuals who do not align with it, therefore using a need for food assistance to label the student as below the university's standard for an independent student.

5.5 Peer Networks and Student Resilience

Students' reliance on their peer networks can be seen as both a representation and limitation of their agency. They informally network to share food, loan money, lend clothes and offer comfort to each other. However, these informal networks can be unstable and are available only to the extent that other students can offer them.

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These findings also highlight a question regarding deficit perspectives often used within the education system, focusing on what students do not possess as opposed to their agency, coping mechanisms, networks and determination [Liverpool et al., 2024].

5.6 Implications for Educational Equity

These results have implications for larger questions about equality in education in post-apartheid South Africa. Food insecurity needs to be conceptualised within a historical context where students of formerly disadvantaged background arrive at university lacking the material and cultural capital typically required by such institutions. The NSFAS allowance gap demonstrates that financial aid can signal a willingness to improve access, but if it does not match the rate of food price increases, it constitutes a faltering rather than a commitment. Addressing food insecurity is both a welfare imperative and an equity imperative.

6. CONCLUSIONS AND RECOMMENDATIONS

6.1 Main Findings

The existence of food insecurity among poor students at the HDI is a structural and institutional problem. The NSFAS allowance is merely R1,500, and its value is reduced every year by inflation, which steadily increases the cost of food. Both students on financial aid and those not on it suffered from food insecurity, showing that students with formal financial aid are not a reliable proxy for food security. Hunger inhibits concentration and participation and increases weariness, particularly during testing and academic stress. Even in cases where public provisions have been implemented, there are various shortcomings due to bureaucratic failures, limited eligibility criteria, restricted information dissemination, and in some cases no publicly available information, leading to student dependence on the more vulnerable informal peer system.

6.2 Recommendations

The issue of food insecurity on campus may benefit from a multifaceted institutional, policy and research-based response. Universities may implement a coupon system which can be redeemed on campus and by local retailers, de-stigmatising food assistance usage. Awareness and access may be improved by an institutional commitment to student-led messaging through orientation programmes, floor meetings, student peer educators and student media. Administrative policies which include expanded programmes hours, satellite

service provision and student consultation in designing interventions can ensure the programmes meets student needs.

At a policy level, indexing NSFAS allowances to food costs, the inflation rate and regional price differences would increase support for vulnerable students. Nationalised food security standards for tertiary institutions may provide a useful reference point. Future research should move beyond cross-sectional studies by tracking students' situations over time and expanding the sample to include postgraduate, international, disabled and first-generation students across different institutional and geographical contexts.

6.3 Study Contributions

This research contributes to the literature on food insecurity at the UWC in three key ways. First, while Sigodi's (2023) work was anchored on the Capability Approach which focuses heavily on conversion factors at the individual level, the present work argues that Bourdieu's cultural capital better explains why structural inequality (not individual capability gaps) prevents students from accessing food aid and assistance. Second, unlike Sigodi (2023), who focused on residence students using a mixed-method design, the present study targets non-resident marginalised students — a population that falls outside residence-based sampling frames and is therefore systematically underrepresented in institutional food security data. Finally, by focusing on academic achievement as the main outcome measure, this paper provides an empirical connection between food insecurity and educational equality that goes beyond issues of welfare.

6.4 Limitations and Further Research

Limitations to this study include having a small qualitative sample size (n=15); using a snowball sample whereby students seeking help may be overrepresented; a cross-sectional design whereby causality cannot be concluded about changes in student food insecurity over time; and self-report measures which may lead to recall bias and social desirability bias. Further research should address these limitations by incorporating longitudinal data analysis, examining food insecurity among additional underrepresented student groups, and assessing institutional food assistance programmes' impact on student retention, persistence, health outcomes, and long-term student outcomes.

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ENTREPRENEURIAL EDUCATION IN BRICS ECONOMIES: A COMPARATIVE ANALYSIS OF GOVERNANCE, PEDAGOGY, AND ECOSYSTEM ALIGNMENT

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Abstract

Entrepreneurial education is increasingly recognised as a strategic mechanism for economic growth, innovation, and employment creation in emerging economies. Within BRICS, governments have prioritised entrepreneurship as a response to persistent structural challenges such as youth unemployment, inequality, and uneven industrial development. However, despite shared developmental aspirations, entrepreneurial education systems across BRICS countries remain fragmented, unevenly institutionalised, and variably integrated into national innovation ecosystems. This study provides a structured comparative review of entrepreneurial education across BRICS economies, examining the alignment between national policy frameworks, higher-education curricula, pedagogical approaches, and ecosystem support structures. Using a structured comparative review of academic literature, policy documents, and institutional reports published over the past 10–15 years, the study analyses how entrepreneurial education is conceptualised and implemented in Brazil, Russia, India, China, and South Africa. The findings reveal significant cross-country divergence in curriculum orientation, experiential learning adoption, and ecosystem integration, alongside common challenges related to access, inclusivity, and practical relevance. The study

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contributes a structured comparative framework for analysing entrepreneurial education in emerging economies and offers policy and curriculum recommendations to strengthen the effectiveness and coherence of entrepreneurial education across BRICS.

Keywords: *Entrepreneurial education; BRICS; higher education; emerging economies; entrepreneurial ecosystems*

JEL Classification: L26; I23; O31; O55

Introduction

Entrepreneurship has emerged as a central pillar of economic transformation strategies in emerging economies, particularly in contexts characterised by high unemployment, limited formal job creation, and widening socio-economic inequality (Ndlovu et al., 2024; Franciscone & Fernandes, 2025). Entrepreneurial education has consequently gained prominence as a policy and institutional response aimed at equipping individuals with the knowledge, skills, and capabilities required to create new ventures, innovate within existing organisations, and contribute meaningfully to national development objectives (Rideout & Gray, 2013; Haryono et al., 2024). Across BRICS countries, comprising Brazil, Russia, India, China, and South Africa, entrepreneurship is increasingly positioned as a solution to structural development challenges, including youth unemployment, skills mismatches, and the limitations of traditional industrial growth models (Nkontwana et al., 2025; OECD, 2019). As a result, entrepreneurial education has been incorporated into national development plans, higher-education strategies, and innovation policies (Lehmann et al., 2020; Liu, 2026). Universities, in particular, are expected to play a dual role: producing entrepreneurial graduates while simultaneously acting as anchors within broader entrepreneurial ecosystems through incubation, knowledge transfer, and industry collaboration (Harima et al., 2020; Liu, 2026; Sibiya, 2025). Despite these shared ambitions, entrepreneurial education across BRICS remains highly uneven in terms of policy coherence, curriculum design, pedagogical practice, and ecosystem integration (Hou et al., 2023; Gcume & Mohapeloa, 2025).

Existing literature highlights that entrepreneurial education in emerging economies is often constrained by theoretical bias, limited experiential learning, weak links to industry, and insufficient alignment with local socio-economic realities (Harima et al., 2020; OECD, 2019). While individual country-specific studies on entrepreneurial education within BRICS contexts are growing,

comparative analyses that examine similarities, divergences, and structural gaps across all BRICS countries remain limited (Rideout & Gray, 2013; Haryono et al., 2024). Much of the current scholarship either focuses on single-country case studies or draws broad generalisations about emerging economies without adequately accounting for the institutional, cultural, and policy heterogeneity within BRICS (Gcume & Mohapeloa, 2025; Franciscone & Fernandes, 2025).

Moreover, the expansion of entrepreneurial education has not always translated into measurable entrepreneurial outcomes (Nkontwana et al., 2025; Lehmann et al., 2020). In several BRICS countries, concerns persist regarding the relevance of entrepreneurship curricula, the capacity of academic staff to deliver practice-oriented learning, and the extent to which higher-education institutions are embedded within functional entrepreneurial ecosystems (Ndlovu et al., 2024; Liu, 2026). These challenges raise critical questions about whether entrepreneurial education, as currently designed and implemented, is adequately positioned to fulfil its developmental mandate across diverse BRICS contexts (Hou et al., 2023; Liu, 2026). Against this backdrop, this study undertakes a structured comparative review of entrepreneurial education across BRICS economies, focusing on three interrelated dimensions: national policy positioning, higher-education curriculum and pedagogy, and ecosystem integration. By comparatively analysing academic literature, policy frameworks, and institutional evidence, the study seeks to provide a structured and comparative understanding of how entrepreneurial education is conceptualized and operationalized across BRICS countries. In doing so, the paper addresses a notable gap in the literature by offering a cross-country analysis that moves beyond descriptive accounts toward analytical comparison.

The study makes three key contributions, first, it advances comparative entrepreneurship education scholarship by developing a consistent analytical framework applicable across heterogeneous emerging economies. Second, it highlights policy–practice misalignments that limit the effectiveness of entrepreneurial education in several BRICS contexts. Third, it provides evidence-based recommendations to inform policy makers, higher-education institutions, and ecosystem actors seeking to strengthen entrepreneurial education as a driver of inclusive and sustainable development.

Literature Review

This literature review establishes the conceptual and empirical foundations for a structured comparative analysis of entrepreneurial education across BRICS economies. It analyses scholarship on entrepreneurial education theory, emerging

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economy contexts, and entrepreneurial ecosystem integration to clarify how entrepreneurial education is conceptualised, delivered, and supported within heterogeneous development environments (Rideout & Gray, 2013). Given the diversity of institutional structures, governance arrangements, and socio-economic conditions across BRICS countries, the review adopts an integrative approach that moves beyond descriptive accounts to critically examine dominant themes, tensions, and gaps in the literature.

The review is structured around six interrelated strands. First, it examines evolving conceptualisations of entrepreneurial education, highlighting the shift from skills-based and business-plan-oriented models toward capability- and mindset-driven approaches (Harima et al., 2020; Sibiya, 2025). Second, it reviews key theoretical foundations supporting entrepreneurial education, including human capital, entrepreneurial mindset, and experiential learning perspectives (Harima et al., 2020; Caliendo et al., 2022). Third, it interrogates structural and institutional constraints shaping entrepreneurial education in emerging economies, with particular attention to policy–practice misalignments (Audretsch & Belitski, 2021). Fourth, it critically reviews comparative insights on entrepreneurial education across BRICS economies, identifying patterns of convergence and divergence (Gcume & Mohapeloa, 2025). Fifth, the review explores the role of digitalisation in expanding and reshaping entrepreneurial education delivery (Hou et al., 2023; Secundo et al., 2020). Finally, it considers issues of inclusion, access, and contextual relevance, which are central to the developmental mandate of entrepreneurial education in emerging economies (Ndlovu et al., 2024; Sibiya, 2025).

The literature review informs the development of an analytical framework for comparing entrepreneurial education systems across BRICS economies. This framework provides the conceptual basis for the comparative analysis that follows, enabling the study to contribute to both entrepreneurship education scholarship and emerging economy policy discourse.

Conceptualising Entrepreneurial Education: From Skills to Capability Formation

Entrepreneurial education has undergone a substantial conceptual evolution over the past two decades. Early approaches framed entrepreneurship primarily as a set of managerial and business planning skills aimed at new venture creation (Lubinski et al., 2025). Contemporary scholarship, however, increasingly conceptualises entrepreneurial education as a capability-building process that

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develops entrepreneurial cognition, behaviour, and adaptability across multiple economic contexts (Letshaba, Mahosi & Sibiya, 2025). This broader framing recognises that entrepreneurial outcomes extend beyond firm creation to include innovation within existing organisations, social entrepreneurship, informal economic activity, and community-based enterprise development (Pieniazek et al., 2024; Kimmitt & Muñoz, 2018; Elsayed, 2018; Roundy, 2017; Muñoz & Cohen, 2017).

The distinction between education about, for, and through entrepreneurship remains central in the literature. Education about entrepreneurship typically emphasises theoretical knowledge and conceptual understanding, while education for entrepreneurship focuses on skill acquisition and preparation for venture creation. Education through entrepreneurship, by contrast, adopts an experiential logic in which learners engage directly in entrepreneurial action as a core pedagogical mechanism (Harima et al., 2020; Rideout & Gray, 2013). Although the latter approach is widely regarded as most effective, its implementation is uneven, particularly in emerging economy contexts where institutional capacity and resource constraints persist (Letshaba, Mahosi & Sibiya, 2025).

Importantly, scholars caution against universalising entrepreneurship education models without accounting for contextual variation (Harima et al., 2020; Mahosi & Sibiya, 2025; Nason et al., 2026; Peredo & McLean, 2018). In emerging economies, entrepreneurial education must contend with structural realities such as informality, necessity-driven entrepreneurship, and unequal access to resources Sibiya et al., 2023). These conditions complicate the translation of entrepreneurial education into measurable economic outcomes and highlight the need for context-sensitive curriculum design.

Theoretical Foundations Supporting Entrepreneurial Education

Entrepreneurial education literature is anchored in multiple theoretical traditions, each offering distinct explanatory power. Human Capital Theory remains influential in policy discourse, positioning education as an investment that enhances productivity and employability. In BRICS economies, this perspective has informed large-scale investments in entrepreneurship programmes as tools for economic development and labour market activation (Marginson, 2024; Urbano et al., 2019). However, critics argue that human capital approaches often fail to account for institutional constraints and may overestimate the capacity of education alone to generate entrepreneurial success (Ndlovu et al., 2024; Nabi et al., 2017). Entrepreneurial Mindset Theory shifts attention toward cognitive and behavioural

attributes such as opportunity recognition, risk tolerance, creativity, and resilience. This theoretical lens is particularly relevant in volatile and resource-constrained environments characteristic of many BRICS contexts (Garcia et al., 2025). Nonetheless, the literature highlights persistent challenges in operationalising mindset development within formal curricula and assessing such outcomes using traditional evaluation mechanisms (Rideout & Gray, 2013; Letshaba et al., 2025).

Experiential Learning Theory provides a pedagogical foundation for action-based entrepreneurial education. Empirical studies consistently demonstrate that experiential approaches, such as simulations, project-based learning, internships, and venture incubation, enhance entrepreneurial intention and competence (Harima et al., 2020; Rideout & Gray, 2013). Despite this evidence, institutional adoption remains inconsistent, often constrained by rigid curricula, limited staff expertise, and assessment systems that privilege theoretical knowledge over applied learning (Nabi et al., 2017; Secundo et al., 2020).

Entrepreneurial Education in Emerging Economies: Structural and Institutional Constraints

Entrepreneurial education in emerging economies is shaped by a complex set of structural and institutional constraints that distinguish these contexts from developed economies. Persistently high youth unemployment, the prevalence of informal labour markets, and limited industrial absorption capacity place significant pressure on education systems to function not only as sites of learning but also as mechanisms for economic participation and social mobility (Urbano et al., 2019; Nabi et al., 2017; Ahmed & Ahmed, 2021). Consequently, entrepreneurial education in emerging economies is frequently positioned as a multi-purpose development intervention, expected to address unemployment, poverty alleviation, social inclusion, and local economic development simultaneously (Nabi et al., 2017; Ndlovu et al., 2024; Hall et al., 2021). This expanded developmental mandate, however, creates inherent tensions within entrepreneurial education systems. Unlike developed contexts, where entrepreneurial education often complements relatively stable labour markets, emerging economies require entrepreneurship education to compensate for structural deficiencies in employment systems (Sibiya et al., 2023). As a result, programmes are often designed with ambitious policy objectives that exceed the realistic capacity of higher-education institutions to deliver sustained entrepreneurial outcomes. The literature cautions that such overextension risks

diluting educational quality and obscuring the primary pedagogical purpose of entrepreneurial education (Secundo et al., 2020).

Institutional capacity constraints further exacerbate these challenges. Many higher-education institutions in emerging economies operate under conditions of resource scarcity, large student cohorts, and limited academic staff with entrepreneurial or industry experience (Rideout & Gray, 2013; Letshaba et al., 2025). These conditions restrict the adoption of experiential and practice-based pedagogies that are widely recognised as central to effective entrepreneurial education. Instead, programmes frequently rely on lecture-based delivery and business plan assessments, which are more administratively manageable but less effective in fostering entrepreneurial capability and action. A persistent policy–practice gap is widely documented in the literature. While national development strategies and entrepreneurship policies often emphasise innovation, venture creation, and ecosystem integration, implementation at institutional level is frequently fragmented and inconsistent (Marginson, 2024; Urbano et al., 2019). Entrepreneurial education initiatives are commonly introduced as discrete modules or short-term interventions rather than embedded within broader curriculum reform (Rideout & Gray, 2013; Nabi et al., 2017). This results in limited coherence between policy objectives, curriculum content, pedagogy, and assessment practices. In mass higher-education systems, entrepreneurial education is often treated as an auxiliary or elective offering, reinforcing its marginal status within academic programmes.

Governance and coordination challenges also constrain entrepreneurial education effectiveness in emerging economies. Fragmented responsibility across education, economic development, and innovation ministries often leads to misalignment between policy intent and institutional delivery (Etzkowitz & Zhou, 2022; Liu, 2026). Universities may be incentivised to expand enrolment in entrepreneurship-related programmes without corresponding investment in quality assurance, staff development, or ecosystem partnerships (Audretsch et al., 2022; Nabi et al., 2017). Consequently, participation rates increase without commensurate improvements in entrepreneurial capability or outcomes (Rideout & Gray, 2013). The dominance of scale-driven approaches further undermines depth and sustainability. Entrepreneurial education initiatives in emerging economies frequently prioritise broad participation, often driven by donor funding or national targets, over longitudinal engagement and mentorship (Audretsch & Belitski, 2021; Garcia et al., 2025). This emphasis on reach rather than intensity results in short-term exposure to entrepreneurship concepts rather than sustained capability

development, limiting the long-term impact of such programmes (Nabi et al., 2017). The literature highlights that without continuity, mentoring, and ecosystem support, entrepreneurial education is unlikely to translate into viable entrepreneurial activity (Stam & van de Ven, 2021; Jack et al., 2010; van Burg et al., 2021; Xie et al., 2021).

Additionally, the structural realities of informality pose significant challenges for entrepreneurial education design. A large proportion of entrepreneurial activity in emerging economies occurs outside formal regulatory frameworks, yet many educational programmes remain oriented toward formal, growth-driven enterprise models (Muchie et al., 2017; Webb et al., 2020; Kistruck et al., 2015; Mahosi et al., 2025). This misalignment reduces relevance for learners who are more likely to engage in necessity-driven or informal entrepreneurship (Kraemer-Mbula & Wunsch-Vincent, 2016; Langevang et al., 2012). Scholars argue that failure to integrate informal economy dynamics into entrepreneurial education curricula limits both inclusivity and contextual relevance (Isayomi & Akintunde, 2021; Mair & Marti, 2009; Schwettmann, 2022).

Taken together, these structural and institutional constraints highlight the limitations of transplanting entrepreneurial education models from developed economies into emerging contexts without adaptation (Oyebanjo & Tengeh, 2021). The literature increasingly calls for context-sensitive entrepreneurial education frameworks that recognise institutional capacity constraints, labour market realities, and ecosystem maturity (Gcume & Mohapeloa, 2025; George et al., 2016). Addressing these constraints requires moving beyond symbolic policy commitments toward coherent, well-resourced, and ecosystem-embedded entrepreneurial education strategies capable of supporting both economic and social development objectives.

Entrepreneurial Education Across BRICS Economies

Comparative scholarship on entrepreneurial education across BRICS economies remains underdeveloped despite BRICS growing economic and geopolitical significance. Existing studies consistently indicate that entrepreneurship is strongly embedded within national development discourse across Brazil, Russia, India, China, and South Africa (Yi et al., 2023). Entrepreneurship is commonly framed as a mechanism for innovation, employment creation, industrial upgrading, and global competitiveness (Muchie et al., 2017; Liu, 2026; Huseynova, 2023). However, while policy narratives across BRICS demonstrate notable convergence, implementation patterns reveal significant divergence (Audretsch & Belitski, 2021;

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Gcume & Mohapeloa, 2025). A key source of variation lies in institutional capacity and governance orientation. Some BRICS economies exhibit strong state-led coordination between higher education, innovation policy, and industrial strategy, enabling relatively coherent entrepreneurial education ecosystems (Etzkowitz & Zhou, 2022; Audretsch et al., 2022). In these contexts, universities are deliberately positioned as engines of innovation, supported through public investment, regulatory alignment, and structured partnerships with industry (Lehmann et al., 2020). Conversely, other BRICS economies rely more heavily on decentralised or fragmented institutional initiatives, where entrepreneurial education emerges through isolated programmes rather than system-wide integration (Rideout & Gray, 2013; Stam & van de Ven, 2021). This fragmentation often results in uneven quality, duplication of efforts, and limited ecosystem embeddedness.

Curriculum orientation further differentiates entrepreneurial education across BRICS economies. While traditional business-plan-driven models remain prevalent, particularly within management and commerce faculties, there is increasing experimentation with innovation-oriented, technology-driven, and interdisciplinary approaches (Secundo et al., 2020; Letshaba et al., 2025). These include venture laboratories, hackathons, design thinking modules, and incubation-linked learning (Garcia et al., 2025; Rideout & Gray, 2013). However, adoption is uneven, and in many cases such approaches coexist alongside conventional pedagogies rather than replacing them (Nabi et al., 2017). The persistence of traditional models reflects both institutional inertia and structural constraints, including staff capacity, assessment regimes, and accreditation requirements (George et al., 2016).

Another important dimension of variation concerns ecosystem maturity and integration. In some BRICS contexts, entrepreneurial education is closely connected to national and regional innovation ecosystems, facilitating experiential learning through industry engagement, incubation, and access to finance (Lehmann et al., 2020; Stam & van de Ven, 2021; Trandafir, 2023; Baloyi & Khanyile, 2022). In other cases, universities operate on the periphery of entrepreneurial ecosystems, limiting opportunities for students to translate learning into entrepreneurial action (Audretsch & Belitski, 2021; Audretsch et al., 2022). The literature suggests that weak ecosystem integration undermines the developmental impact of entrepreneurial education, particularly in environments characterised by informality and limited market access (Kraemer-Mbula & Wunsch-Vincent, 2016; Webb et al., 2020).

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Despite these differences, a common limitation across BRICS scholarship is the predominance of single-country studies or institution-specific evaluations (Rideout & Gray, 2013; Nabi et al., 2017). While such studies offer valuable contextual insights, they do not support systematic comparison or theory building across BRICS (George et al., 2016; Garcia et al., 2025). Few studies employ a consistent analytical framework that captures similarities, divergences, and structural patterns across all BRICS economies. As a result, opportunities for cross-country policy learning and cumulative knowledge development remain constrained (Gcume & Mohapeloa, 2025; Liu, 2026).

This gap is particularly problematic given the tendency to treat BRICS as a relatively homogenous category within global entrepreneurship discourse. The evidence suggests that entrepreneurial education systems across BRICS are better understood as occupying different positions along a continuum shaped by governance coordination, curriculum orientation, and ecosystem integration (Etzkowitz & Zhou, 2022; Urbano et al., 2019). A structured comparative approach is therefore essential to move beyond descriptive categorisation toward analytical differentiation and explanatory insight (Garcia et al., 2025; Secundo et al., 2020). To move beyond a purely descriptive account of entrepreneurial education, this study first develops an analytical framework based on a developmental continuum illustrated in Table 1. By categorizing system integration into high, moderate, and low levels, this matrix provides the conceptual criteria necessary to evaluate how governance coordination, curriculum orientation, and ecosystem maturity interact within heterogeneous emerging economies.

Table 1: Analytical Framework –: The BRICS Entrepreneurship Education Continuum

Dimension	High Integration (e.g., China)	Moderate/Emerging Integration (e.g., India, Brazil)	Low/Fragmented Integration (e.g., South Africa, Russia)
Governance Coordination	**State-Led:** High alignment between industrial strategy and HEI mandates.	**Hybrid:** Strong national policy (e.g., Startup India) but uneven regional execution.	**Fragmented:** Multiple ministries with overlapping or conflicting mandates.
Curriculum Orientation	**Tech-Driven:** Focus on "Indigenous Innovation" and	**Mixed:** Strong commerce roots transitioning toward incubation-linked learning.	**Theoretical:** Heavy reliance on business-plan models and classroom delivery.

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Dimension	High Integration (e.g., China)	Moderate/Emerging Integration (e.g., India, Brazil)	Low/Fragmented Integration (e.g., South Africa, Russia)
	high-growth sectors.		
Ecosystem Maturity	**Embedded:** Universities act as core anchors in tech-hubs and industrial parks.	**Developing:** Maturing incubator networks; limited reach to rural/regional HEIs.	**Peripheral:** Weak industry-university links; graduates often face high labor market entry barriers.

Source: Authors 2026

Building on this conceptual foundation, Table 2 applies these dimensions to the specific institutional contexts of the five BRICS nations. This empirical snapshot illustrates how each economy occupies a distinct position along the continuum, highlighting the practical misalignments and structural gaps that occur when national policy intentions meet local institutional realities.

Table 2: Comparative Dimensions of Entrepreneurial Education Across BRICS Economies

Comparative Dimension	Brazil	Russia	India	China	South Africa
Policy emphasis on entrepreneurship	High	High	High	Very high	High
Governance orientation	Mixed (state–market)	State-coordinated	Mixed, decentralised	Strong state-led	Mixed, fragmented
Role of universities	Skills & innovation hubs	Technical & applied focus	Mass education & skills	Innovation & technology drivers	Access & transformation focus
Curriculum orientation	Business & innovation mix	Technical–managerial	Skills & venture exposure	Innovation & tech-driven	Business & developmental
Dominant pedagogy	Mixed (theory + practice)	Structured, formal	Mixed, scale-driven	Experiential & applied	Predominantly theory-based
Ecosystem integration	Moderate	Moderate	Uneven	Strong	Uneven
Digital entrepreneurship focus	Growing	Moderate	Strong	Very strong	Growing
Key systemic constraint	Fragmentation	Institutional rigidity	Scale vs quality	Centralisation risks	Resource & capacity gaps

Source: Authors 2026

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Table 2 presents a comparative analysis of dominant entrepreneurial education patterns across BRICS economies, illustrating both convergence at the policy level and divergence in implementation. While all BRICS countries demonstrate a strong policy emphasis on entrepreneurship, the table highlights marked variation in governance orientation, curriculum design, pedagogical approaches, and ecosystem integration. These differences reflect underlying disparities in institutional capacity, state coordination, and innovation system maturity. Notably, economies characterised by stronger policy coordination and deeper ecosystem integration tend to exhibit more experiential and innovation-driven pedagogies, whereas more fragmented systems rely predominantly on theory-based or scale-oriented approaches. The table highlights the heterogeneity of entrepreneurial education systems within BRICS and reinforces the limitations of treating BRICS as a homogenous category. It further provides a structured basis for cross-country comparison and informs the subsequent empirical analysis by identifying key dimensions through which entrepreneurial education effectiveness can be assessed.

Digitalisation and Entrepreneurial Education

Digitalisation has emerged as a significant enabler of entrepreneurial education globally, reshaping how entrepreneurial knowledge, skills, and experiences are delivered. Digital platforms, online simulations, virtual incubators, and massive open online courses (MOOCs) have expanded access to entrepreneurial education, particularly in contexts where physical infrastructure, geographic distance, and institutional capacity present barriers (Secundo et al., 2020; Van Laar et al., 2017). In emerging economies, digital entrepreneurial education is frequently promoted as a scalable and cost-effective solution to address widening demand for entrepreneurship training (Secundo et al., 2020; Urbano et al., 2019). The literature highlights several potential advantages of digital entrepreneurial education. These include increased reach, flexibility in delivery, opportunities for peer-to-peer learning across geographic boundaries, and exposure to global entrepreneurial practices (Secundo et al., 2020; Van Laar et al., 2017). Digital tools also enable the integration of data analytics, prototyping software, and platform-based business models into entrepreneurial curricula, aligning education more closely with contemporary entrepreneurial realities shaped by the digital economy (Nabi et al., 2017; Liu, 2026).

However, empirical studies caution that digitalisation does not automatically translate into improved entrepreneurial outcomes. One recurring concern is the replication of traditional pedagogical models in digital formats, where online entrepreneurial education remains content-heavy and lecture-driven rather than

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experiential (Rideout & Gray, 2013; Letshaba et al., 2025). Without deliberate instructional design, digital platforms risk reinforcing passive learning approaches that are misaligned with the action-oriented nature of entrepreneurship (Nabi et al., 2017; Rideout & Gray, 2013). Digital divides further complicate the effectiveness of digital entrepreneurial education in emerging economies (Robinson et al., 2020). Unequal access to reliable internet connectivity, digital devices, and digital literacy skills constrains participation and deep engagement, particularly among students from disadvantaged socio-economic backgrounds (van Deursen & van Dijk, 2019; Marginson, 2024). As a result, digital entrepreneurial education may inadvertently reproduce existing inequalities rather than mitigate them (Robinson et al., 2020; Kraemer-Mbula & Wunsch-Vincent, 2016).

Moreover, the literature notes limited integration between digital entrepreneurial education and physical entrepreneurial ecosystems (Sibiya, 2025). Online learning environments often operate in isolation from local incubators, industry networks, and financing mechanisms, reducing opportunities for experiential learning and venture progression (Secundo et al., 2020; Rideout & Gray, 2013). Scholars increasingly argue that digital entrepreneurial education is most effective when embedded within hybrid delivery models that combine online learning with in-person mentorship, incubation, and ecosystem engagement (Secundo et al., 2020; Stam & van de Ven, 2021).

In the context of BRICS economies, digitalisation presents both an opportunity and a challenge. While digital platforms offer scalability and innovation potential, their impact is contingent upon institutional readiness, ecosystem integration, and inclusive design (Nkontwana et al., 2025; Singh et al., 2023). These dynamics reinforce the need for comparative analysis to understand how digital entrepreneurial education is positioned, implemented, and supported across heterogeneous emerging economy contexts (Muchie et al., 2017; Gcume & Mohapeloa, 2025).

Inclusion, Access, and Contextual Relevance in Entrepreneurial Education

Inclusivity has become a central concern in entrepreneurial education scholarship, particularly within emerging economies characterised by deep socio-economic inequalities. The literature emphasises that entrepreneurial education must extend beyond elite institutional settings to reach historically marginalised groups, including women, youth, rural populations, and participants in the informal economy (Kraemer-Mbula & Wunsch-Vincent, 2016; Herbertson & Lee, 2024; Chowdhury et al., 2024). In this context, entrepreneurial education is increasingly

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framed as a tool for social inclusion and equitable development rather than solely a mechanism for high-growth venture creation (Secundo et al., 2020; Lee, 2022).

Despite this normative emphasis, empirical evidence suggests that access to entrepreneurial education remains uneven. Participation is often shaped by institutional selectivity, geographic location, language of instruction, and socio-economic status (Marginson, 2024). In mass higher-education systems, entrepreneurship programmes may be formally accessible but substantively exclusionary, as students from disadvantaged backgrounds may lack the social capital, financial resources, or ecosystem support necessary to translate learning into entrepreneurial action (Rideout & Gray, 2013).

A key critique in the literature concerns the misalignment between entrepreneurial education curricula and lived entrepreneurial realities in emerging economies. Many programmes continue to privilege formal, growth-oriented business models, while neglecting necessity-driven entrepreneurship, informal enterprise, and community-based economic activity (George et al., 2016; Sibiya & Langa, 2026; Mseleku & Sukati, 2025; Morais & Bacic, 2020; Deschamps & Slitine, 2024; Ben-Hafaïedh et al., 2024; Siedlok et al., 2025). This narrow framing limit relevance for learners who are more likely to engage in informal or hybrid forms of entrepreneurship (Garcia et al., 2025; Nabi et al., 2017; Webb et al., 2020; Lianu et al., 2024).

Gender disparities further complicate inclusion outcomes. Studies consistently highlight lower participation and completion rates among women in entrepreneurial education programmes, often linked to cultural norms, caregiving responsibilities, and limited access to finance and networks (Isayomi & Akintunde, 2021; Mair & Marti, 2009; Cioni, 2022). Entrepreneurial education that fails to address these structural barriers risks reinforcing gendered patterns of exclusion. Contextual relevance is therefore critical. Scholars argue that inclusive entrepreneurial education must incorporate local case studies, community engagement, informal economy dynamics, and culturally responsive pedagogy (Sibiya & Langa, 2026). Programmes that integrate mentorship, peer learning, and community-based projects are more likely to support meaningful participation and sustained entrepreneurial engagement (Suryani et al., 2022; Morrison et al., 2017).

Within BRICS contexts, inclusion and relevance are particularly salient due to demographic scale and socio-economic diversity. The literature suggests that entrepreneurial education systems that are insufficiently adapted to local conditions struggle to achieve inclusive outcomes, regardless of policy intent. This reinforces the importance of examining how entrepreneurial education across BRICS

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economies addresses access, inclusion, and contextual relevance within broader development agendas.

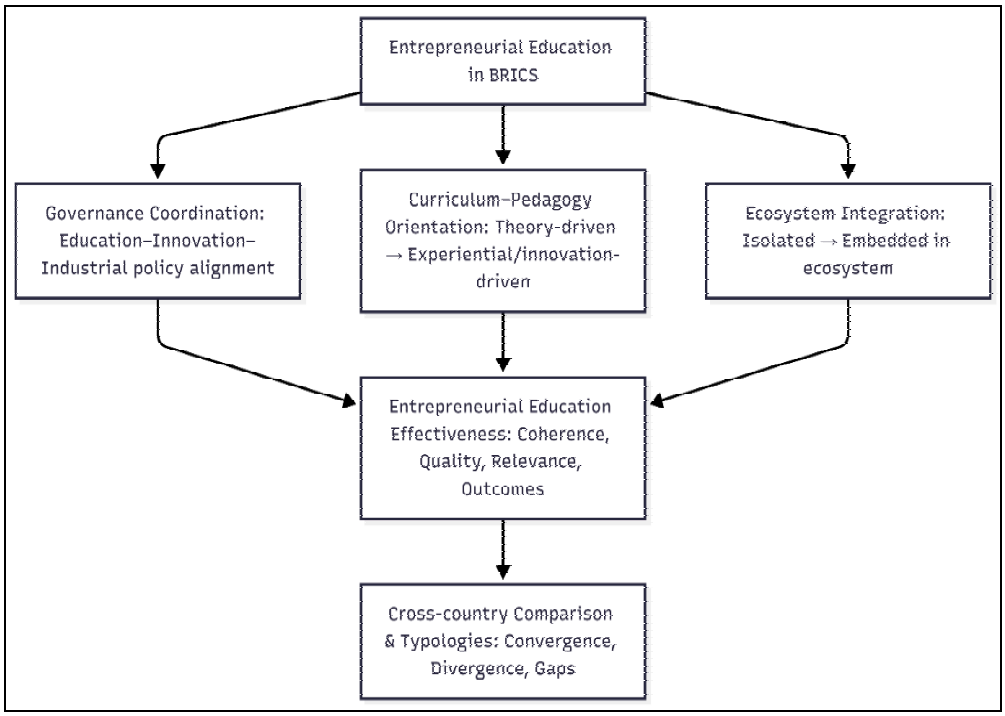


Figure nr.1. Analytical Framework for Comparing Entrepreneurial Education Across BRICS Economies

Source: Authors 2026

Figure 1 presents the analytical framework developed from the literature to guide the comparative examination of entrepreneurial education across BRICS economies. The framework conceptualises entrepreneurial education effectiveness as shaped by the interaction of three interrelated dimensions: governance coordination, curriculum–pedagogy orientation, and ecosystem integration. Governance coordination refers to the degree of alignment between education policy, entrepreneurship strategy, and industrial development frameworks (Etzkowitz & Zhou, 2022; Ranga & Etzkowitz, 2013; Akinrinde & Telukdarie, 2023). Curriculum–pedagogy orientation captures the extent to which

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entrepreneurial education moves from theory-driven delivery toward experiential and innovation-oriented learning. Ecosystem integration reflects the depth of institutional embeddedness within entrepreneurial support systems, including industry, incubators, government agencies, and financial institutions (Theodoraki et al., 2017; Stam & van de Ven, 2021). Rather than proposing causal relationships or testing hypotheses, the framework functions as an analytical lens for systematically comparing entrepreneurial education systems across heterogeneous emerging-economy contexts. It provides the conceptual foundation for the methodological approach adopted in this study and informs the comparative analysis presented in subsequent sections.

Conclusion of the Literature Review

This literature review highlights the growing recognition of entrepreneurial education as a strategic instrument for economic development, innovation, and inclusion within emerging economies. Across the reviewed scholarship, there is broad consensus that entrepreneurial education must extend beyond narrow business start-up training to encompass capability development, experiential learning, and ecosystem engagement. However, the review also reveals persistent conceptual ambiguity, uneven pedagogical practice, and significant variation in institutional and ecosystem conditions that shape entrepreneurial education outcomes. In the context of BRICS economies, the literature underscores strong policy commitment to entrepreneurship alongside marked divergence in governance coordination, curriculum–pedagogy orientation, and ecosystem integration. While some contexts demonstrate increasing alignment between higher education, innovation policy, and entrepreneurial ecosystems, others continue to exhibit fragmented implementation and limited experiential learning opportunities. These disparities challenge assumptions of homogeneity within BRICS and highlight the limitations of existing single-country or institution-specific studies.

Critically, the review identifies a significant gap in comparative scholarship that examines entrepreneurial education across all BRICS economies using a consistent analytical lens. Existing studies provide valuable insights but fall short of enabling cross-country learning, theory building, and evidence-based policy comparison. This gap necessitates a structured comparative approach capable of capturing both convergence and divergence across heterogeneous emerging economy contexts. In response, this study develops an analytical framework to guide a comparative examination of entrepreneurial education across BRICS economies. The framework, derived from the reviewed literature, informs the research design and

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enables coherent cross-country comparison. The following section outlines the methodological approach adopted to operationalise this framework and ensure rigour and transparency in the comparative analysis.

Methodology

Research Design

This study adopts a structured comparative literature review design to examine entrepreneurial education across BRICS economies. The approach is qualitative, interpretive, and integrative in nature, drawing on academic literature, policy documents, and institutional reports to develop a comparative understanding of entrepreneurial education systems within diverse national contexts. Unlike a systematic review, which seeks exhaustive coverage of all available evidence through formal screening procedures, a structured comparative literature review focuses on the purposeful selection and analysis of relevant scholarly and policy sources to facilitate conceptual analysis and cross-country comparison. The design is particularly suitable for identifying patterns of convergence and divergence across BRICS economies and generating insights into governance coordination, curriculum-pedagogy orientation, and ecosystem integration..

Analytical Framework

The comparative analysis is guided by an analytical framework comprising three interrelated dimensions: governance coordination, curriculum–pedagogy orientation, and ecosystem integration. These dimensions were inductively derived from the literature review and reflect dominant themes identified in entrepreneurship education scholarship, particularly within emerging economy contexts. Together, these dimensions provide a consistent analytical lens for examining entrepreneurial education across BRICS economies and facilitate structured cross-country comparison.

- Governance coordination refers to the extent of alignment between national education policy, entrepreneurship and innovation strategies, and industrial development frameworks.
- Curriculum–pedagogy orientation captures the dominant approaches to entrepreneurial education delivery, ranging from theory-driven and business-plan-focused models to experiential, innovation-oriented pedagogies.
- Ecosystem integration reflects the degree to which higher-education institutions are embedded within entrepreneurial ecosystems, including linkages with industry, incubators, government agencies, and financial support mechanisms (Theodoraki et al., 2017; Wurth et al., 2022).

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Data Sources

Data were collected from three primary source categories:

1. Academic literature: Peer-reviewed journal articles, book chapters, and conference proceedings focusing on entrepreneurial education, higher education, and entrepreneurship policy in BRICS and emerging economies (Rideout & Gray, 2013).
2. Policy and strategy documents: National education strategies, entrepreneurship and innovation policy frameworks, and development plans relevant to entrepreneurial education in BRICS countries.
3. Institutional and multilateral reports: Reports from universities, development agencies, and international organisations addressing entrepreneurship education, innovation systems, and skills development (OECD, 2019). The inclusion of multiple data sources enabled triangulation and enhanced the credibility and robustness of the comparative analysis.

Search Strategy, Inclusion and Exclusion Criteria

A structured literature search strategy was employed to identify relevant sources. Searches were conducted across major academic databases, including Scopus and Web of Science, using combinations of keywords such as entrepreneurial education, entrepreneurship education, higher education, entrepreneurship policy, emerging economies, and BRICS. Country-specific search strings were also applied for each BRICS economy. The search was limited to publications from approximately the last 10–15 years to capture contemporary developments while allowing for foundational contributions where necessary (Nabi et al., 2017). Reference lists of key articles were manually screened to identify additional relevant sources.

Sources were included if they met the following criteria:

- Focused on entrepreneurial education in higher-education or closely related institutional contexts
- Addressed at least one BRICS country or provided relevant comparative insights
- Were peer-reviewed or constituted authoritative policy or institutional documents
- Provided conceptual, empirical, or policy-relevant insights related to governance, curriculum, pedagogy, or ecosystem integration

Sources were excluded if they:

- Focused exclusively on primary or secondary education without relevance to higher education

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- Addressed entrepreneurship broadly without reference to education or learning processes
- Lacked sufficient methodological transparency or analytical depth

The literature search was designed to ensure breadth, relevance, and diversity of perspectives rather than exhaustive retrieval of all available studies. Sources were identified through keyword searches, citation tracking, reference list reviews, and targeted searches of policy repositories and institutional publications. Particular attention was given to highly cited studies, influential theoretical contributions, recent empirical research, and policy documents relevant to entrepreneurship education within BRICS economies. This approach enabled the development of a robust evidence base suitable for comparative analysis while maintaining a focus on conceptual relevance and analytical depth. Consistent with the principles of a structured comparative literature review, source selection prioritised relevance, conceptual contribution, and contextual applicability to the BRICS entrepreneurial education landscape rather than exhaustive identification of all available publications.

Data Analysis

The selected sources were analysed using thematic synthesis, guided by the analytical framework. Data were coded according to the three core dimensions and associated sub-themes, such as policy alignment, experiential learning mechanisms, digital delivery, and inclusion (Vasile & Panait, 2023).Country-level evidence was first analysed independently to identify dominant patterns within each BRICS economy. This was followed by cross-country comparison, enabling identification of similarities, differences, and structural gaps across BRICS entrepreneurial education systems. The analysis process informed the development of comparative tables and the typology model presented in the discussion section.

Trustworthiness and Rigour

To enhance trustworthiness, the study employed a transparent and structured source selection process, clearly defined inclusion and exclusion criteria, and a consistent analytical framework applied across all country cases. Methodological rigour was further strengthened through triangulation of academic, policy, and institutional sources, allowing findings to be cross-validated across multiple forms of evidence. The use of predefined analytical dimensions ensured consistency in interpretation and comparison across the BRICS economies..

Methodological Limitations

While the structured comparative literature review approach enables broad cross-country analysis, it is limited by reliance on secondary data and variability in

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the depth and availability of country-specific literature. Additionally, the study does not measure entrepreneurial education outcomes quantitatively (Queissner et al., 2025). These limitations are acknowledged, and the study positions its findings as analytically informative rather than definitive, providing a foundation for future empirical research.

Comparative Findings: Entrepreneurial Education Across BRICS Economies

This section presents the comparative findings of the study, analysing evidence on entrepreneurial education across Brazil, Russia, India, China, and South Africa. Guided by the analytical framework (Figure 1), the findings are structured around three core dimensions: governance coordination, curriculum–pedagogy orientation, and ecosystem integration. The analysis reveals both convergence in policy intent and divergence in institutional implementation across BRICS economies.

Governance Coordination in Entrepreneurial Education

Across all BRICS economies, entrepreneurship is prominently positioned within national development, innovation, and skills strategies. Policy discourse consistently frames entrepreneurial education as a mechanism for employment creation, innovation, and economic diversification. However, the findings reveal substantial variation in the degree of coordination between education policy, entrepreneurship policy, and industrial strategy. Some BRICS economies exhibit relatively strong state-led coordination, where entrepreneurial education initiatives are embedded within broader national innovation and industrial development frameworks (Lehmann et al., 2020; OECD, 2019). In these contexts, higher-education institutions are strategically positioned as instruments of economic transformation, supported by aligned funding mechanisms and policy mandates. Conversely, other BRICS contexts demonstrate more fragmented governance arrangements, with entrepreneurial education dispersed across multiple ministries, agencies, and institutions. This fragmentation often results in duplication of initiatives, uneven institutional capacity, and limited coherence between policy intent and educational delivery (Ranga & Etzkowitz, 2013; Isayomi & Akintunde, 2021). Overall, the findings indicate that policy presence alone is insufficient to ensure effective entrepreneurial education. Governance coordination emerges as a critical enabling condition that shapes curriculum reform, institutional incentives, and ecosystem engagement (Lehmann et al., 2020; Urbano et al., 2019).

Curriculum and Pedagogical Orientation

The comparative analysis reveals notable divergence in curriculum design and pedagogical practice across BRICS economies. While entrepreneurship is widely

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incorporated into higher-education curricula, its positioning and delivery vary considerably. Traditional, theory-driven approaches, often centred on business planning and classroom-based instruction, remain prevalent, particularly within mass higher-education systems (Nabi et al., 2017). These approaches are frequently favoured due to their administrative simplicity and alignment with existing accreditation and assessment structures. At the same time, the findings point to growing experimentation with experiential and innovation-oriented pedagogies, including project-based learning, venture laboratories, hackathons, and incubation-linked programmes Rideout & Gray, 2013; Harima et al., 2020). Such approaches are more commonly observed in institutions operating within supportive innovation environments or benefiting from targeted state or private-sector investment. However, experiential pedagogies often coexist alongside conventional models rather than being systematically embedded across curricula. A recurring pattern across BRICS economies is the uneven diffusion of experiential learning, resulting in pockets of innovation rather than system-wide transformation (Harima et al., 2020). This unevenness reinforces disparities in entrepreneurial capability development among students and limits the scalability of effective pedagogical practices.

Ecosystem Integration of Entrepreneurial Education

Ecosystem integration represents one of the most significant points of differentiation across BRICS entrepreneurial education systems. The findings indicate wide variation in the extent to which universities are embedded within entrepreneurial ecosystems comprising industry, incubators, accelerators, government agencies, and financial institutions (Audretsch & Belitski, 2017; Urbano et al., 2019; Sibiya et al., 2023). In more integrated contexts, entrepreneurial education is closely linked to venture support mechanisms, enabling students to access mentorship, funding pathways, and real-world entrepreneurial experiences. These environments facilitate learning *through* entrepreneurship and enhance the likelihood that educational interventions translate into entrepreneurial activity. In contrast, many institutions across BRICS operate in relative isolation from entrepreneurial ecosystems. In such cases, entrepreneurial education is largely confined to the classroom, limiting opportunities for experiential learning and venture progression. Weak ecosystem integration is particularly constraining in contexts characterised by informality and limited market access, where external support structures are critical for entrepreneurial viability. The transition of universities into "entrepreneurial hubs" requires the active management of institutional boundaries and industry relations (Urbano et al.,

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2019; Lehmann et al., 2020). The findings suggest that ecosystem integration acts as a multiplier, amplifying or constraining the effectiveness of entrepreneurial education regardless of curriculum content or policy emphasis.

Digitalisation as an Enabler and Divider

Digitalisation features prominently across BRICS entrepreneurial education systems, particularly as a mechanism for scaling access and expanding reach. Online platforms, blended learning models, and digital entrepreneurship content are increasingly incorporated into curricula (Secundo et al., 2020; OECD, 2019). These developments have enabled broader participation and introduced learners to platform-based and technology-driven entrepreneurial models. However, the findings also reveal persistent digital divides that shape participation and outcomes. Unequal access to digital infrastructure and varying levels of digital literacy limit the effectiveness of digital entrepreneurial education, particularly for students from disadvantaged backgrounds. Moreover, digital delivery often replicates traditional pedagogical models, with limited integration into physical entrepreneurial ecosystems. As digital entrepreneurship becomes a core pillar of development, ensuring the "digital readiness" of both educators and students is a critical prerequisite for meaningful impact (Van Laar et al., 2017; OECD, 2019). As such, digitalisation emerges as a conditional enabler, whose impact depends on institutional readiness, inclusive design, and ecosystem linkage.

Inclusion and Contextual Relevance

Across BRICS economies, entrepreneurial education is widely framed as a tool for inclusion and social mobility. Nevertheless, the findings indicate ongoing challenges related to access, relevance, and equity. Entrepreneurial education programmes frequently privilege formal, growth-oriented entrepreneurship models, which may be misaligned with the realities of necessity-driven and informal entrepreneurship prevalent in many BRICS contexts (Urbano et al., 2019; OECD, 2019). Gender disparities, socio-economic barriers, and geographic inequalities continue to shape participation and outcomes. Programmes that fail to incorporate local contexts, informal economy dynamics, and community-based entrepreneurship risk limited relevance and impact. Conversely, initiatives that integrate contextualised content, mentorship, and community engagement demonstrate greater potential for inclusive entrepreneurial capability development.

Cross-Dimensional Analysis

Analysing across the three analytical dimensions, the findings suggest that entrepreneurial education effectiveness in BRICS economies is shaped by the

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interaction between governance coordination, curriculum–pedagogy orientation, and ecosystem integration. Strong performance along one dimension does not compensate for weakness in others. Instead, misalignment across dimensions constrains overall system effectiveness. These patterns reinforce the value of a comparative analytical framework and provide the empirical basis for the entrepreneurial education typologies developed in the following discussion section (Figure 2).

Table 3: Key Alignment Tensions in Entrepreneurial Education Across BRICS Economies

Analytical Tension	Manifestation Across BRICS	Implication for Entrepreneurial Education
Policy ambition vs institutional capacity	High policy expectations often exceed delivery capacity in universities	Limits depth and sustainability of entrepreneurial education
Scale of provision vs quality of learning	Mass access prioritised over experiential intensity	Superficial exposure rather than capability development
Theory-driven curricula vs experiential pedagogy	Persistence of classroom-based approaches despite policy rhetoric	Weak translation of learning into entrepreneurial action
Formal entrepreneurship focus vs informal realities	Curricula oriented toward formal, growth models	Reduced relevance in necessity-driven contexts
Digital expansion vs digital inequality	Digital platforms scale access unevenly	Risk of reinforcing exclusion
Central coordination vs institutional autonomy	Strong coordination improves coherence but may reduce flexibility	Context-sensitive adaptation is constrained
Ecosystem intent vs ecosystem embeddedness	Universities expected to act as ecosystem anchors without sufficient linkages	Experiential learning opportunities remain limited

Source: Author 2026

Table 3 highlights the key structural and institutional tensions shaping entrepreneurial education across BRICS economies. Rather than comparing countries directly, the table highlights recurring alignment challenges between policy intent, institutional capacity, pedagogical practice, and ecosystem realities. These tensions provide an interpretive bridge between the comparative findings

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and the typological analysis developed in the discussion section, illustrating why entrepreneurial education systems across BRICS diverge in form and effectiveness despite shared policy commitments.

Conclusion of the Comparative Findings

The comparative findings demonstrate that entrepreneurial education across BRICS economies is characterised by strong convergence at the level of policy intent but substantial divergence in institutional implementation. Across all countries, entrepreneurship is positioned as a strategic response to employment, innovation, and development challenges; however, the extent to which this intent translates into coherent curriculum reform, experiential pedagogy, and ecosystem integration varies considerably. The analysis reveals that governance coordination, curriculum–pedagogy orientation, and ecosystem integration interact in complex ways, shaping entrepreneurial education effectiveness across contexts. Weaknesses in any one dimension constrain system performance, while misalignment across dimensions amplifies structural and institutional challenges. The findings further highlight cross-cutting tensions related to scale versus quality, formal versus informal entrepreneurship orientation, and digital expansion versus inclusion. These patterns underscore the limitations of analysing entrepreneurial education through single-country lenses or assuming homogeneity across BRICS. Instead, the findings point to the need for an interpretive framework capable of explaining why entrepreneurial education systems diverge despite shared developmental aspirations. Table 2 analyses these structural alignment tensions and provides the foundation for the typological interpretation developed in the following discussion section.

Discussion: Entrepreneurial Education Typologies Across BRICS Economies

This section interprets the comparative findings through the analytical lens developed in the literature review and operationalised in the methodology. Building on the alignment tensions synthesised in Table 3, the discussion introduces Figure 2, which presents entrepreneurial education typologies across BRICS economies. Rather than treating BRICS as a homogenous grouping, the typological approach highlights how different configurations of governance coordination, curriculum–pedagogy orientation, and ecosystem integration give rise to distinct entrepreneurial education systems.

Interpreting Alignment Tensions in Entrepreneurial Education

The alignment tensions presented in Table 2 illustrate that entrepreneurial education systems across BRICS economies are shaped by persistent structural

contradictions. A central tension concerns the gap between policy ambition and institutional capacity, where national strategies place expansive expectations on higher-education institutions without commensurate investment in staff capability, curriculum redesign, or ecosystem partnerships. This misalignment limits the depth and sustainability of entrepreneurial education interventions. Similarly, the tension between scale and quality reflects the massification of higher education across BRICS contexts. While expanded access has increased exposure to entrepreneurship education, it has often occurred at the expense of experiential intensity, mentorship, and longitudinal support. As a result, entrepreneurial education frequently delivers awareness rather than capability. These tensions are not unique to individual countries but recur across the BRICS, reinforcing the need for interpretive frameworks that move beyond country rankings toward systemic explanation.

Entrepreneurial Education Typologies Across BRICS

Figure 2 conceptualises entrepreneurial education systems across BRICS economies as occupying different positions along three interrelated dimensions: governance coordination, curriculum–pedagogy orientation, and ecosystem integration (Lehmann et al., 2020; Urbano et al., 2019; Stam & Van de Ven, 2021). The typologies derived from this framework capture dominant system configurations rather than fixed national characteristics (Isenberg, 2016; Stam & Van de Ven, 2021). One typology reflects coordinated and innovation-oriented systems, characterised by strong policy alignment, experiential pedagogy, and deep ecosystem embeddedness (Audretsch & Belitski, 2017; Lehmann et al., 2020). These systems demonstrate greater coherence and are more likely to support venture creation and innovation outcomes. A second typology represents coordinated but structured systems, where governance alignment is strong but pedagogical transformation is more gradual, resulting in moderated experiential learning (Rideout & Gray, 2013; Nabi et al., 2017). In contrast, scaled but fragmented systems prioritise access and participation but struggle to embed experiential pedagogy and ecosystem linkages consistently (OECD, 2019; Urbano et al., 2019). Finally, fragmented and capacity-constrained systems exhibit weak alignment across dimensions, limiting entrepreneurial education effectiveness despite strong policy intent (Lehmann et al., 2020; OECD, 2019). Importantly, these typologies should not be interpreted as static classifications but as dynamic configurations shaped by institutional reform, policy evolution, and ecosystem development.

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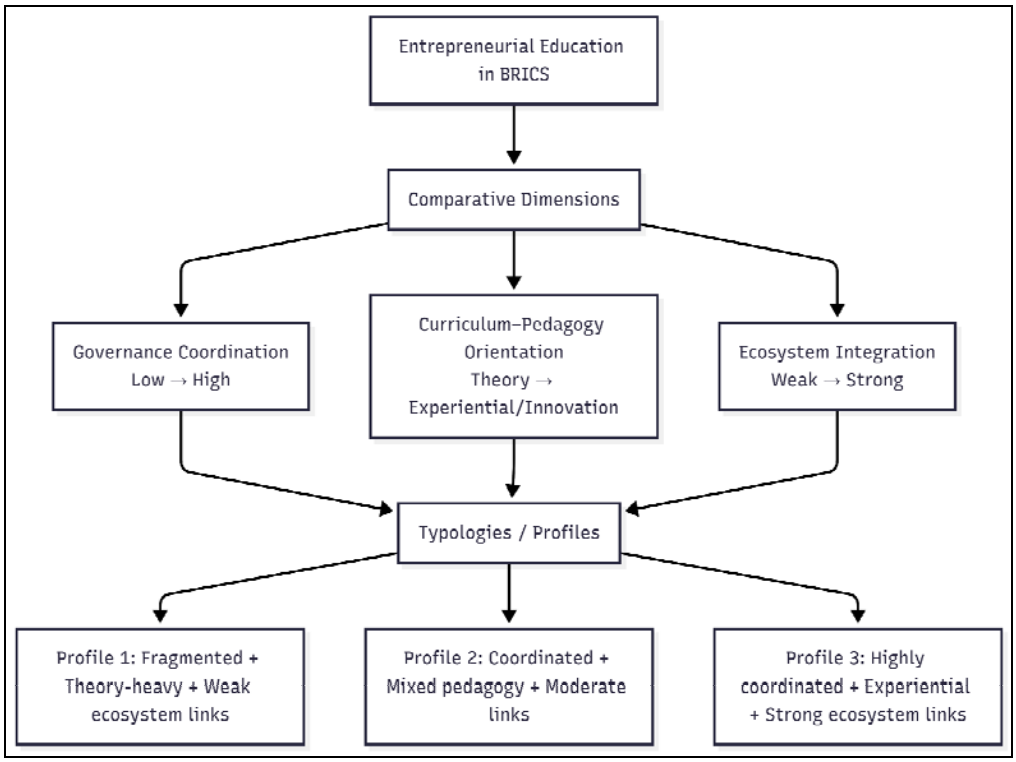


Figure nr 2: Entrepreneurial Education Typologies Across BRICS Economies

Source: Authors

Figure 2 presents a typological interpretation of entrepreneurial education systems across BRICS economies, derived from the comparative synthesis of governance coordination, curriculum–pedagogy orientation, and ecosystem integration (Lehmann et al., 2020; Stam & Van de Ven, 2021; Urbano et al., 2019). Rather than classifying countries through ranking or performance metrics, the figure illustrates how different configurations of these three dimensions give rise to distinct entrepreneurial education typologies. The model emphasises that entrepreneurial education effectiveness in emerging economies is shaped by systemic alignment across institutional and ecosystem dimensions rather than by isolated policy or curricular interventions (Nabi et al., 2017; Rideout & Gray, 2013). The typologies depicted in Figure 2 reflect dominant patterns observed across BRICS contexts and should be understood as dynamic and non-exclusive.

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Some systems exhibit relatively high levels of governance coordination combined with experiential, innovation-oriented pedagogies and strong ecosystem embeddedness, resulting in more coherent entrepreneurial education configurations (Audretsch & Belitski, 2017; Secundo et al., 2020). Other systems prioritise scale and access but demonstrate fragmented governance and limited ecosystem integration, constraining the translation of entrepreneurial education into sustained entrepreneurial capability (OECD, 2019; Urbano et al., 2019). A further configuration reflects capacity-constrained systems where strong policy intent is undermined by institutional limitations and weak alignment across dimensions (Lehmann et al., 2020; Stam & Van de Ven, 2021).

By conceptualising entrepreneurial education systems as typologies rather than homogenous national models, Figure 2 provides an interpretive lens for understanding divergence within BRICS despite shared development aspirations (Isenberg, 2016; Stam & Van de Ven, 2021). The typological approach also highlights potential pathways for system evolution, suggesting that shifts in governance coordination, pedagogical orientation, or ecosystem integration can reposition entrepreneurial education systems over time. As such, the figure serves as an analytical bridge between the comparative findings and the policy and institutional implications discussed in the concluding section.

Explaining Divergence within BRICS

The discussion highlights that divergence in entrepreneurial education across BRICS economies is driven less by differences in policy intent and more by variation in institutional coordination, implementation capacity, and ecosystem maturity (Alvedalen & Boschma, 2017; Spigel & Harrison, 2018). Strong governance coordination enhances curriculum reform and ecosystem engagement, while fragmented governance constrains innovation and scalability (Etzkowitz & Zhou, 2022; Ranga & Etzkowitz, 2013). The findings also suggest that ecosystem integration acts as a critical multiplier (Spigel, 2017; Brown & Mason, 2017). Even well-designed curricula struggle to achieve impact when universities operate in isolation from entrepreneurial support structures (Rideout & Gray, 2013). Conversely, ecosystem-embedded institutions are better positioned to translate learning into entrepreneurial action. Digitalisation further complicates these dynamics (Spigel & Harrison, 2018; Brown & Mason, 2017). While digital entrepreneurial education expands reach, its effectiveness depends on inclusion, instructional design, and integration with physical ecosystems (Van Laar et al.,

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2017; Secundo et al., 2020). Without these conditions, digitalisation risks reinforcing existing inequalities rather than addressing them.

Theoretical Contributions, Policy and Institutional Implications

This study contributes to entrepreneurial education scholarship in three ways. First, it advances comparative analysis by introducing a multi-dimensional framework that explains variation across emerging economies without resorting to simplistic rankings (Urbano et al., 2019; Welter et al., 2017). Second, it reconceptualises entrepreneurial education effectiveness as an outcome of systemic alignment rather than isolated programme quality (Rideout & Gray, 2013; Lehmann et al., 2020). Third, it extends entrepreneurial ecosystem theory by positioning education systems as relational and institutionally embedded rather than standalone interventions (Roundy et al., 2018; Wurth et al., 2022). The typological analysis suggests that improving entrepreneurial education outcomes in BRICS economies requires targeted strategies that address alignment tensions rather than uniform policy prescriptions (Acs et al., 2017; Audretsch & Belitski, 2021). Strengthening governance coordination, embedding experiential pedagogy within mass education systems, and deepening ecosystem integration emerge as critical priorities (Harima et al., 2020; Letshaba et al., 2025). These implications are elaborated in the concluding section of the paper.

Conclusion and Recommendations

This study set out to comparatively examine entrepreneurial education across BRICS economies through a structured analytical framework focusing on governance coordination, curriculum–pedagogy orientation, and ecosystem integration. Drawing on a comparative review, the findings demonstrate that while entrepreneurial education is strongly embedded in national development discourse across Brazil, Russia, India, China, and South Africa, its implementation remains highly uneven. The analysis reveals that divergence in entrepreneurial education effectiveness is driven less by differences in policy intent and more by variation in institutional alignment, pedagogical transformation, and ecosystem embeddedness. By integrating comparative findings with a typological interpretation, the study advances understanding of entrepreneurial education as a systemic and relational phenomenon rather than a collection of isolated programmes. The results challenge assumptions of homogeneity within BRICS and demonstrate that entrepreneurial education outcomes are contingent upon how education systems resolve key alignment tensions between policy ambition and institutional capacity, scale and quality, and formal curricula and contextual realities. From an academic

perspective, the study contributes to entrepreneurship education scholarship by offering a replicable comparative framework applicable to heterogeneous emerging economy contexts. It extends entrepreneurial ecosystem theory by foregrounding the role of higher-education institutions as embedded, yet constrained, actors within broader governance and innovation systems. From a policy perspective, the findings underscore the limitations of uniform policy prescriptions and highlight the need for context-sensitive strategies that address structural and institutional alignment.

Policy Implications for BRICS Governments and Universities

The comparative and typological analysis yields several important policy implications for BRICS governments, higher-education institutions, and ecosystem stakeholders. BRICS governments should prioritise stronger alignment between education policy, entrepreneurship strategy, and industrial development frameworks. Fragmented governance arrangements undermine curriculum reform and dilute institutional incentives for experiential and ecosystem-oriented entrepreneurial education. Dedicated inter-ministerial coordination mechanisms and aligned funding instruments can enhance coherence and accountability.

While expanding access to entrepreneurial education remains important, policy emphasis should shift from participation metrics toward learning quality and capability development. This requires investment in academic staff development, curriculum redesign, and assessment reform to support experiential and action-based learning within mass higher-education systems. Universities should be supported and incentivised to function as active ecosystem participants rather than standalone education providers. Policy frameworks should encourage sustained partnerships with industry, incubators, financial institutions, and local communities, enabling students to engage in entrepreneurship through real-world contexts.

Entrepreneurial education policies must better reflect the socio-economic realities of BRICS contexts, including informality, necessity-driven entrepreneurship, and community-based enterprise. Curricula that privilege only formal, high-growth models risk limited relevance and exclusion of large segments of the population. Digital entrepreneurial education should be embedded within hybrid delivery models that combine online learning with mentorship, incubation, and ecosystem engagement. Addressing digital divides through infrastructure investment and inclusive instructional design is essential to ensure that digitalisation enhances, rather than constrains, entrepreneurial education outcomes.

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Limitations and Future Research

This study is subject to several limitations that provide opportunities for future research. First, the analysis relies on secondary data, including academic literature, policy documents, and institutional reports. While this enables broad comparative insight, it limits the ability to assess entrepreneurial education outcomes empirically at the individual or institutional level. Future studies could complement this approach with primary data, including interviews with educators, policy makers, and students across BRICS contexts. Second, the study focuses primarily on higher education, which may underrepresent the role of TVET institutions, informal training mechanisms, and community-based entrepreneurial learning. Future research should adopt multi-level approaches that capture interactions between higher education, vocational systems, and informal learning pathways. Third, while the typological model captures dominant system configurations, it does not account for intra-country variation among institutions and regions. Comparative case studies within individual BRICS countries could provide deeper insight into how local conditions mediate entrepreneurial education implementation. Finally, future research could build on the analytical framework developed in this study to examine the relationship between entrepreneurial education configurations and specific outcomes, such as graduate employability, venture sustainability, and inclusive economic development. Longitudinal and mixed-methods studies would be particularly valuable in assessing how entrepreneurial education systems evolve over time in response to policy reform and ecosystem development.

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POSTGRADUATE STUDENTS' LEARNING EXPERIENCE AND EFFECTIVENESS AT THE NATIONAL OPEN UNIVERSITY, FRAMED AS A STRATEGY OF UNIVERSITY LEADERSHIP

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Abstract

This study investigated the National Open University of Nigeria's postgraduate students' learning experience (PSLE) and learning effectiveness (LE). The study used a descriptive survey design, including all postgraduate students. A random sample of 200 individuals was obtained from nine faculties: Arts, Agricultural Science, Education, Health Science, Computer Science, Law, Management Science, Social Science, and Science and Technology. A 36-item survey was used to gather data, assessing the PSLE and their Postgraduate Students' Learning Effectiveness Scale (PSLES) (r=.76), which consisted of four sub-scales: Formal Education Experience Scale (r=.77), Learners' Knowledge and Skill (LKS) to Extract Information from the Web Scale (r=.74), Self-regulated Learning Strategies Scale (r=.78)

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and Institutional Support Service (ISS) (r=.75). Descriptive statistics, including frequency counts, simple percentages, multiple regression, mean, and standard deviation, were used to analyse the collected data. The research results indicated that the PSLE and their LE (specifically formal education experience (FEE), LKSs to extract information from the web, self-regulated learning strategies (SrLS) and ISSs) were statistically significant (F (4, 195) = 914.45; R2 = .949), explaining 94.9% of the variance. Given these results, it is recommended that virtual opportunities for engagement through ICTs be developed and used in a way that is easy for postgraduate learners (PGL) to comprehend and relate to in order to improve students' academic performance in remote education, teaching, and learning development in the digital age.

Keywords: *postgraduate students, learning experience; formal education, learners' knowledge and skills, learning effectiveness*

JEL Classification: I21; I23; I29; M10

1. Introduction

The global education landscape has been witnessing a shift towards flexible and online learning modes and this trend has validated Open Distance Learning (ODL) as a practical and alternative educational provision in most countries of the world. In contrast, education is the process by which people learn and impart expertise, skills, mindsets, passions, capacities, and cultural norms for the benefit of society at large. The methods by which pedagogies are delivered are changing as a result of the global technological revolution. This phenomenon has resulted in distance education and e-learning gaining prominence as alternatives to traditional and on-campus education. In Nigeria, the establishment of the National Teachers' Institute (NTI) in Kaduna marked the first time a government parastatal would undertake a major distance education programme. Igwe and Okorie (2024) have commented on NTI's use of distance learning (DL) to promote teacher training in Nigeria. The authors recognised ODL's impact on individual and national development, the economy, and its use in other aspects of life, such as improving people's health.

The paradigm shifts in modern societies to knowledge-driven, information- and communication technology-based ones have resulted in a growing recognition of DL as a competitive alternative to traditional educational delivery methods. The range of educational opportunities has expanded as a result of open

and distance learning (ODL) being acknowledged and accepted as standard components of education. This has allowed many people, particularly working adults, to further their education in order to increase their knowledge through open-distance learning institutions. The field in which ODL is used to improve education is hindered by a number of obstacles that prevent rapid educational achievement through regular and formal modes of education. The need to address the apparent shortcomings of the traditional formal education system, particularly with regard to expanding educational access to people who were not previously served, also contributed to the introduction and widespread adoption of DL systems throughout the world, including Nigeria (Quadri & Muibi, 2024). With the advent and widespread use of remote learning as a teaching tool, millions of people who were previously excluded from the conventional educational system throughout the world are now able to get an education (Ferri, Grifoni & Guzzo, 2020). DL is an emerging field of study and education delivery that not only increases educational options but also lowers costs and inequalities, encourages curriculum changes, and aids in meeting labour shortages (Dudar, Riznyk, Kotsur, Pechenizka, & Kovtun, 2021). According to research, the rise in distance education is also causing issues with an extremely high attrition rate, indicating that providing education remotely is not a simple process (Thorpe, 2002, as cited in Muibi, 2017).

This posed a serious challenge to students based on the nature and pattern of teaching and learning. While it becomes a major reason for most DL institutions to make provision for course materials, learner-learner interaction, tutor-learner interaction, ICT integration, student support services and feedback mechanisms. It has been observed that the underpinned ideas of ODL and the institution's objective are to achieve excellence in scholarship, research, consulting, professional skill and competency upgrades of learners and knowledge growth enhancement. It is also to generate and develop learners' learning strategies, improving the quality of life and their experiences by creating an atmosphere that is suitable for the pursuit of high-quality undergraduate and postgraduate studies. Master's and doctoral postgraduate programmes in a range of subjects are available at the National Open University of Nigeria (NOUN). Working professionals and other students who want to further their education without having to attend regular classrooms may find these programmes tailored to their requirements. These postgraduate programmes are delivered through DL mode, which means that students can study at their own pace and time using a variety of materials, including ODL course materials, online resources, audio and video

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lectures. Besides, NOUN offers a network of study centres throughout Nigeria where students can access resources and support services. It appears that students' enrolment at the postgraduate level comprised graduates from a regular degree programme, thereby having their first experience of how the DL programme operates. Based on this, the need to examine how the postgraduate learners (PGL) find the resources useful and their ability to adjust to this type of learning mode is evident. In other words, this study would focus on students' formal experience, learners' knowledge and skills (LKS) of extracting information from the web, SrLS and institutional support services (ISS). This study aimed to investigate the gap arising from the lack of studies on postgraduate students' learning experiences (PSLE) and their learning effectiveness (LE) at the NOUN.

1.1 Objectives of the Research

The study's purpose is to:

1. ascertain the degree to which the correlates of distance learners' LE (formal education experience (FEE), LKSs to extract information from the web, SrLS and ISSs) influence PGL's LE at the NOUN; and

2. assess the relationship between each of the four variables (FEE, LKS to extract information from the web, SrLS and ISS) on PGL's LE in the institution

1.2 Research Question

The following research questions are the foundation of this work:

1. How did the four components of the correlations influence learners' LE at NOUN?

1.3 Research Hypotheses

Ho_1: FEE and PGL's LE in the institution do not significantly correlate.

Ho_2: There is no discernible connection between PGL's LE in the institution and LKSs to harvest information from the web.

Ho_3: The institution's postgraduate learners' learning effectiveness (PLLE) and SrLS do not significantly correlate.

Ho_4: The institution's ISS and PLLE do not significantly correlate.

2. Theoretical framework

Theoretical frameworks have been used or modified by a number of studies to support their research on DL. The idea of interaction and independence was chosen as the appropriate theory for this investigation. According to Daniel *et al*.

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(1981), referenced in Muibi (2024), the DL system's freedom and communication were made possible by the concepts of interaction and independence. The theory states that a remote student is free to pick any course and learning technique from the media informational bundle that the distance learning institution offers. After that, the student is free to think critically, do tasks, and progress at their own speed. In order to help and push him or her in the DL setting, he or she communicates with others at the same time. Dropout rates and wear and tear may be decreased in this manner. There are also a few uncertainties, misunderstandings, and complaints. The most significant assumption of the theory is the independent study of distant learners. The less significant idea of interactive activities comes next. He goes on to say that well-designed distant learning programmes combine flexibility with thoughtful learning activities. Daniel gives instances of independent behaviour, such as reading a book and concentrating on the literature provided by the distant institution. However, Daniel sums up the theory as follows:

(i) Both teachers and students must participate in in-person tutorial sessions. They may be essential for new students participating in online learning programmes.

(ii) If in-person sessions show a weaning (crossing over) capacity between formal and distance learning approaches, they would be advantageous. This helps a remote learner progressively acquire the learning patterns in accordance with the techniques used in remote instruction.

(iii) After the initial semester, the course's concept can result in fewer in-person encounters.

(iv) Free phone services may provide a focused educational conversation between mentors and remote learners.

(v) Two-way communications by arranging a gathering for discussion soon after radio and television shows. Using this device will make self-study simpler for distant learners. These devices include Moodle, Blackboard, the Online Library, and the Online Course Module/Study Guide. Digital Education for Student Mentorship and Peer Collaboration, together with Access Periods for Online Learning Applications, also function as examples of such devices.

3. Research Methodology

In this study, a descriptive research design approach was used. The NOUN postgraduates were also included in the research. All postgraduate students from levels 100 to 500 in the Faculties of Arts, Agricultural Science, Education, Health

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Science, Computer, Law, Management Science, Social Science, and Science and Technology comprised the target group. Convenient and intentional sampling techniques were used to obtain the sample size for this study. In the first phase, all of the institution's faculty members were chosen using the purposive sampling approach. Second, 200 respondents were chosen from each faculty using a suitable selection technique: Education 57, Agricultural Science 9, Management Science 40, Social Science 38, Science and Technology 16, Arts 14, Law 4, Health Science 15, and Computer 7. A systematic questionnaire called the "Postgraduate Students' Learning Experience and their Learning Effectiveness Scale" (PSLELES) served as the main tool for gathering data. The demographic data of the respondents is the main topic of the first part. The purpose of the second portion was to gauge how PSLE affected their LE at the NOUN. The participants completed the questionnaire autonomously with the support of two competent research assistants. After explaining the purpose of the study, the respondents were gently urged to complete the questionnaire. The data was examined after all 200 questionnaires had been completed. The demographics were evaluated using descriptive statistics, such as counts and frequencies and basic percentages. The research hypothesis was analysed using the Pearson Product-Moment Coefficient (PPMC). Multiple regression analysis was used to look at the first study problem. Additionally, descriptive statistics of count frequencies and simple percentages were used to analyse the second study question at a significance level of 0.05.

Validity of the Instruments

The questionnaire, which was the primary research tool, had its face, construct, and content validity assessed. Key indicators were selected and expert opinion and a study of the literature were used to evaluate the questionnaire's content validity. Experts from the University of Ibadan's Faculty of Education's Departments of Information Science and Science and Technology Education reviewed the questionnaire to determine its validity. Before pretesting, these experts' suggestions, criticisms, and enhancements were included in the final version.

Reliability

The dependability of the instrument was determined by a pretest. To grade the subject under investigation, the researchers developed a scale. All 35 questions in this assessment use a Likert scale. It encompasses Strongly Agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD). The researchers selected a

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population analogous to the present study, with the weights of these alternatives being 4, 3, 2, and 1, respectively. Due to comparable traits, several additional students from the chosen university were also chosen. Thirty additional copies of the questionnaire were sent to students at Alayande University of Education, Oyo. Cronbach's alpha was used to derive the coefficients. Through pretesting, researchers were able to obtain a reliability value of r = 0.82 for the constructed questionnaire. This illustrates the device's inherent reliability and consistency.

4. Results and discussion

Table 1: Demographics of the Participants

Variables	Frequency	Percentage
Gender		
Male	79	40
Female	121	60
Total	200	100
Age Bracket		
20 and below years	39	20
21-30years	89	45
31-40years	59	29
41years and above	13	6
Total	200	100
Respondents' Faculties		
Science	16	8
Agricultural Science	9	5
Arts	14	7
Computer	7	3
Education	57	29
Social Science	38	19
Health	15	7
Management	40	20
Law	4	2
Total	200	100

The biodata, gender, and age summary of the study participants was shown in the above table, which indicated that (79) 40% of the participants were men and (121) 60% were women. The results show that a greater percentage of female participants than male participants were involved in the study. Similarly, (39) 20% of the study participants are 20 years and below, (89) 45% are between 21-

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30 years, (59) 29% are between 31-40 years and (13) 6% are between 31 years and above. Based on the findings, it is obvious that the majority of the respondents are aged 21-30 years, followed by respondents in the 31-40 years. In addition, from the above table, it is observed that 8% (16) of the study participants are in science, 5% (9) are in Agricultural Science, (14) 7% are in Arts, (7) 3% are in Computer science, (57) 29% are in Education, (38) 19% are in social science, (15) 7% are in health, 20% of the study participants are in Management and (4) 2% are in Law. Based on the findings, it is obvious that the majority of the respondents are in Education, Management and Social Science, respectively.

Research Question 1: To what extent do the postgraduate students' experiences **(**FEE, LKS of extracting information from the web, SrLS and ISS) influence students' LE?

Multiple R = 0.974 R Square = 0.949 Adjusted R Square = 0.948 Standard Error = 0.762					
Source of Variance	Sum of Square	Df	Mean Square	F	Sig.
Regression	2126.457	4	531.61	914.45	0.000
Residual	113.363	195	0.581		
Total	2239.820	199			

Significant @ p < 0 .05.

Table 2 indicates that there is a composite contribution of the independent variables (FEE, LKS of extracting information from the web, SrLS and ISS) and the dependent variable (PLLE) ($F(4, 195) = 914.45$; $R = 0.974$, $R^2 = 0.949$; $p < 0.05$). This implies that when FEE, LKS, extracting information from the web, SrLS and ISSs are taken together, they jointly relate to PLLE. An additional finding of the result is an adjusted multiple regression $R^2 = 0.948$. This demonstrates that independent variables explained 94.8% of the variation in LE among PGL, with residuals and additional factors possibly accounting for the remaining 5.2% of the variance. The findings indicate that the null hypothesis was rejected and that a substantial composite of characteristics, such as FEE, learners' expertise in information extraction from the web, SrLS, and ISSs, predicts PLLE.

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Testing the Hypothesis

Ho_1: FEE and PGL's LE in the institution do not significantly correlate.

Table 3: Correlation between FEE and PLLE

Variables	No	(r)	P	Remark
FEE	200	0.974	0.000	Significant
PLLE	200			

Significant @ p < 0 .05.

The PPMC finding for the relationship between PLLE and their FEE is shown in Table 3. The table showed a statistically significant positive link between the two variables (r = 0.974, p = 0.000). This suggests that one factor influencing PLLE in the institution is their formal schooling experience.

Ho_2: There is no discernible connection between PGL's LE in the institution and LKSs to harvest information from the web.

Table 4: Correlation between LKS to Extract Information from the Web and PLLE

Variables	No	(r)	P	Remark
LKS to Extract Information from the Web	200	0.176	0.013	Significant
PLLE	200			

Significant @ p < 0 .05.

The relationship between the learning accomplishment of PGL and their ability to obtain educational material from the Internet is shown in Table 4, which shows the PPMC result. The table showed a statistically significant positive link between the two variables (r = 0.176, p = 0.000). This suggests that one factor influencing postgraduate students' academic success in the institution is their ability to access material from the Internet.

Ho_3: The institution's PLLE and SrLS do not significantly correlate.

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Table 5 Correlation between SrLS and PLLE

Variables	No	(r)	P	Remark
SrLS	200	0.392	0.000	Significant
PLLE	200			

Significant @ p < 0 .05.

The PPMC result for the relationship between the learning accomplishment of PGL and self-regulated learning practices is shown in Table 5. The results suggest that one of the factors influencing PLLE at the institution is their use of self-regulated learning techniques. The table showed a significant positive relationship between the two variables (r = 0.392, p = 0.000).

Ho_4: The institution's ISS and PLLE do not significantly correlate.

Table 6: Correlation between ISS and PLLE

Variables	No	(r)	P	Remark
ISS	200	0.363	0.000	Significant
PLLE	200			

Significant @ p < 0 .05.

Table 6 displays the PPMC result for the correlation between the LE of PGL and ISSs. The table showed a statistically significant positive link between the two variables (r = 0.363, p = 0.000). This suggests that one factor influencing PGL's academic success in the institution is the ISS.

5. Discussion of Findings

The results of this research showed that learners' LE among PGL at the NOUN were impacted by four factors: learners' formal educational experience, learners' self-regulated skills, ISS, and knowledge and abilities of obtaining educational content from the web. Regardless of where they live, NOUN may strive to guarantee that its students obtain a top-notch education that equips them for both academic and professional success by implementing the comparable hypothesis, which was validated by the study's findings. This result is also consistent with the

research of Clark and Barbour (2023) and Ergulec (2019), who contended that a well-thought-out DL programme is a challenging undertaking in which well-crafted, high-quality distant education strategies (DES) may create a productive learning environment. Furthermore, Muibi (2023) highlighted that the COVID-19 pandemic has forced modern educational practices to take on a new dimension and given teachers and students multiple opportunities to integrate digital tools and well-packaged learning materials to facilitate effective remote communication between tutors and students. Moreover, Muibi (2024) stressed that, if done well, the incorporation of platforms like Moodle and Blackboard, online libraries, course modules, frequent online interactions between tutors and students, and suitable access times for online learning could greatly enhance DL courses and programs.

Furthermore, the relationship among each of the four components (learners' formal educational experience, learners' self-regulated skills, ISS and knowledge and skills of extracting educational information from the web) and PLLE revealed that the four components had a significant relationship to PLLE. The result implies that learners' FEE had the highest correlation, followed by SrLS, as the determinants of learners' LE among postgraduate students in the institution. According to the findings of researchers studying distant learning, it is critical that institutions of higher learning have the technology required to fulfil the requirements of this style of instruction (Ferri, Grifoni, & Guzzo, 2020; Santo, 2016). This aligns with Greenberg's (1998) assertion that having the right environmental infrastructure is crucial for students' academic success in DL. The author noted that DL employs a variety of technologies to connect with learners remotely and is designed to foster interaction and validate learning. Similarly, the evidence corroborates the findings of Muibi (2019), who found that integrating a range of technologies would improve students' digital literacy and skill development. The research also found that it enables people to utilise social media applications. These include Google apps like Google Meet and Google Classroom, as well as Telegram and WhatsApp (WA). Others include learning apps like LMS, Moodle, and Zoom. In order to properly use ICTs to improve distance learners' engagement, retention, and general academic achievement, this integration is essential.

Similarly, in terms of the relationship between ISS and learners' LE, the present study discovered a positive, moderately significant relationship between the two variables; the result implies that ISS is one of the determinants of PLLE in the study. As part of institutional support, this aligns with the equivalent theory, in the context of distance education and open universities like the NOUN,

relates to the idea that the learning outcomes and quality of education delivered through distance or online platforms should be equivalent to those delivered through traditional face-to-face instruction (Lekhetho, 2022). This, in essence, would attract more learners to embrace the open-DL programme. The equivalent theory suggests that NOUN should strive to ensure that its distance education programmes are designed and delivered in a way that provides learners with a learning experience that is comparable in quality and effectiveness to traditional campus-based programmes.

This is consistent with Universal Design for Learning's tenets. The principles place a strong emphasis on developing inclusive, adaptable, and student-centred learning environments. It further states that the features ensure that all students may access and take advantage of tasks, responsibilities, and educational resources from anywhere at any time. In addition, Crick (2021) discovered that the COVID-19 pandemic led to reforms in digital education. Students may apply and use the information they have learned using digital learning materials (McGrath et al., 2020). The idea that COVID-19 has created new opportunities for innovation in the field of digital education is supported by these observations. The proposals include a strong emphasis on successful courses and programs, high-quality DES connected to teaching and learning, and evaluation techniques that would help students learn in the event of future calamities.

Similarly, on the relationship between LKSs in extracting educational information from the web and learners' LE, findings revealed the least significant positive relationship between the four variables. The result implies that the LKS of extracting information from the web posed a challenge to PLLE in the institution. The findings aligned with an earlier study by Winne and Hadwin (2013), who established a significant and positive relationship between learners who demonstrated superior knowledge of digital resource selection and utilisation and learners' LE. This result corroborates Muibi's (2020) claim that successful assessment procedures for distance learners include online tests, group discussions, cooperation, and simple access to exam results using platforms like WA Messenger, email, Edmodo, Google Forms, and Moodle. Muibi (2021) also observed that students who are able to use smartphones and Android devices as additional support services have easier access to online course modules and study guides. This facilitates peer and tutor interaction, which can result in significant educational improvements through platforms like Zoom and WA, ultimately improving their academic performance.

6. Conclusion

This study has demonstrated a significant positive correlation between four factors of postgraduates' learning experience and students' LE DES at the NOUN. Therefore, it is expected that DL institutions would see an increase in student retention and programme performance if they concentrate on adopting DES for both undergraduates and postgraduates. The research leads to the conclusion that learners are more likely to get favourable and desired academic results when distance learning is helpful.

7. Recommendations

The study's findings led to the following recommendations being put forward:

- Increased use of various digital educational tools should enhance the virtual engagement experience for PGL, and ICTs should be used more effectively by optimising their potential to support students' academic success and learning efficiency within the institution.
- To improve students' academic performance in remote education, virtual opportunities for engagement through ICTs should be designed and used in a way that is easy for PGL to comprehend and relate to.
- The administration of the NOUN should formulate an effective strategy that promotes the integration of technological resources in educational activities, especially for both synchronous and asynchronous components.
- University management should provide an ICT infrastructure that is capable of supporting distance education among all categories of students. This will improve learning results.

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BUILDING SUSTAINABLE SUPPLY CHAIN: OPPORTUNITIES AND CHALLENGES

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Abstract

Sustainable Supply Chain (SSC) plays a crucial role in shaping the economic, social and environmental sustainability of businesses in developing economies. This study investigates the challenges and opportunities of adopting SSC in Imo State, Nigeria. Using mixed method approach, the study gathered quantitative data from 78 questionnaire responses alongside 16 contextual insights from interview participants. The core objectives of this research is to evaluate the existing challenges impeding the use of renewable energy in SSC practices, while assessing the harnessed opportunities available for implementing green practices. Additionally, the findings disclose compelling factors of adopting sustainability principles like costs constraints,

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technology and infrastructure limitations and policy gaps. The potential opportunities identified from sustainability-driven businesses includes operational efficiency, costs savings, competitive advantage and green funding. Moreover, the results underscore the needs to transforms Imo's businesses with resilient SSC, while offering actionable solutions for stakeholders and policy makers in unlocking the full potentials of sustainability principles in Imo State and Nigeria at large.

Keywords: *sustainable supply chain, strategic policies and technology and innovation*

JEL Classification: Q01, Q56, L91, M14, A19, Y20 O31, M15

INTRODUCTION

Background to the Study

Sustainable supply chain refers to the management of supply chain operations in a way that minimizes environmental, social, and economic impacts while maintaining economic viability. It involves considering the entire supply chain, from sourcing raw materials to end-of-life product disposal, and ensuring that practices are: Environmentally friendly: reducing waste, emissions, and resource consumption. Socially responsible: promoting fair labor practices, human rights, and community engagement and Economically viable: ensuring long-term profitability and competitiveness. Sustainable sourcing involves procuring materials and services in a way that minimizes environmental and social impacts. This can include: Sourcing from suppliers with strong environmental and social track records, Using locally sourced materials to reduce transportation emissions, Implementing responsible mining practices and promoting fair trade and fair labor practices. Some benefits of sustainable sourcing include:

- Reduced environmental footprint
- Improved brand reputation
- Compliance with regulations
- Risk mitigation

Organizations of our time have recognized Sustainable Supply Chain as essential ingredient for improving business viability, timely delivery and customer satisfaction. By emphasizing operational alignment with sustainable practices, sustainable supply chain incorporates social, economic and environmental dimensions into their operations to achieve long-term organizational goals,

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alongside mitigating environmental and societal impact (Dubey et al., 2020). The sustainability practices gained multifaceted concerns that are far-beyond developed economies but in emerging economies such as Imo State, Nigeria. Consequently, Supply chain plays a crucial role in shaping business operations across various sectors in Nigeria, particularly manufacturing, agriculture, trade and services supplies. A study by Akintola et al. (2021) assert that socio-economic issues, insufficient infrastructure, unfavorable policy framework and limited accessibility to advanced technology as significant challenges hindering the implementation of sustainable supply chain. These challenges are considerably led to vulnerability in supply chain, by creating inefficiency in operation, resource wastage and environmental degradation. Thus, the growing transition and adoption of sustainability practices like renewable energy and carbon free equipment in supply chain operations marked a pivotal response to the challenges posed by traditional supply chain practices. The core objective of sustainable supply chain practices is to stand on equilibrium between economic potentials, social responsibilities and environmental preservation (Yadav et al., 2020). Therefore, emerging economies like Imo in Nigeria requires localized solutions in implementing transition and adoption of sustainable supply chain practices. The composition of business activities in Imo such as manufacturing, services, merchandizing, retailing and e-commerce were heavily relying on supply chain to ensure uninterrupted and smooth flow of goods and services throughout the chains. Nwokoro & Okeke (2021) characterized inefficient supply chain with significant energy costs, lack of waste management systems and dilapidated infrastructure. This contributes to air pollution, deforestation and overall environmental degradation, while accumulating additional operational costs. Implementing Green supply chain and logistics practices such as renewable energy and route optimization techniques can minimizes carbon foot-print (emissions) and cost efficiency (Ifeanyi et al., 2022). Subsequently, the use of closed-loop supply chain and circular economy strategies like reverse logistics, recycling, remanufacturing and asset recovery principles can be appropriate in mitigating wastes and exploring unattended business opportunities. This research study aimed at examining the challenges and opportunities in adopting sustainable supply chain in Africa, focusing on investigating economic, social and environmental dimensions, while offering valuable and in-depth insights that may encourage the implementation of sustainable practices

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Statement of the Problem

Building sustainable supply chains in Africa is a complex issue with numerous opportunities and challenges. The continent's rapid growth and urbanization present a unique chance to develop environmentally friendly and socially responsible supply chains. Supply chain plays a crucial role in shaping business operations across various sectors in Africa, Nigeria precisely, particularly in manufacturing, agriculture, trade and services supplies. A study by Akintola et al. (2021) investigated that socio-economic issues, insufficient infrastructure, unfavorable policy framework and limited accessibility to advanced technology as significant challenges hindering the implementation of sustainable supply chain. These challenges are considerably led to vulnerability in supply chain, by creating inefficiency in operation, resource wastage and environmental degradation, but the opportunities that comes with it are enormous. The study therefore, tends to examine these challenges and opportunities and proffer strategic policies for future usage.

Objectives of the Study

The main aim of the study is to examine: Building Sustainable Supply Chain in Africa: Challenges and Opportunities, other sub-objectives are;

1. To examine the challenges facing the building of sustainable supply chain in Africa.
2. To assess the various opportunities associated with building sustainable supply chain in Africa.
3. To assess the impact of technology and innovation in building sustainable supply chain in Africa
4. To investigate the various strategic policies necessary for building sustainable supply chain in Africa.

Research Questions

The following research question guided the study.

1. What are the challenges facing the building of sustainable supply chain in Africa?
2. What are the various opportunities associated with building sustainable supply chain in Africa?
3. What is the impact of technology and innovation in building sustainable supply chain in Africa?

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4. What are the various strategic policies necessary for building sustainable supply chain in Africa?

Significance of the Study

The findings of this study can promote the economic, social and environmental well-being reducing additional costs for businesses in Nigeria (Adebayo & Salawu, 2020). Transitions sustainable practices can improve efficiency and effectiveness in operations, lowering costs as well as building robust business opportunities, improve social equity, social responsibility, ethical labor practices, diversity and inclusion etc. This social dimensions can contribute to the livelihood of workers . The study underscores the need to lessen environmental concerns of supply chain operations in the state. Implementing ecofriendly practices such as resource and energy-efficiency, emissions-free practices and waste recycling can significantly increase global sustainability efforts. The research detects barriers and regulatory gaps and offer practical and localized solutions for authorities to create and promote a favorable and enabling ecosystem for implementing sustainable supply chain practices. The findings of this study can contributes to the existing theories and literature through the use of localized perspectives to address and substitute the challenges of sustainable practices with potential opportunities in emerging cities like Imo State, Nigeria.

LITERATURE REVIEW

CONCEPTUAL FRAMEWORK

Sustainable Supply Chain

Seuring & Muller (2020), defined Sustainable Supply Chain "as the integration of environmental, social and economic sustainability principles to create long-term value while minimizing negative impact on the ecosystem and society. Organizations that implement sustainable practices can reduce their environmental footprint, improve operational efficiency, and enhancing their reputation among consumers, investors and regulators (Wang et al., 2020). However, the integral parts of SSCM comprise resource efficiency, ethical sourcing, green logistics and waste management (Bai & Sarkis, 2022). Despite stringent environmental regulations and compliance issues, SSC has widely been implemented in developed economies, benefiting from cost efficiency and brand equity (Tachizawa et al., 2019). However, there is limited transition from traditional supply chain to SSCM

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in emerging markets and economies as a result of initial costs of transition, infrastructure deficits, Technology required and regulatory challenge (Kovacs & Spens, 2020). These distinct challenges delayed extensive implementation of sustainable supply chain practices in Kano to endure, withstand and sustain its diverse commercial activities and rapidly growing population.

CHALLENGES FACING THE BUILDING OF SUSTAINABLE SUPPLY CHAIN

Infrastructure: Inadequate infrastructure, including roads, energy, and logistics, hinders the development of sustainable supply chains.

Financial Constraints: Limited access to finance and high costs of sustainable technologies impede adoption. These contributes the main challenges hindering the shift from outdated practices to sustainability practices, others include unstable power and energy supplies, lack of modern logistics and warehousing facilities, and poor condition of transport connectivity among others. Akintola et al. (2021) emphasized that these obstacles increased operational costs and often disrupting the smooth flow of goods and services across supply chain. Moreover, businesses find these inefficiencies considerably difficult to adopt green practices while reducing environmental impact of supply chain activities (Sarkis et al., 2020).

Regulatory Frameworks: Weak regulatory frameworks and lack of enforcement hinder the implementation of sustainable practices.

Current State of Infrastructure: **Initial Cost of Transitioning**: In Imo, significant portion of businesses find the costs of investing in eco-friendly supply chain and its upkeep maintenance costs as quite indispensable. Ifeanyi et al. (2022) highlighted financial constraints as the most significant barriers of transitioning from traditional to sustainable supply chain practices like energy-efficient practices, sustainable packaging and wastes management systems. Similarly, the application of SSCM is more intricate with restricted access to government incentives and financial possibilities (Adebayo & Salawu, 2020).

Technology Involved: Lack of commitments to technical expertise in optimizing supply chain operations with technological approaches such as data analytics, software and automations GPS for real-time tracking etc, have significantly delay the shift to sustainability practices in Kano. A study by Chukwu et al. (2022), suggests high implementation cost and technical expertise as impediments that limits the application of these technologies.

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Policy framework and Gaps: The government in-action towards compliance to a sustainable business practices that can reduce climate change and enhance environmental preservations are equally uncomplimentary, particularly in Nigeria. Nwokoro & Okeke (2021), identify insufficient degree of penalties and lack of environmental laws enforced to businesses harming and compromising the environment. Moreover, incentives such as tax holidays or subsidies should be offer to encourage those businesses with sustainable behavior, carbon footprint portfolio, sustainable sourcing and wastes management systems.

OPPORTUNITIES IN THE BUILDING OF SUSTAINABLE SUPPLY CHAIN

Renewable Energy: Africa has vast renewable energy resources, such as solar and wind power, which can be leveraged to reduce carbon emissions in supply chains.

Local Production: Investing in local production can reduce reliance on imports, create jobs, and stimulate economic growth.

Technology: Adopting digital technologies, like blockchain and IoT, can enhance supply chain transparency, efficiency, and sustainability

STRATEGIC POLICIES

To address these challenges, policymakers and businesses can focus on:

Investing in Infrastructure: Developing infrastructure that supports sustainable supply chains.

Promoting Public-Private Partnerships: Collaborating with private sector entities to access financing and expertise.

Enhancing Regulatory Frameworks: Strengthening regulatory frameworks to support sustainable practices.

METHODOLOGY

This study combined both quantitative and qualitative aspects of data collection to investigates the challenges and opportunities available for implementing the use of green supply chain in Imo, Nigeria. The mixed approaches employed will be use to strike a balance between economic, social and environmental perspectives of sustainability practices. Consequently, questionnaires are designed to gather numerical data while semi structured interview were conducted for contextual insights.

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Research Design:

The research uses a combination of descriptive and exploratory research design. A descriptive statistical design examines the challenges and opportunities affecting the shift to renewable energy, while exploratory design focus on capturing a snap-short of the present considerations of implementing sustainable supply chain in Imo.

Sampling Population

The sampling population is randomly selected due to the fact that sustainability practices covers all strata of businesses activities, comprising 78 questionnaire respondents, ranging from shop- keepers, distributors, households and students were chosen based on stratification to ensure diverse perspectives. Additionally, 16 interview participants from regulators, manufacturers, agriculture, wholesaling, retailing and services establishments were selected based on their daily experiences and engagements in supply chain functions within the purview of their organizations.

DATA ANALYSIS

Quantitative Analysis: The quantitative data analysis employs descriptive and inferential statistical tools. A descriptive technique is used to measure the demographic profiles of the respondents and their inputs to each question. In other hand, the inferential statistics analyzes the relationship between perceived barriers to sustainable supply chain and factors affecting the transition to renewable energy program.

Qualitative Analysis: Data from interview were analyzed using thematic analysis to evaluate the key challenges and potential opportunities businesses encountered while adopting sustainable practices in Kano. The thematic analysis aimed at identifying patterns, drawing contextual insights and conclusion.

Sample Size: The sampling population may be regarded as small, though sufficient for the research purpose but cannot capture a comprehensive view of Imo in Nigeria, considering the business population of the state.

FINDINGS

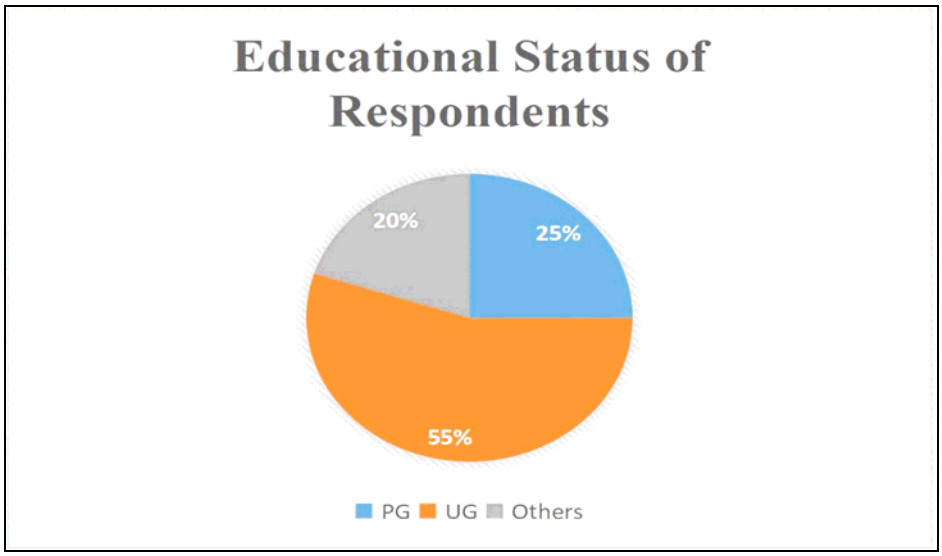
This chapter exhibits how data collected were analyze to provide both numerical and contextual insights into challenges and opportunities of substituting traditional practices into sustainable supply chain practices in Imo. Statistical tools such graph, charts and frequency distribution table were used to reinforce the

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findings, dividing demographic profiles and core questions related to Sustainable Supply Chain.

QUANTITATIVE FINDINGS

Demographic Information of the respondents



Educational Qualifications

Graph 1: Education of the Respondents

Fig. 0.1 The data in a pie-chart above present the current education qualifications of the respondents. Majority of the respondent are undergraduate with 55% responses, while the average respondents possess their postgraduate studies with a theoretical and conceptual understanding of SSCM. Those below this brackets provides 20% responses. These responses show education-driven population sample that can foster reliability of the findings.

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Age Group of the Respondents

Graph 2 : Age Status of the Participants

Fig. 0.2 The aggregate age of the modal responses were younger generations of professionals with age difference ranges from 26-35, representing 50%. The mean of this age distribution are people above 36 years of age and are often involved in a number of supply chain operations and stands at 26%.

RQ 1: Analysis of challenges facing the building of sustainable supply chain in Africa

Table 1: Are there challenges facing the building of sustainable supply chain in Africa?

Responses	Frequency (%)
Yes	70
No	18
May be	12
Total	100

The challenges of adopting sustainable supply chain practices has been proven by the significant number of the respondents. Citing costs, infrastructure deficits and technology involved among others as factors that limit the adoption. Those that denied the acknowledging the challenges constitutes 18%, alongside those that are neutral represents 12% respectively.

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RQ 2: What are the various opportunities associated with building sustainable supply chain in Africa?

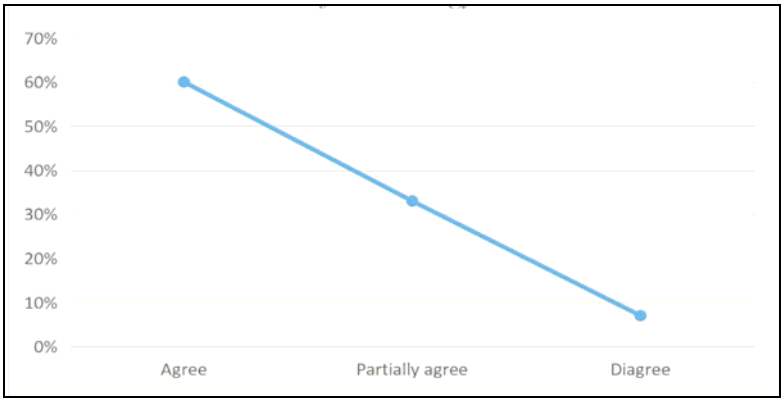
Table 2: Are there various opportunities associated with building sustainable supply chain in Africa?

Responses	Frequency (%)
Yes	88
No	12
Total	100

The table 0.2 above indicated that majority of people and businesses in Imo, attest that there are various opportunities associated with building sustainable supply chain in Africa. While on the other hand, few among the respondents that represents 12% of the responses answered No, but emphasized the need for more awareness campaigns.

RQ 3:What is the impact of technology and innovation in building sustainable supply chain in Africa?

Table 3: Are there impact of technology and innovation in building sustainable supply chain in Africa?



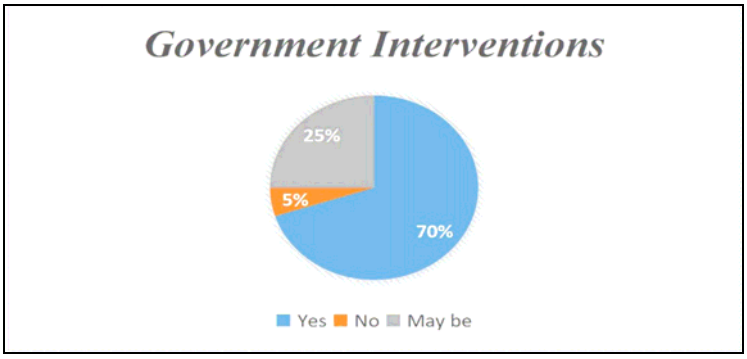
Graph 3: Role of Technology and Innovation in building Sustainable Supply Chain

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The data above underscores how majority of the respondents (60%) agree that technology plays a crucial role in sustainable supply chain. Investing in data analytics, software and applications for real-time tracking and route optimizations, including automations and robotics applications in warehousing and distributions. Additionally, the average responses (40%) have probability of the role of these technologies, while 8% of the responses denied any aid from technological innovation in building sustainable supply chain in Africa

RQ4: What are the various strategic policies necessary for building sustainable supply chain in Africa?

Table 4: Are there strategic policies necessary for building sustainable supply chain in Africa?



Graph 4 : Policy Framework required

Graph 4 above indicates that the significant portion of the respondents (70%) disclosed the possibilities of sound policy framework could promote this transition program in Imo. Government supports such as incentives, subsidies and tax holidays were repeatedly recommended by the respondents. In contrast, the average respondents (25) were uncertain that political instability may often hinder the progress of sustainable policies, particularly in Africa where businesses are prone to these challenges.

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Qualitative Findings

This section deals with interviews findings based on economic, social and environmental dimensions of SSC in Imo. The duty also identifies profits, people and the plate as triple bottom line available to address these dimensional impact of sustainability practices. Alternatively, the key findings are:

Economic Impact of SSC

Cost and Energy Efficiency (CEE): The average interview participants (7 out of 16) suggested that the use of compressed-natural-gas, solar-powered vehicles and electric vehicles (E.Vs) serves as alternative options for large scale organizations and businesses. This development has drastically reduced pollutions, preserve ecosystem and terminating the operational costs of fueling, servicing and other upkeep maintenance.

Competitive Advantage: Some participants revealed growing customer's demand for eco- friendly materials in emerging markets. Therefore, those organizations and businesses that seized these sustainability principles have great competitive advantages over their competitors as consumers are appealing for environmentally friendly products.

External Green Financing Initiatives: Other portion of the interviews participants highlight the importance of securing and accessing external financing from NGOs such as Sustainable Development Goals (SDGs) and other Government incentives for green practices will be quite indispensable. The above economic benefits require investment cost, technology, training and awareness campaigns to overcome the barriers that hinder the adoption of green supply chain in Imo.

Social Impact of SSC

Employment Opportunities: Some organizational employees among the participants noted that the emergence of SSC in Imo provide a lot of job opportunities in business environment. The implementation of these practices like recycling, waste management, eco-friendly logistics and renewable energy have led to the creation of newly direct employment to those communities neighboring some organizations.

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Social Responsibility: The interviews findings also presents facts about how societal well-being and inclusion can be guaranteed due to SSC practices. Pollution control mechanisms, resource conservation and energy-efficiency are all beneficial to society.

Environmental Impact of SSC

Carbon Footprint: Some Participants highlighted the significant roles that SSCM plays in reducing carbon substances like methane, carbon-dioxide and other chemicals that are harmful to health. Practices such as waste reduction, recycling and route optimizations are considerably critical in minimizing environmental footprint.

Resource Conservation: Sustainability practices such closed-loop supply chain, reverse logistics and recycling have a profound impact in preserving the suitability of the ecosystem. These practices can equally avenues for using the environmental potentials without compromising future generations.

Renewable Energy Potential: The findings also indicated potential solutions of transitioning to renewable energy such as solar-power and CNGs to ensure energy efficiency, while supporting sustainability in the overall supply chain functions.

DISCUSSION

This study tries to strike a balance between the challenges and opportunities of Adopting eco- friendly supply chain practices in Imo. Based on economic, social and environmental dimensions, the findings provide valuable insights on how collaborative efforts among various stakeholders like organizations, businesses and policymakers including non-governmental interventions (NGOs) can unlock the full potential and prospects of adopting SSC in Imo.

CONCLUSION AND RECOMMENDATION

This study investigated the challenges and opportunities of adopting sustainable supply chain (SSC) in Imo, based on social, economic and environmental dimensions. The findings identified costs constraints, technology and infrastructure deficits, including regulatory framework as constant challenges impeding the implementation of SSC in Imo. Despite the challenges, the study explores numerous opportunities such as capacity building, collaborative efforts and policy supports that can transform the implementation of SSC in Imo. Additionally, the study contributes to the academic discourse and the existing literature of SSC, alongside offering long-term actionable solutions for stakeholders and policymakers on how to actualized the full potential of SSC in Imo and Nigeria.

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FROM WELL-BEING THEORY TO BUSINESS PRACTICE: A COMPARATIVE ANALYSIS OF BENEFIT MODELS AND NEW ACCOUNTING STANDARDS

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Abstract: *This article examines the convergence between welfare economics and the recent purpose driven evolution enterprise models , with a specific focus on benefit corporations and the emerging global standards of impact accountability . Building on the theory foundations of the new welfare economics from Bentham's utilitarianism to the contributions of Pigou, Bergson, Arrow and Sen the study investigates how the principles of efficiency, equity and social welfare are operationalized within contemporary legal forms that integrate profit -making with the pursuit of collective benefit. The analysis adopts a comparative perspective, exploring the diffusion of benefit corporations across the United States , Europe and Latin America, as well as the parallel rise of Certified B Corporations promoted by B Lab. Particular attention is devoted to the role of impact- measurement instruments , including the B Impact Assessment (Version 7), ESRS, GRI Standards and SROI, which enable multidimensional objectives to be translated into verifiable and comparable indicators. Furthermore, the paper highlights the growing integration between public policies such as the EU Clean Industrial Deal, Green and Socially Responsible Public Procurement and due diligence obligations and private initiatives oriented toward social and environmental value creation.*

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Keywords: *welfare economics, benefit corporations, impact measurement, ESG reporting standards, social sustainability, corporate governance.*

JEL Classification: D60; L31; M14; Q56

* The paragraphs 1,2,3,4,5 were written by dott.Mario Fontana and parahraphs 6,7,8,9 were written by Avv.Gino Fontana PhD. The abstract and bibliography were created by both authors.

1.Introduction

Over the past twenty years, the international economic landscape has witnessed a profound redefinition of the parameters used to evaluate "good" growth. Indeed, the expansion of gross domestic product is now accompanied by new dimensions such as distributive equity, ecological resilience, and the quality of social relations, in a perspective that the literature defines as a welfare economy. This paradigm, heir to the theoretical tradition inaugurated by Bentham and renewed in the twentieth century by the contributions of Pigou, Bergson, Arrow, and Sen sees the convergence of both scientific and ethical concerns, as well as *policy issues.* around a crucial question, namely how to ensure that the production of wealth does not occur to the disadvantage – but rather to the advantage – of present and future generations.

At the same time, the business community has witnessed the emergence of hybrid legal forms, capable of incorporating common-benefit objectives into their bylaws. Among these, the benefit corporations introduced in Italy by Law 208/2015 represent a significant testing ground: as of December 31, 2023, there were 3,619 of them, a 37.8% annual growth, with over 188,000 employees and an average economic performance superior to that of traditional businesses. Globally, the "certification movement" promoted by B Lab brings together nearly 10,000 Certified B Corporations spread across over 100 countries and sixteen macro-sectors, demonstrating an expansion that in Europe alone has reached 24% in the last year.

Public institutions' interest in these models is confirmed by the EU context: with the Clean Industrial Deal, launched in February 2025, the European Commission pledged to mobilize over €100 billion to support low-emission manufacturing « *made in Europe* », introducing sustainability and resilience criteria into procurement procedures that reward companies with certified impact reporting.
Therefore, in light of this dual evolution, theoretical and institutional, this article aims to analyze to what extent the welfare economy paradigm finds concrete implementation in the benefit corporation model, investigating:

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- the conceptual coherence between the efficiency-equity criteria developed by *new welfare economics* and the statutory obligations of common benefit;
- the effectiveness of impact measurement tools (B Impact Assessment , ESRS, GRI, SROI) in translating multidimensional objectives into comparable indicators;
- the *policy implications* of the interaction between private initiative and public strategies – both European and national – aimed at climate neutrality, environmental regeneration, and social cohesion.

The overall aim of the survey is to highlight the markets' ability to integrate the goals of widespread well-being, outlining the conditions under which the symbiosis between public intervention and legal and organizational innovation within businesses can transform economic growth into sustainable and shared prosperity.

2. Literature Review

When discussing economics, especially in the contemporary era, we must not forget that the underlying concept is based on a series of past transformations that, in their own way, have ultimately shaped today's welfare economy. This *latter concept* has its roots in a long tradition of philosophical and economic reflection that, beginning in the late 18th century, has progressively transformed utilitarian principles into rigorous analytical tools for evaluating public policies.

The starting point on which we must discuss is the principle of utility, expressed by Jeremy Bentham (Betham, 1879). He asserted that public action must maximize *"the greatest happiness of the greatest number",* a concept that establishes the idea of a common yardstick – well-being – for judging social institutions. Subsequently, John Stuart Mill and Henry Sidgwick refined the notion of utility as the sum of individual satisfactions, providing the ethical basis for the aggregate measurements that will characterize the welfare economics of the twentieth century (Schultz , 2017). With the "marginalist revolution" – Marshall in England and the continental neoclassicists – the analysis shifts from the labor-value to the maximization of marginal utility (Marshall, 1890). Vilfredo Pareto formalizes the criterion of " Pareto optimality ": a state is efficient when no one can improve without worsening the position of others (Pareto, 1964). This criterion, devoid of any reference to distribution, allows the evaluation of well-being to be anchored to order relations obtainable from voluntary exchanges in competitive equilibria. The publication of *The Economics of Welfare* by Arthur C. Pigou marks the entry of public intervention into welfare economics (Pigou, 2017). Pigou demonstrates that, in the presence of "divergences" between private and social net product – positive or

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negative externalities – the market does not achieve the Pareto optimum; hence the need for corrective taxes or subsidies. The distinction between efficiency and distribution remains central, but it becomes clear that the State can, in principle, correct market failures to increase collective well-being. The next watershed is the article by Abram Bergson (1938), which introduces the *social welfare function.* (SWF): a real function that orders social states based on explicit ethical judgments (Bergson , 1968). Paul Samuelson , in the Foundations of Economic Analysis (1947), generalizes the approach, showing how competitive equilibrium maximizes the SWF in a system free of failures (Samuelson , 1893). In parallel, Nicholas Kaldor and John Hicks propose the compensation criteria (Kaldor-Hicks) (Kaldor, 1939): a project is socially desirable if the winners could compensate the losers and remain profitable, even without the transfer actually occurring; TiborScitovsky will later highlight the inconsistencies of this test (Scitovsky, 1941). Kenneth Arrow, in Social Choice and Individual Values demonstrates the impossibility of constructing a social choice rule that, while respecting seemingly innocuous properties of fairness and rationality, consistently transforms a set of individual preferences into a complete and transitive collective preference (Arrow, 2012). This result, known as the impossibility theorem—requires us to recognize the logical limitations of any attempt to base collective decisions on ordinal preferences without further hypotheses.

In the post-World War II period, welfare theorems (Arrow- Debreu) specified the conditions under which competitive markets achieve Pareto optimum performance (Pareto, 1964); information economics, however, demonstrated that information asymmetries, incomplete markets, and public goods produced new inefficiencies. In the 1970s, Amartya Sen pioneered alternative metrics effective capabilities and freedoms going beyond individual utility alone (Sen, 1970); in parallel, experimental and behavioral analysis documented systematic deviations from classical hypotheses of rationality. Thus, welfare economics was enriched with interdisciplinary tools, while maintaining its original objective of evaluating public policies in light of explicit normative criteria. The new welfare economics adopted the methodological program outlined by Lionel Robbins, affirming the need to clearly separate positive analysis from normative ethics. In formal terms, the economist's object is the one-to-one mapping between scarce means vectors r $\square \mathbb{R}^{+l}$ and sets of goals G, regardless of the latter's axiological contents. The value - freedom imperative implies that economic propositions are based on demonstrable factual relations, without incorporating deontic verbs ("ought") that belong to a different cognitive domain. On this basis, the Pareto school abandons the cardinality of utility since it is neither observable nor intersubjectively comparable

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in favor of an ordering of preferences represented by indifference curves $U_i(\ ) = \text{const}$. The replacement of numerical maps with order relations allows us to formulate allocative efficiency without assuming absolute measures of individual well-being.

Let $\mathsf{E} = \langle \{u_i\}, \{\omega_i\}, \{ Y_f \} \rangle$be a pure exchange and production economy. An allocation (x, y) is Pareto-efficient if there is no feasible (x′, y′) such that $u_i(x_i') \geq u_i(x_i)\ \forall$ i with strict inequality for at least one individual. The set of efficient outcomes constitutes the utility frontier $P \subset \mathbb{R}^I$, whose projection in the pure exchange economy coincides with the contract curve of the Edgeworth box. The tangentiality of the indifference curves at these points is equivalent to the equality of the marginal rates of substitution among all agents:

$$MRS_i\hat{}\{XY\} = \lambda, \forall\ i.$$

As for the fundamental theorems, the first one states that, given locally "unsatiated preferences" (LNS) and competitive technologies, every Walrasian equilibrium $\langle p, (x^*, y^*) \rangle$belongs to P. The second theorem adds convexity and continuity, guaranteeing that any interiorly located point of P can be decentralized as an equilibrium after *lump-sum transfers* T_i. These results rely on the existence of support prices, formally proved by Arrow & Debreu using point-fixing techniques in convex topological spaces.

The first theorem thus provides a theoretical justification for the efficiency of competitive markets, but at the same time indicates that the presence of market failures requires external interventions to restore efficiency. Under additional conditions of convexity (consumer preferences with indifference curves convex to the origin, production technologies with non-increasing returns to scale) and the absence of unwanted income effects, any Pareto-efficient (socially desired) allocation can be achieved as a competitive equilibrium through an appropriate transfer of resources.

In other words, the second theorem guarantees that any point on the Pareto frontier (for example, any point on the contract curve in an exchange economy, or any point on the PPF combined with an efficient allocation among consumers in a production economy) can be implemented as a competitive market equilibrium, provided that the initial endowments are redistributed appropriately (through lump -sum resource transfers). By modulating the initial distribution of wealth or resources (for example, through lump-sum taxes and subsidies or initial endowments assigned by the state), the community can therefore ensure that the

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market achieves the desired Pareto-efficient allocation. It is crucial to note that transfers must be lump-sum, i.e., such as not to alter relative prices or the marginal incentives of agents (if transfers introduced distortions such as proportional taxes or subsidies tied to the quantities exchanged, the outcome would not be guaranteed).

The second theorem of welfare economics has an important implication for economic policy: it separates the problem of efficiency from that of distribution. Society can first focus on achieving efficiency through competitive markets (guaranteed by the first theorem in the presence of competition), and then, through appropriate endowment transfers (e.g., *lump -sum taxation* and income redistribution), achieve whatever Pareto-efficient allocation is deemed most equitable or desirable, without sacrificing efficiency. In practice, this suggests that equity and efficiency are not necessarily in conflict: the state could redistribute wealth *ex ante* (endowments) and let the free market operate *ex post,* thus achieving allocations that are both efficient and compliant with certain criteria of distributive justice. The second theorem also requires strong technical assumptions (convexity, continuity, perfect information, etc.): if these are lacking, it may not be possible to implement some Pareto-optimal allocations through market mechanisms without introducing inefficiencies (for example, with non-convex preferences or public goods, the social plan may prefer a Pareto-optimal point that, however, is not sustainable as a competitive equilibrium without more invasive corrective interventions).

Thus, the two fundamental theorems of welfare economics establish a solid theoretical basis for the normative analysis of markets. The first theorem asserts the efficiency of competitive markets under ideal conditions (*ex post efficiency given a distribution), while the second theorem provides the implementation lemma for Pareto-optimal allocations, indicating that the entire set of efficient allocations is accessible through perfect markets by appropriately adjusting initial endowments (ex ante* efficiency combined with social desirability).

These results provide a powerful argument in favor of the market economy as an efficient allocative tool, but at the same time highlight the potential role of the state in adjusting the initial distribution of resources to achieve equity objectives without compromising efficiency. It is important to emphasize that Pareto efficiency, while a necessary condition for a social optimum, is not in itself a guarantee of social justice: many Pareto-efficient allocations can be highly unequal. Modern welfare economics, starting from these theorems, therefore questions the *trade -offs between efficiency and equity, introducing additional*

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criteria (such as those based on utilitarian, Rawlsian, etc., social welfare functions) to evaluate and compare different Pareto-optimal allocations. The fundamental theorems, however, provide the theoretical foundation for believing that, in the absence of market failures, a competitive economy spontaneously tends towards Pareto efficiency, and that any redistributive objective can conceptually be achieved without sacrificing such efficiency, by separating the instruments of redistribution (*lump -sum*) from market forces.

Pareto order is silent when faced with cases in which a project improves the well-being of some and worsens that of others. The solution proposed by Kaldor and Hicks is the potential compensation test: the reform is acceptable if the "winners" could compensate the "losers" and remain in surplus. Formally, given the aggregate compensatory variation $\Sigma_i CV_i$, the move is *welfare- improving* if this sum is positive. Scitovsky shows, however, that the K–H criterion can produce preference cycles; the dual condition K–H & H–K resolves the inconsistency but does not avoid the need for distributive weights.

To re -introduce interpersonal comparison without repudiating ordinalism, Bergson and Samuelson define the FBS $W(u_1, \ldots, u^I)$, a quasi-concave and monotonic map incorporating ethical parameters via weights $\lambda_i > 0$.

The regulatory problem becomes:

$$\max_{(x,\ y)\ fact.}\ W(u_1(x_1),\ \ldots,\ u^I(x^I))$$
$$st\ \Sigma_i x_i = \Sigma_i \omega_i + \Sigma_f y_f .$$

The first-order conditions imply proportionality of the distributive weights to the partial derivatives of W. Specific choices of W—utilitarian, Rawlsian (maximin), Atkinson index with inequality aversion ε —generate corresponding measures of fairness.

Arrow shows that no voting rule aggregating individual ordinal preferences into a complete social order can simultaneously satisfy universality, independence from irrelevant alternatives, Pareto-ness, and non - dictatoriality. The impossibility theorem limits the construction of non-cardinal FBSs, pushing toward restricted domains or multidimensional criteria. Sen proposes weakening completeness or adding non-welfare information (rights, capabilities) to reestablish social evaluation.

Parametric indices of inequality (Gini , Atkinson , Kolm-Pollak) allow us to translate the Lorenz curve into scalars consistent with differentiable social welfare functions. More recently, the literature on "Beyond GDP" has shown the inadequacy of average income as a *proxy.* of prosperity, introducing *dashboards*

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composites (HDI, OECD-BLI) and monetized metrics of equivalent well-being that incorporate health, leisure and environmental risk.

3. Measuring instruments

In the context of welfare economics, measurement tools represent that set of conceptual and graphical apparatuses that allow us to translate the abstract notion of collective "well-being" into observable terms and to evaluate its allocative equilibrium: the Edgeworth box , first of all, constitutes the geometric matrix through which all possible combinations of two goods between two agents are recorded, allowing us to identify, through the intersection and tangency of their respective indifference curves, both situations of inefficiency and the contract curve, i.e. the locus of Pareto-efficient allocations.

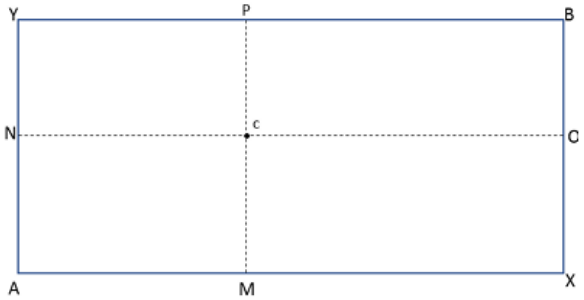


Figure 1: Edgeworth box. Own source

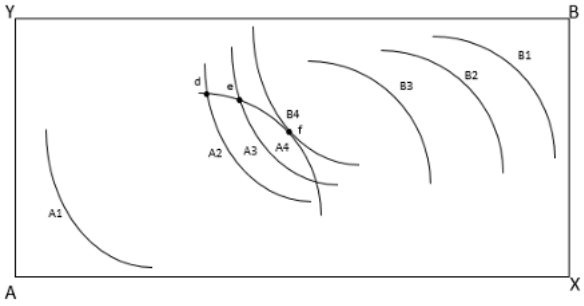


Figure 2: Indifference curves. Own source

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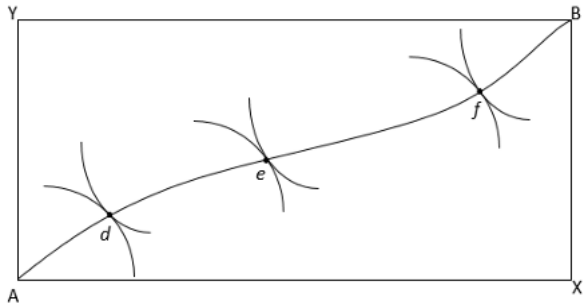


Figure 3: Contract Curve. Own source

In an economy with production, the same measurement function is performed by the production possibility frontier (PPF), whose slope – the marginal rate of transformation – makes the relative opportunity cost between goods immediately visible and, combined with consumers' marginal rates of substitution, allows us to test the coherence between the production structure and consumption needs.

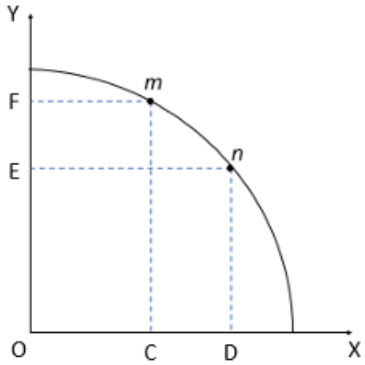


Figure 4: Production Possibilities Frontier. Own source

Bergson - Samuelson social welfare function transforms the individual ordering of utilities into a scalar index that allows for comparisons of welfare between Pareto-efficient allocations, while indicators such as the Lorenz curve and the Gini coefficient, although external to the Pareto criterion provide a synthetic measure of income distribution, essential for integrating exclusively allocative analysis with considerations of equity.

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Hicks 's compensatory variation and Kaldor 's equivalent variation criteria offer objective monetary references with which to assess, *ex ante* or *ex post*, the changes in well-being resulting from public projects or policies, thus completing the range of quantification tools available to economists to measure, represent, and compare the outcomes of markets or public interventions in terms of efficiency and distribution.

4. Origin and diffusion of the benefit company model

The benefit corporation model *was* born in the United States in 2006 at the instigation of the *non-profit organization* B Lab. It all began with a new legislative campaign aimed at creating a new type of company capable of combining profit-making and community-benefit purposes. The first legal recognition came with the signing of the Benefit Corporation Act in Maryland (April 13, 2010) – the first law in the world to mandate by statute the creation of a "general public benefit" alongside profit. From the Maryland prototype, adoption quickly spread. In fact, by early 2025, 45 states plus the District of Columbia had introduced specific statutes for *benefit corporations ,* confirming the US as a leading regulatory laboratory. The proliferation of state laws has provided legal certainty to iconic companies (e.g., Patagonia, Danone NA, Kickstarter) and has encouraged impact capital and ESG funds to favor *stakeholder-oriented corporate forms.* Italy was the first non-US country to fully implement the model: Law 208/2015 (paragraphs 376-384) introduced the concept of benefit companies into national corporate law, effective January 1, 2016 (Pontrelli et al., 2025). The InfoCamere-Unioncamere census shows exponential growth: 3,619 benefit companies registered at the end of 2023 (+37.8% year-on-year).

In attempting to describe the global panorama in relation to these *benefit corporations,* it must be said that France, with the Loi PACTE (22 May 2019), also introduced the *société à mission,* a French variant that requires the definition of a "raison d'être" and social objectives verified by a third-party body. By December 2024, there were approximately 2,000 *sociétés à mission ,* with a new registration every 18 hours; over a million workers today work in companies with this *status.* Latin America, with Colombia as the leading example, is also mentioned in this regard (Trujillo et al., 2023).

In fact, the first Latin American implementation dates back to Law 1901/2018 in Colombia, which created the *Sociedades de Beneficio e Interés Collective* (BIC) (Peña-Beltránet al., 2022). According to Forbes Colombia, in January 2024, registered BICs exceeded 1,500 and involved companies from all production sectors. This regulatory "wave" and therefore growth, has pushed other Andean

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jurisdictions: Peru (Law 31072/2020)(Serrano et al., 2024), Ecuador (2020) and Chile (amendment to the Ley de Sociedades of 2022). As regards the Italian case, the attribution of the status of benefit company dates back to the Stability Law for 2016 (Law 28 December 2015, n. 208). In paragraphs 376-384 of art. 1, the legislator has grafted, onto the background of traditional corporate types in the Italian Civil Code , a device aimed at combining private and collective utility. It is appropriate to focus directly on the literal meaning of the provision, since the legislative formulation makes clear from the outset the innovative scope of the institution: "*The provisions set forth in paragraphs from this to paragraph 382 aim to promote the establishment and encourage the spread of companies, hereinafter referred to as 'benefit companies', which, in the exercise of an economic activity, in addition to the aim of sharing profits, pursue one or more common benefit purposes and operate in a responsible, sustainable and transparent manner towards people, communities, territories and the environment"* (Article 1, paragraph 376, Law 208/2015).

The lexical choice of combining "responsible, sustainable, and transparent" with the phrase "common good" allows us to grasp the rationale behind the measure: to overcome the *for-profit/non-profit dichotomy* and recognize legal standing for business models that aim to generate shared value. Paragraph 377, by recalling the requirement to include such purposes in the bylaws, completes the framework and requires directors to balance the interests of shareholders with those of interested *stakeholders* . Such a clause, while not transforming the profit-making purpose into an altruistic one, broadens the scope of the duty of diligence pursuant to Article 2392 of the Italian Civil Code, translating into an obligation of *accountability* to a broader audience of recipients.

The application tools were refined with Circular No. 3689/C of the Ministry of Economic Development (now MIMIT) of May 6, 2016, which outlined the procedures for registering the "SB" qualification in the Company Register and provided operational clarifications on resolutions for the transformation of existing companies. This administrative practice is part of a simplification strategy, facilitating the dissemination of the model without introducing new formal requirements beyond those already required by common corporate law.

In terms of reporting, paragraphs 382-383 require the annual preparation of an impact report to be attached to the financial statements and published on the company's website. The report must be based on "*external assessment standards",* a term the legislator links to Annex 4 of the same law, anticipating subsequent convergence with international methodologies such as the B-Impact Assessment or,

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prospectively, the ESRS provided for by the Corporate Sustainability Reporting Directive (CSRD) 2022/2464/EU. Compliance therefore serves as a bridge between national and EU legislation, intended to integrate with the digital reporting formats that will be fully implemented for large companies starting in 2026.

Reputational profile represents a powerful incentive: according to the 2025 National Survey on Benefit Corporations, at the end of 2024, there were 4,593 registered companies (+27% year-on-year), with over 217,000 employees and a production value of approximately €62 billion. The survey found a median turnover growth of 26% for the three-year period 2021-2023, compared to 15.4% for comparable traditional companies, and an increase in labor costs (+25.9%), demonstrating the tendency to redistribute value toward human capital.

Regarding economic incentives, the legislator has also intervened outside the body of the founding law: Article 38-ter of Legislative Decree no. 34 of 19 May 2020 (converted into Law no. 77 of 17 July 2020) introduced a tax credit equal to 50% of the costs of incorporating or transforming a benefit company, a measure that has encouraged SMEs in particular to adopt the model. Regarding supervisory mechanisms, paragraph 384 expressly refers to Legislative Decree 145/2007 on misleading advertising and the Consumer Code, granting the AGCM the power to sanction cases of *greenwashing.* The AGCM's Annual Report (31 March 2024) reiterates the centrality of the fight against misleading environmental claims and frames the European guidelines on sustainability agreements as a tool for protecting consumers and competition together.

The European regulatory landscape confirms this trend: in addition to the CSRD, noteworthy is the Corporate Sustainability Due Diligence Directive (CSDDD) 2024/1760/EU, adopted on June 13, 2024, which requires large companies, including many benefit corporations to integrate social and environmental risk management across the entire value chain, providing for penalties and civil liability in the event of non-compliance.

5. International B- Corp Models

The international panorama of so-called B Corps has developed along two converging lines. On the one hand, there is the voluntary " Certified B Corporation" certification issued by the non-profit network B Lab; on the other, hybrid legal forms have been introduced in numerous jurisdictions the US benefit corporation, the French *société à mission*, the Colombian Sociedad BIC, and so on—capable of inscribing public utility purposes and impact reporting mechanisms into their corporate bylaws. On the certification front, B Lab now has nearly 10,000

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certified companies in over 100 countries and 160 sectors; the "B Corp" campaign Month 2025" highlighted that in Europe alone the number of B Corps has grown by 24% in the last year, demonstrating an increasingly widespread demand for *accountability among consumers and investors.*

The transposition into binding law has begun in the United States, where forty-one states and the District of Columbia now provide for the form of the public benefit corporation. The text cornerstone is § 362 of the Delaware General Corporation Law, according to which the corporation "*shall be managed in a manner that balances the stockholders' pecuniary interests, the best interests of those materially affected by the corporation's conduct, and the public benefit".* According to academic estimates, US *benefit corporations* and *public benefit corporations* have exceeded the threshold of 10,000 units, including around 15 listed companies (Dorff , 2023).

The model quickly took root in Europe: the French PACTE law (22 May 2019) created the *société à mission* . Article L210-10 of the Code de Commerce requires that the articles of association indicate a *raison d' être*and and "*un ouplusieurs objects social and environmental"* to be pursued under the control of a mission committee. At the end of 2024, there were 1,961 companies with this status, with over a million employees, and the growth curve remains upward.

In Latin America, Colombia led the way with Law 1901/2018: the Sociedades de Beneficio e Interés Collective corporations (BICs) must integrate environmental and social objectives into their corporate purpose and publish an annual impact report. According to data released on April 27, 2024, registered BICs have reached approximately 2,600, alongside 120 Colombian companies that also hold B Lab certification. Spain has incorporated the Sociedad de Beneficio e Interés Community Interest Company (SBIC) with Law 18/2022 ("Create and Grow "); the implementing decree currently being finalized should open the register in 2025, signaling the Spanish legislator's desire to align with the new European sustainability standards. In the United Kingdom, although the Community Interest Company (CIC) dates back to 2005 and was born in a mutualistic context, it anticipates many of the characteristics of the benefit corporation: a restricted purpose, *assets Lockdown* and oversight by a dedicated regulator. The latest annual report from the Office of the CIC Regulator confirms over 32,500 active CICs and 7,230 new formations in the 2023-24 financial year alone, a sign of the continued vitality of the social economy sector.

Outside these countries, similar entities exist: the Community Contribution Company (C3) in the Canadian provinces of British Columbia and Nova Scotia; the

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BICs in Peru and Ecuador; and the numerous Certified B Corporations in Australia and New Zealand, where, however, a specific legal vehicle is lacking. These experiments converge toward a common core of obligations: a statutory mission statement, periodic independent reporting, *stakeholder protection* , and clauses that allow directors to balance profits and impact. The relationship between private label and legal status has become more complex in recent months. The case of Nespresso, certified B Corp in 2022, and the subsequent abandonment of the label by historic companies like Dr. Bronner's have raised concerns about *greenwashing*. B Lab responded by presenting Version 7 of its standards, which introduces mandatory minimum thresholds regarding climate, working conditions, and *governance* for all applicant companies.

Looking ahead, the trajectory appears to be marked by two forces that can be defined as converging. On the one hand, the European Union's Corporate Sustainability Reporting Directive (CSRD) and Corporate Sustainability Due Diligence Directive (CSDDD), which will impose reporting and value chain oversight obligations on many large companies, including Italian benefit corporations and French *sociétés à mission (Sociétés à Mission*). On the other, the progressive raising of private standards, necessary to preserve the credibility of an now global brand. In essence, we are witnessing a shift in progress, from a mere "ethical option" to a new competitive paradigm, in which the generation of economic value is structurally integrated with the creation of social and environmental value.

6. Synergy between the welfare economy and the benefit society

In countries that are experimenting with the “well-being economy”, the convergence between public policies and business initiatives is making benefit corporations a real tool for practical implementation: the governments that are members of the WEGo partnership – currently Scotland, Iceland, New Zealand, Wales, Finland and Canada as an observer – are already translating their “*well-being budgets”* in new calls for tenders and framework agreements in which the technical score rewards companies capable of documenting dignity of work, distributive equity, and environmental regeneration, all dimensions measured by mandatory impact standards for SBs. At the same time, the European Commission is making access to the €100 billion from the Clean Industrial Deal, mobilized for low-emission manufacturing, more selective, and is doing so through green and social procurement criteria established in the Guidelines on Green Public Procurement and Socially Responsible Public Procurement. Responsible Public

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Procurement , which requires "scientifically verifiable" supply chain reporting—a requirement that benefit corporations meet with their annual impact report. Furthermore, the new *Simplification Omnibus package* with which Brussels has committed to reducing reporting burdens by 25% (and 35% for SMEs) without compromising quality increases the competitive edge of corporate models that already have certified external metrics, allowing them to access public markets and subsidized financing lines with accelerated procedures compared to companies that still need to comply.

Furthermore, the recent relaxation of state aid rules, designed to support the Clean Industrial Deal until 2030, allows grants and guarantees of up to €200 million for projects that "*demonstrate measurable positive impacts".* This criterion almost perfectly overlaps with the measurement requirements of SBs and makes their certification a reputational shortcut to attracting private and public capital, from pension funds to sovereign *green bonds* .

In this context, therefore, the benefit corporation is not only the vehicle through which the company expresses its value orientation, but also becomes the technical-legal bridge through which governments experimenting with the welfare economy can translate macro objectives (dignity, participation, equity, regeneration) into concrete administrative procedures, structurally rewarding those who are already able to report on these results.

7. Identification of economic and social benefits

As already highlighted, the adoption of the qualification of benefit corporation, and internationally of the B Corp certification , produces a double virtuous effect that intertwines economic growth and social impact: first of all, it strengthens the company's reputation, making it more credible in the eyes of consumers who are increasingly sensitive to the coherence between value declarations and concrete behaviors, as demonstrated by the widespread media attention dedicated to emblematic cases such as Patagonia, where the story of an industrial project founded on the dignity of work and the protection of ecosystems translates into customer loyalty and a participatory and innovative corporate climate (Works, 2019).

The legal framework that requires measuring and publishing the results achieved, foreseen in Italy by the impact report and, on a global level, by the B Impact Assessment system becomes a positive signal for investors oriented towards *impact investing*, as recognised by both *the* private *equity network* which is focusing on B Corps to promote regenerative models and international studies that link *" purpose-driven " governance* to lower capital volatility.

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At the supply chain level, structural attention to *stakeholders* translates into more cohesive relationships, capable of proving decisive in times of crisis the Unioncamere-Symbola analysis of resilience during the pandemic indicates that companies with deep-rooted local ties and cooperation with the third sector rebounded more quickly thanks to already mobilized social capital; finally, on the public front, the integrated reporting required of benefit corporations aligns with the evolution of European Green and Socially responsible policies. Responsible Public Procurement , which allows companies with verified impact metrics to obtain premium scores in procurement and strategic funding lines such as the Clean Industrial Deal, as EU directives expressly encourage buyers to favor candidates able to demonstrate environmental and social benefits throughout the entire life cycle of their products.

In short, the qualification of benefit company transforms the commitment to sustainability from an accessory cost to a strategic lever: it strengthens credibility towards consumers and investors who are sensitive to the purpose attracts capital oriented towards *impact investing,* consolidates more cohesive and resilient supply chain relationships and offers a competitive advantage in public procurement that rewards verified environmental and social impact metrics; the result is a virtuous circle in which economic growth and collective value feed each other, making shared well-being a long-term condition for the company's profitability.

8. Measuring impact

Measuring the true impact that socially responsible companies have on society and its surroundings, including other stakeholders, citizens, and users, requires establishing clear measurement points, not only in formal terms but also in structural terms of corporate management. The process begins with defining the common benefit purpose and the related theory of change: the desired effects are identified, the causal chain "input-process-result-impact" is described, and the baselines for data collection are established. At this stage, it is essential to listen to workers, suppliers, local communities, and the environment to avoid attribution errors or overestimation of the social impact. When choosing indicators and methods, companies in Italy and abroad focus on three families of tools, all recognized by the market and, above all, independently assessed:

- B Impact Assessment, renewed in 2024 in “Version 7”, which replaces the old aggregate score with mandatory minimum requirements in seven areas (*governance*, climate, decent work, human rights, equity, stewardship of natural resources, impact on customers) and introduces differentiated audit trails by sector and company size;

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- ESRS principles issued by the EU, based on the criterion of dual relevance: the company must report only what is significant for both its economic performance and for people and the environment, as a result of an assessment of impacts, risks and opportunities along the entire value chain;
- GRI 1-2-3 universal standards and related sector standards, which from 2023 will be fully interoperable with the ESRS thanks to an agreement between EFRAG and GRI, thus enabling a single reporting capable of satisfying, with the same data set, both European obligations and global market expectations (GRI, 2022).

As for the monetary evaluation of outcomes, some benefit corporations adopt the SROI (Social Return on Investment method), which assigns an economic value to social and environmental impacts (for example, reducing school dropouts or absorbing CO_2) and calculates the ratio between the value generated and the resources employed. The framework involves six codified steps, from stakeholder mapping to the public disclosure of results (Giordano & Perrini, 2025).

Finally, regarding independent verification and publication, whatever the chosen method, data collection must be documented and, preferably, subjected to external assurance : auditors or accredited bodies verify the accuracy of the logical chain and the consistency between indicators, sources, and improvement plans. Only after this "third-party certification" is the impact report approved by the administrative body, filed with the financial statements, and made publicly available. This transparency, in addition to complying with the law, facilitates access to green and socially responsible procurement and attracts investors who require verified data to assess the sustainability profile of companies. In short, impact measurement for benefit corporations is not a marginal obligation, but a management cycle that integrates strategic planning, stakeholder engagement , evidence gathering, and independent oversight, transforming commitment to the common good into a shared language with regulators , finance, and the market.

9. Conclusions

Beyond any introductory review, the analysis highlights substantial findings emerging from the theoretical comparison, empirical analysis, and public policy framework. Based on the findings, the benefit business model is no longer an experimental phenomenon: in Italy, registered Benefit Corporations exceeded 3,600 at the end of 2023, employing over 180,000 workers and generating over €40 billion in revenue. Internationally, the B Corp movement encompasses nearly 9,700 certified companies in 105 countries, with approximately 980,000 employees, confirming its widespread presence across sectors and jurisdictions.

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The introduction of new certification criteria announced by B Lab in April 2025 – which replaces the scoring system with mandatory minimum requirements in seven areas, from climate to human rights – strengthens the movement's credibility and reduces the scope for *impact- washing* . In parallel, alignment with the Corporate Sustainability Reporting Directive (CSRD) and the European The Sustainability Reporting Standards (ESRS) pave the way for international regulatory convergence on impact measurement criteria.

However, despite all the positive aspects associated with the companies *in question,* the critical issues surrounding international data comparability, especially among jurisdictions that implement the benefit model inconsistently and the risk of "two-tier" standards between large groups and SMEs remain. Furthermore, the technological frontier of *digital impact disclosure suggests future insights into the adoption of blockchain* traceability solutions and the integration of subjective well-being indicators into corporate reporting.

purpose-driven enterprise now operates as an operational interface between the principles of welfare economics and managerial practice. The convergence of public regulation, legal innovation, and advanced *accountability metrics* indicates that the goal of a well-being-oriented economy is not merely an ethical aspiration, but rather a concretely viable and already underway path, capable of transforming economic returns into shared and lasting prosperity.

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SUSTAINABILITY IN DIGITAL SUPPLY CHAIN MANAGEMENT: A COMPARATIVE ANALYSIS OF ENVIRONMENTAL IMPACT

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Abstract

This study sought to investigate the sustainability in digital supply chain management: a comparative analysis of environmental impact. This study aims to investigate the relationship between sustainable digital supply chain strategies and supply environmental impact. The study investigateswhether Nestle Nig. Plc distribution channels incorporate the sustainability strategy into supply chain management. The study population consists of 175 managers of the distribution department of the company. A structured questionnaire is

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designed and distributed among top managers in the surveyed branches.A Structural Equation Modeling technique is used to analysis the data and provide theresults. Analysis proves the relationship between sustainabledigital supply chain strategies and supply chain collaboration,where companies are interested in attaining some achievements in the area of social and environmentalto gain some collaborative strategies with their partners in the supply chain. The study suggests that organizationsmay adopt the Triple Bottom Line (TBL) framework to evaluate their performance in a broader perspectiveand extend the collaboration with suppliers and customers through information sharing along the supply chainpartners.

Keywords: *digital supply chain, environment, sustainability*

JEL Classification: M15, D23, D83, O31, O33

1.1 Introduction

Digital supply chain management is the process of maintaining and supporting your supply chain via a cloud-based software platform rather than using outdated manual paper-based methods.Digital supply chain management is comprised of the electronic technologies and tools organizations use to support their supply chain from end to end. Automation capabilities and digital tools enable organizations to reduce their use of paper, eliminate manual processes, and reduce the need for information requests since all vendor and buyer data is hosted in one location. The objective of digital supply chain management is to holistically manage your orders, invoices, and supplier and buyer relationships, all on a digital platform that is easy to access for all involved parties. With enhanced insights and data, digital supply chain management platforms offer a depth of information on performance, requirements, and overall supply chain dynamics that leaders can use to make informed decisions.

Sustainability is defined as the quality of not being harmful to the environment or depleting natural resources, and thereby supporting long-term ecological balance. Environmental impacts from supply chains can include toxic waste, water pollution, loss of biodiversity, deforestation, long-term damage to ecosystems, hazardous air emissions as well as greenhouse gas emissions and energy use.There is an increasing need to combine environmentally friendly choices into supply-chain management. Your supply chain costs impacts the environment because if you deliver products more efficiently, it can reduce your carbon footprint on the environment. Companies are now implementing sustainability programs to help the

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environment by reducing miles, reducing production costs, and reducing product waste as well as unplanned activities.

Success in sustainability cannot be established without collaboration and integration and real commitment. All internal andexternal members of the supply chain should be truly sustainable, also companies' departments, and individuals who work incompany have to be sustainable. Moreover, companies' external partners must be sustainable as well. Supply chain must playa significant role through procurement decisions to shape the supplier relationships that focus via suppliers' collaboration toreduce the environmental impacts and priorities the suppliers relative to their environmental impacts, and encourage the supplierstо report based on their environmental impact (Chin et al., 2015). These integrated practices not only support collaboratedinbound logistics but also involve the clients. An organization should develop better strategies to align the supply chainsustainability with supply chain collaboration by building good relationship with internal stakeholders, employees, customersand suppliers. Effective and efficient use of supply chain activities resources should lead to enhance the performance, andshould design based on competitive priorities. Competitive priorities are a strategic choice in sustainable supply chain tomaintain its performance. This approach is considered critical as organizations understand that social and environmental aswell as profitability of sustainable supply chain could impact on company choice of competitive priorities.

1.2 Statement of the Problem

The world is more connected than ever before, and global relationships have become complex and difficult to manage.Companies seek to adopt competitive strategies that achieve sustainability standards, not only in achieving economic success but also in serving society and preserving the environment at the same time. Liu et al. (2017) defined sustainable supply chain as how to gain a competitive advantage by improving the profitability and increasing the positive impact on people and decreasing the negative impact on environment. These relationships require upkeep and transparency in order to be successful, changes in processes, compliance laws, and the state of global trade all impact a business's ability to secure cash flow and fulfill orders. As global trade expands, managing supply chain also can quickly become time-consuming.

Due to the above mentioned reasons, it is imperative to apply the modern paradigm shift in supply chain because as business operations grow and modernize, more and more digital tools to help support supply chain are introduced. With the

impact of climate change on our environment, companies are under increasing pressure to reduce their carbon footprint and adopt sustainable practices. Particularly in supply chain management, logistics and freight forwarding, the transportation and storage of goods can have a significant impact on the environment. To reduce these impacts, companies should take a holistic approach and consider every aspect of their operations and supply chain. This study tends to investigate on the impact of sustainable digital supply chain management on the environment and strategies to reduce the impact of traditional supply chain on the environment and challenges of adopting digital supply chain management.

1.3 Objectives of the Study

The main purpose of the study is to assess the Sustainability In Digital Supply Chain Management: A Comparative Analysis Of Environmental Impact, other sub-objectives are;

1. To examine the digital supply chain strategies to reduce the impact of traditional supply change on the environment.
2. To outline the challenges in adopting digital supply chain management

1.4 Significance of the Study

The study will be beneficial to the following people;

Customers

Digital supply chains can lead to more accurate, quicker, and on-time deliveries, which can improve customer satisfaction and reduce cancellations and returned orders.

Stakeholders

Digital supply chains can improve communication and collaboration between stakeholders, such as suppliers, manufacturers, logistics providers, and customers.

Organizations

It can help organizations improve decision-making, anticipate and resolve problems, and shorten planning cycles. They can also help organizations become more resilient and adaptable to future challenges.

Supply chain teams

Digital supply chains can help supply chain teams reimagine, upskill, and optimize their current ways of working.

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1.5 Research Question

The following research question guided the study;

1. What are the digital supply chain strategies to reduce the impact of traditional supply change on the environment?
2. What are the challenges in adopting digital supply chain management?

1.6 Operational Definition Of Terms

Environment: this is the surroundings or conditions in which a person, animal, or plant lives or operates.

Sustainability: Sustainability is a social goal that aims to ensure that people can coexist on earth for a long time without depleting resources. Its often defined as meeting the needs of the present without compromising the ability of future generations to meet their own needs.

Supply Chain: Is a supply chain that uses digital technologies to improve the flow of information and goods, and to make better decisions

2.1 Literature Review

Digital Supply Chain

A digital supply chain is a supply chain that uses digital technologies and data analytics to improve performance, make decisions, and respond to changes. Digital supply chains use technologies like automation, cloud computing, big data analytics, and the Internet of Things (IoT) to create an integrated system. A digital supply chain, in contrast, provide significantly more visibility into the workings of the chain. The added near real time visibility of supplier performance and customer needs lets supply chain owners develop more complex relationships with more suppliers — thus indemnifying themselves against most sources of disruptions. Digital supply chains are more customer-centric and aim to meet today's three pillars of excellence in demand fulfillment: speed, personalization and choice.

Digital supply chain management is a process that involves multiple steps. As an end-to-end supply chain strategy, digital supply chain management begins in the planning stage and continues all the way through relationship management after order fulfillment. At every stage of the cycle, organizations need to utilize digital tools that support the processing of information and facilitate open communication. Without access to transparent data regarding orders and transactions, organizations open their supply chains up to potential roadblocks.

- **Plan —** The planning stage of digital supply chain management is just that: planning out your processes and inventory before advancing to order management.

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This stage is imperative for control over your business's inventory and manufacturing processes. This stage will look different for companies based on their industry and the tools they use. For example, some firms rely heavily on technology and tools to help them map out their materials and order planning. Planning ahead helps your company ensure they are prepared with materials, tools, and human capital to fulfill future orders.

- **Source —** In the sourcing stage, organizations work to identify vendors and suppliers for goods and services necessary for order completion. Your business needs to have suppliers that can provide you with the tools and materials you need to actually meet the demands of your customers. Luckily, with the support of supply chain networks like the Tradeshift Network, organizations can get access to information about hundreds of qualified suppliers, and can easily add and adjust supplier information as needed.
- **Make —** This step is fairly self-explanatory. At this stage in the cycle, your team and digital tools should be focused on performing the necessary steps and operations to manufacture the product from raw materials.
- **Deliver —** The delivery stage involves more direct interaction and engagement with your customer. After making the product or service, organizations need to have a process in place to help deliver the order to the customer. Digital supply chain management tools help to make this stage more efficient by granting both parties access to the necessary information and by facilitating a space for open and honest communication. Your best bet to a happy customer is to not only fulfill your order promise but to create a buying experience that is enjoyable and free from miscommunication.
- **Return —** The return stage is part of the digital supply chain management process that involves relationship management. The relationship you have with your suppliers can have direct benefits on the efficiency and productivity of your supply chain. You want to ensure that your buyers see value from your relationship and have an enjoyable experience working with you. In this stage, supply chain managers need to plan out processes for returning or replacing defective products, what steps will be taken if a process is not fulfilled correctly, or any other potential roadblocks you may encounter.

Challenges Of Adopting Digital Supply Chain Management

As with any new tool or process, organizations might face some hurdles to implementation or objections from their team. While these barriers may create a challenge initially, they are easily outweighed by the benefits of an integrated digital supply chain management system.

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Below are the most common issues organizations face when considering utilizing a digital supply chain management platform:

- **Low acceptance initially —** Getting employees and executive leadership on board can be a tricky task. What can be even trickier is getting your team excited about training for a new platform or tool. Employees and suppliers have an aversion to change, and it will take some effort to overcome their initial objections. While some people will initially be unwilling to turn over control of their supply chain to digital tools, you can take comfort in knowing this is a common hurdle many organizations face. With time and gentle nudging, your team and suppliers will see the benefit of implementing a digital supply chain management strategy.
- **Lack of cooperation —** Often, performance is measured for departments based on isolated factors like order completion, units produced, on-time delivery, or cost per piece. What this means is that performance metrics often create solid departments that are focused on hitting their personal benchmarks. This silo-based procurement, inventory, and maintenance process create internal conflicts within an organization.
- **Implementation Costs**: Initial investment in digital technologies can be high, potentially deterring smaller businesses.
- **Data Privacy and Security:** The use of digital tools raises concerns about data management and protection.
- **Change Management:** Transitioning from traditional to digital systems requires cultural shifts and employee training.

These challengespositively can be overcome when organizations commit to implementing digital supply chain management tools. By offering support and training to your team and suppliers, you can create a resilient and efficient integration.

Advantages Of Digital Supply Chain Management

As business operations expand globally and organizations embrace and implement digital tools in their existing processes, digital supply chain management strategies become even more necessary. While some businesses might be hesitant to transition to a fully digital supply chain platform, the benefits of digitization far outweigh any potential costs. Digital supply chain management provides many helpful benefits for organizations such as:

Enhanced collaboration

When organizations embrace the support of digital tools, their supply chain benefits from enhanced collaboration. With more and more businesses being

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conducted in a digital format, businesses need to find solutions that support the move towards digitization. Alongside heightened collaboration, digital supply chain management also reduces the likelihood of departments undergoing a "data silo effect". By sharing transaction information among internal and external teams, digital supply chain management helps to create a unified, shared view of the entire supply chain process through one singular portal.

Automation capabilities

Automation is the key to an effective supply chain in our modern age. By reducing the amount of manual input that is needed, digital supply chain management tools and strategies create an end-to-end digital platform built around efficiency. Supply chain professionals can automate tedious tasks, saving themselves time and energy while also reducing the likelihood of manual errors. Other benefits that organizations might see when implementing digital supply chain management strategies are improved data accuracy and increased supply chain speed.

Better data analytics

Without access to clear and timely data, your supply chain and business relationships will suffer. Organizations need clear information in an easily accessible location in order to plan ahead and make informed decisions. Today's analytics and data are more useful than you might know. Nowadays, digital supply chain management tools have features that can spot problem patterns, identify bottlenecks and pinpoint savings and cost-reduction opportunities, watch for imminent and future risks and recommend proactive solutions, and enable real-time transactional reporting. What does this mean? It means you and your partners will have access to real-time data that facilitates stronger relationships, enables better decision-making, and allows for proactive planning.

Environment Impact Of Digital Supply Chain

Sustainable supply chain management (SSCM) and digital technologies can help organizations improve their performance and create a more sustainable future in the following ways;

Reduce environmental impact: Companies can incorporate green practices into their supply chains to reduce the negative impact of their products and activities on the environment.

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Improve operational performance: Digital technologies can help improve operational performance by lowering barriers and facilitating digital-based supply chain integration.

Improve competitiveness: Companies can use sustainable practices and digital technologies to gain a competitive advantage.

Improve customer satisfaction: Companies that adopt green practices can improve customer satisfaction.

Improve social wellbeing: Companies can use sustainable practices to enhance societal wellbeing.

Drive economic development: Companies can use sustainable practices to drive economic development.

Improve access to resources: Scaling up sustainable businesses can give governments access to resources, expertise, and technologies to improve environmental and social circumstances.

STRATEGIES TO REDUCE THE IMPACT OF TRADITIONAL SUPPLY CHAIN ON THE ENVIRONMENT

To reduce these impacts, companies should take a holistic approach and consider every aspect of their operations and supply chain. Below are some strategies that can help companies reduce their environmental impact and work toward sustainability in these areas.

Optimizing transportation

Transportation of goods is a significant contributor to carbon emissions, especially road transportation. The high volume of vehicles on the road, combined with the long distances and heavy loads, results in a significant amount of greenhouse gas emissions. However, to reduce emissions, companies can optimize transportation by choosing the most fuel-efficient modes of transport, such as rail, and consolidating shipments to reduce the number of vehicles on the road. In addition, by using GPS and route optimization software, companies can determine the most efficient routes, avoid unnecessary empty runs, and generally make freight forwarders more efficient through digitalization. Using fuel-efficient vehicles can also help a transportation company reduce its environmental footprint. Companies can invest in newer, fuel-efficient trucks or retrofit older vehicles with aerodynamic features, low rolling resistance tires and other fuel-saving technologies.

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Environmentally friendly driving

By encouraging their drivers to drive in an environmentally friendly manner, companies can significantly reduce fuel consumption and emissions. Eco-friendly driving includes driving at moderate speeds, reducing idling time, avoiding hard acceleration and braking, and maintaining proper tire pressure. Avoiding traffic congestion and other obstacles can also result in significant fuel savings.

Monitoring the carbon footprint

To track progress and identify areas for improvement, companies should monitor and reduce their carbon footprint. This includes measuring carbon emissions throughout the supply chain and identifying opportunities to reduce emissions, such as by improving energy efficiency, shortening transportation distances, or using renewable energy sources.

Using renewable energy and alternative fuels

Environmental impacts can also be reduced by using renewable energy sources such as solar or wind power. Installing solar panels on the roof of a company's warehouse or offices can help generate electricity for electric truck charging stations. Fuels such as electricity or even Bio-natural gas (CNG) and Bio-liquefied natural gas (LNG) have lower emissions of carbon and other pollutants than traditional diesel.

Reducing waste and using environmentally friendly packaging

The production of packaging and other materials can generate significant amounts of waste that may not be recyclable or biodegradable. This waste can have a significant impact on the environment, including pollution and depletion of natural resources. Packaging is thus another major source of waste and environmental impact in supply chain management, logistics and freight forwarding. Companies can reduce packaging waste by using recyclable or biodegradable materials and optimizing packaging design to reduce the amount of material needed so that packaging is more efficient and lightweight.

Partnerships with sustainable suppliers

To truly reduce environmental impact, companies must also promote sustainability throughout their supply chain. Trucking companies can partner with suppliers that emphasize sustainability, such as those that use renewable energy, reduce waste, select environmentally friendly products and materials, and generally prioritize environmental stewardship. This can help reduce the environmental impact of the entire supply chain.

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Mindful land use

The construction of warehouses, distribution centers and other facilities can have a significant impact on land use. In areas where land is scarce, the construction of such facilities can lead to deforestation, habitat destruction, and other environmental problems.

Introducing environmentally friendly warehousing

Warehouses can be a significant source of energy consumption and greenhouse gas emissions. To reduce these impacts, companies can adopt environmentally friendly warehousing practices, such as energy-efficient lighting, heating, and cooling systems; optimized warehouse layouts to shorten transportation distances; and the use of renewable energy sources such as solar panels.

2.2 Theoretical Framework

This study is anchored on the Natural Resource-Based View (NRBV) theory; is a management theory that focuses on how environmental practices can help organizations achieve a sustainable competitive advantage. It was developed by Hart in 1995 and is an extension of the Resource-Based View theory. The natural resource-based view (NRBV) integrates the constraintsimposed by the natural environment to conceptualize resources(Hart, 1995). The focus is put on pollution prevention to minimize harms to the environment. The theory aims to gain a sustainable competitive advantage. An organization can sustain its competitive advantage only through an extensive resource analysis, resource allocation, and cross-functional resource usage.

The Natural Resource-Based View (NRBV) theory is a framework for environmental management that focuses on how a business can achieve a sustainable competitive advantage through its relationship with the natural environment: NRBV theory emphasizes the importance of environmental practices and ecological sustainability in strategic resource management. NRBV theory aims to examine how resources can lead to competitive advantages while also having positive outcomes for the natural environment. It identifies three strategies that can lead to sustainable competitive advantage:

Pollution prevention: Reducing waste and emissions through the production process

Product stewardship: Integrating the "voice of the environment" into the product design and development process

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Sustainable development: Working towards sustainable development .considers resources that are not fully controlled by the firm, such as green suppliers.

In relation to study, this theory is related with the current study as both encourages sustainable competitive advantage through positive relationship with the natural environment

2.3 Empirical Review

Rudnicka (2016) recommended sustainability practices across supply chains, which included: assuring suppliers support, orientation,cognition, conceptualize supply chain and commonality and supply chain measurement.

However, Schaltegger et al.(2014) focused on environmental sustainability and put more emphasis on CSR reports. Their findings were supported tointegrate and improve triple bottom line within ten dimensions. These ten dimensions include: internal supply chain, externalenvironment, institutional pressure, health and safety, community focus, energy, risk management, measures, customer orientation,and go-green. Moreover, Schaltegger et al. (2014) developed a framework that support the relationship betweenorganization's sustainability performance and sustainable supply chain management. Results assure that entrepreneurial activitiesand strategic procurement had significant impacts on improving sustainability and sustainable supply chain management.

Many approaches and methods have been used to measure environmental and social along with profitability in thesupply chain management. Even though there are no common reporting standards for these metrics. However, some studieshave been found to recommend adopting TBL approach in sustainable supply practices and organizational sustainability whichaddress social and environmental issues along economic issues.

Arora (2014) examined the strategic orientation of the sustainablesupply chain, and developed a model by examining a 7-strategies for sustainable supply chain using the triple bottomline approach. Ortas et al. (2014) aimed to create integrated values and they not only focused on economic values by maximizingprofits, but also adopted a stronger responsibility to create social values which includes: offering good jobs, imposeequality and quality training and encourage innovations, while the environmental values include: responsible consumption,renewable energy and clean water and sanitation, by maximizing positive impact while minimizing negative impact.

Yun etal., (2018) and Alzoubi and Ahmed (2019) recommended three dimensions of implementing triple bottom line approach insustainable supply chain

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management including: maximizing economic benefits, minimizing negative effect on environmentand benefits to society.

3.1 **Methodology**

The research design of this study is considered as an empirical, exploratory and descriptive study, where we attempt to understand the causes and effects among the sustainable digital supply chain strategies and environmental impact. The study aimed to empirically investigate the direct and indirect effects of sustainable digital supply chain strategies as perceived by managers on the environment at Nestle Nig. Plc.

Population and Sample

The study population arethe distribution department of Nestle Nig. Plc. in Nigeria that involve in distribution of Nestle Products around the state. The study has followed a comprehensive sample by considering all distribution department of Nestle branches in Nigeria. The unit of analysis consisted of all top managers in the surveyed branches and175 valid questionnaires wereused for data analysis.

4.1 Data Analysis

A statistical SmartPLS software package was used to analysis the data in order to understand the direct and indirect effect ofsustainable digitalsupply chain strategies on the environment at Nestle Nig. Plc in Nigeria. The questionnaire wasconsidered as the study tool to measure the study variables and it was constructed on a five-point Likert-type scale withanchors of (1 = 'strongly disagree') and (5 = 'strongly agree'). However, sustainable digital supply chain strategies were composed of three dimensions (maximize economic benefits, minimize negative effect on environment, and maximize benefits to society) and was assessed with 12 items. Supply chain collaboration variable was composed of three dimensions (supplier collaboration, internal collaboration and customer collaboration) and was assessed with 12 items.

Exploratory factor analysis was used to describe and examine the measures. Cronbach's alpha was also used to measure the consistency of each part of the measure, varimax rotation of exploratory factor analysis helped to determine which questions considered to be best to measure the study variables and dimensions. Cronbach's alpha coefficient was used to examine the internal consistency. Table 1 shows acceptable levels of reliability to all study constructs, where the reliability coefficient was ranging between 0.778 and 0.878, and all constructs were above (0.7) (Hair et al., 2010), this indicator helps us learn about that the design and the

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scale of the questionnaire and whether the items in the questionnaire were able to represent each variable of the study.

Table 1
Cronbach's Alpha Coefficient for Study variables

Item	Dimension	Mean	Standard Deviation	Level of Importance
1	Maximize economic benefits	3.15	0.731	Medium
2	Minimize negative effect on environment	3.22	0.801	Medium
3	Maximize benefits to society	2.98	0.894	medium

5.1 Conclusion and Recommendation

CONCLUSION

The integration of digital technologies in supply chain management offers substantial environmental benefits compared to traditional methods. By enhancing efficiency, improving transparency, and reducing waste, digital SCM can significantly lower the environmental impact of supply chains, maximize economic benefits and societal benefits. However, addressing implementation challenges is vital for maximizing these benefits.

RECOMMENDATIONS

The study thus recommend as follows;

Investment in Technology: businesses should be encouraged to invest in sustainable technologies for long-term benefits.

Collaboration Across Supply Chains: Foster partnerships between stakeholders to enhance sustainability efforts.

Continuous Improvement: Implement a feedback loop to regularly assess and improve sustainability initiatives within the supply chain.

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SOCIAL INEQUALITIES AND LABOR MARKET TRANSFORMATIONS IN THE DIGITAL ECONOMY: A COMPARATIVE SOCIO-ECONOMIC ANALYSIS BETWEEN ITALY AND ROMANIA

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Abstract

The digital economy has profoundly transformed labor markets, production systems, and social relations across Europe. While technological innovation has generated new opportunities for productivity and economic growth, it has simultaneously intensified structural inequalities linked to education, gender, territory, and social class. This article presents a comparative socio-economic analysis of Italy and Romania, two European Union countries characterized by significant regional disparities, labor market fragilities, and uneven digital development. Through the integration of data from Eurostat, OECD, ISTAT, the European Commission, and contemporary sociological literature, the study examines how automation, artificial intelligence, digital platforms, and remote work are reshaping employment structures and social stratification. Particular attention is devoted to the relationship between technological transformation and labor precariousness, the gender digital divide, youth unemployment, migration of skilled workers, and the emergence of new forms of economic vulnerability. The analysis demonstrates that digitalization does not operate as a neutral process but rather interacts with pre-existing inequalities, often reinforcing territorial polarization and labor fragmentation. Italy and Romania exhibit different trajectories of digital modernization, yet both countries face similar challenges concerning social cohesion, educational

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adaptation, and inclusive economic development. The article concludes by discussing the necessity of integrated public policies aimed at ensuring equitable digital transition, labor protection, lifelong learning, and social inclusion within contemporary European economies.

Keywords: *digital economy; labor market transformation; social inequalities; digital divide; automation; platform work; labor precariousness; social inclusion; Italy; Romania.*

JEL Classification: J21, J24, J31, J81, O33, O15, R11, D63

1. Introduction

The digital transformation of contemporary economies constitutes one of the most significant socio-economic processes of the twenty-first century. Digitalization has modified the organization of production, the structure of employment, communication systems, and the relationship between individuals and labor markets. The emergence of platform economies, artificial intelligence, remote work systems, and automated production processes has accelerated economic globalization while simultaneously redefining social inequalities and labor relations.

The relationship between technological progress and inequality has historically represented a central issue within economic and sociological debates. Industrial revolutions have consistently produced both economic growth and social fragmentation. The contemporary digital revolution reproduces similar contradictions, although in a more complex and globalized context. Digital technologies facilitate innovation, efficiency, and productivity, yet they also intensify labor precarity, occupational polarization, and unequal access to opportunities.

Within the European Union, Italy and Romania represent particularly relevant case studies for understanding the socio-economic implications of digital transformation. Both countries experience persistent regional inequalities, labor market instability, demographic decline, and significant disparities in digital competencies. However, they also differ considerably in terms of economic structure, historical development, and technological integration. Italy remains one of the largest industrial economies in Europe, yet it suffers from slow digital adaptation and strong territorial imbalances between the North and the South. Romania, on the contrary, has experienced rapid economic growth in the

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technological and outsourcing sectors, while continuing to face structural vulnerabilities related to poverty, migration, and educational inequalities.

The digital economy therefore emerges as a contradictory process capable of generating modernization while simultaneously reinforcing forms of exclusion. The comparative analysis developed in this article aims to investigate how digital transformation interacts with labor market structures and social inequalities in Italy and Romania. The study adopts an interdisciplinary approach integrating sociology, economics, labor studies, and digital governance perspectives.

2. Digital capitalism and the transformation of labor

The emergence of digital capitalism represents one of the most radical socio-economic transformations of contemporary societies. Unlike industrial capitalism, which was primarily based on the ownership of physical means of production, digital capitalism is characterized by the centrality of immaterial assets such as algorithms, data, cloud infrastructures, artificial intelligence systems, and digital communication networks. Within this paradigm, economic value is increasingly generated through the extraction, processing, and commercialization of information flows. Labor itself becomes progressively dematerialized, fragmented, and algorithmically managed.

Manuel Castells conceptualized this transformation through the notion of the "network society," emphasizing how digital infrastructures reorganize social relations, production systems, and labor dynamics on a global scale. In network societies, economic competitiveness depends less on territorial proximity and more on informational connectivity and technological integration. Consequently, labor markets become transnational systems regulated by digital platforms capable of coordinating millions of workers simultaneously across different geographical contexts.

The transition from industrial to digital capitalism may be analytically represented through the progressive decline of stable Fordist employment models and the simultaneous growth of flexible and platform-based labor structures.

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Figure 1. Historical transformation of labor models (1980–2025)

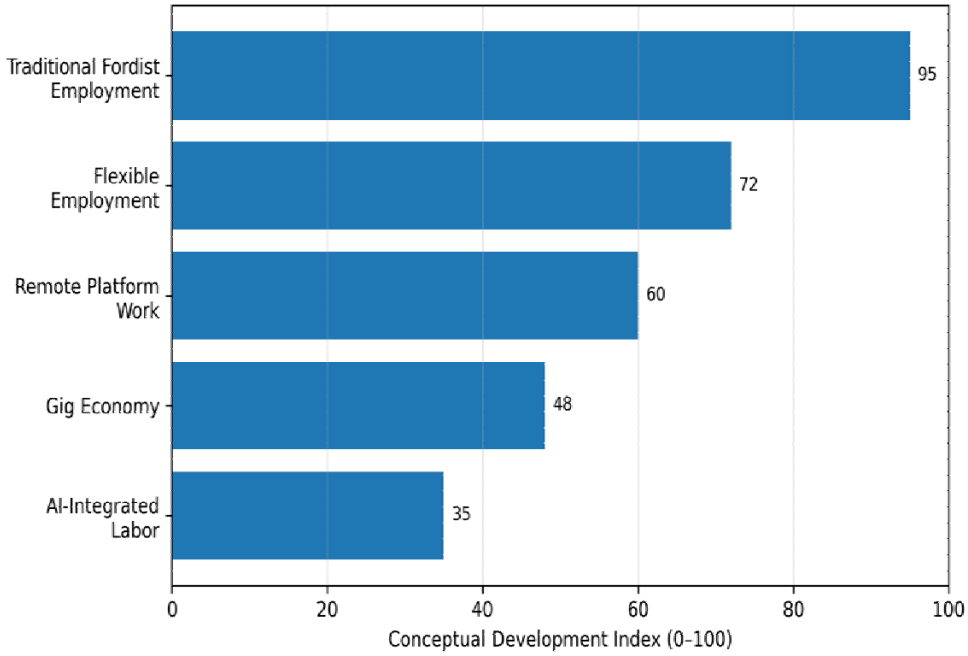


Figure 1. Historical transformation of labor models (1980–2025). *Conceptual representation of the progressive transition from traditional Fordist employment toward increasingly flexible, platform-based, and AI-integrated labor models. Values represent a conceptual index (0–100) used exclusively for comparative visualization.*

The digital economy differs substantially from previous economic systems because production increasingly depends upon the circulation and monetization of data. In industrial capitalism, labor productivity was directly connected to mechanization and physical production capacity. In digital capitalism, by contrast,

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productivity is associated with computational efficiency, predictive analytics, algorithmic optimization, and the capacity to automate cognitive processes.

This transformation profoundly affects occupational structures. Artificial intelligence systems progressively replace repetitive cognitive tasks previously associated with administrative work, logistics management, customer service, accounting, and information processing. Simultaneously, robotics and automation technologies reduce the demand for routine manual labor in manufacturing and transportation sectors.

The relationship between automation and employment may be mathematically conceptualized through a labor substitution function:

$$L_t = L_0 - \alpha A_t$$

where:

- L_t represents labor demand over time,
- L_0 indicates initial labor demand,
- A_t represents the level of automation adoption,
- α expresses the elasticity of labor substitution.

The formula demonstrates that increases in automation tend to reduce demand for routine labor, particularly within sectors characterized by repetitive operational tasks.

At the same time, automation does not affect all occupational categories equally. High-skilled professions associated with creativity, innovation, strategic coordination, and digital management tend to maintain stronger resilience against technological substitution. Consequently, digital capitalism generates increasing occupational polarization between highly qualified workers and precarious labor groups.

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Figure 2. Occupational exposure to automation

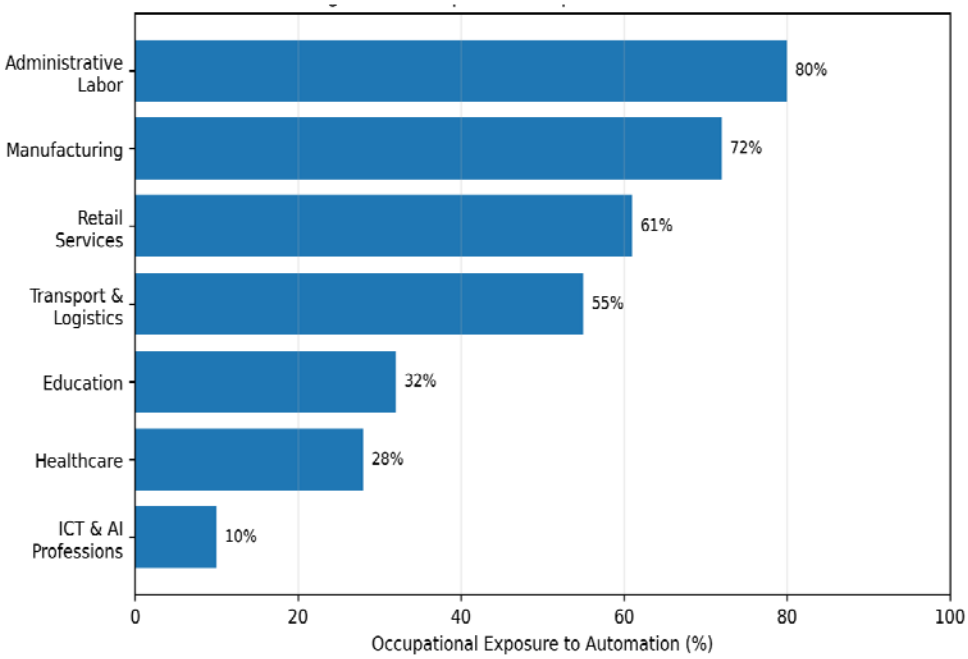


Figure 2. Occupational exposure to automation. *Estimated occupational exposure to automation across major employment sectors. Administrative and manufacturing occupations exhibit the highest automation potential, whereas education, healthcare, and ICT professions remain comparatively less exposed due to their greater reliance on cognitive, interpersonal, and creative competencies.*

This polarization process may also be statistically interpreted through the standard deviation of wage distribution. As digital economies expand, wage inequality increases because highly specialized workers capture disproportionate economic benefits compared with low-skilled labor groups.

The standard deviation of income distribution is expressed as:

$$\sigma = \sqrt{\frac{\sum_{i=1}^{N} (x_i - \mu)^2}{N}}$$

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where:

- σ indicates standard deviation,
- x_i represents individual income values,
- μ corresponds to average income,
- N represents the number of observations.

An increasing standard deviation indicates growing economic inequality within labor markets.

The expansion of digital capitalism also contributes to the concentration of economic power within large technological corporations. Shoshana Zuboff introduced the concept of "surveillance capitalism" to explain how digital corporations extract behavioral data from users and transform personal information into economic commodities. Within this model, individuals simultaneously become consumers, workers, and data producers.

Digital labor platforms such as delivery applications, freelance marketplaces, and ride-sharing services operate through algorithmic management systems capable of assigning tasks, monitoring productivity, evaluating worker performance, and determining compensation through opaque computational mechanisms. Consequently, labor relations become increasingly mediated by software systems rather than traditional managerial hierarchies.

The algorithmic regulation of labor may be represented through a productivity optimization function:

$$P = f(A, D, T) = \beta_1 A + \beta_2 D + \beta_3 T$$

where:

- P represents labor productivity,
- A corresponds to algorithmic monitoring intensity,
- D indicates data extraction capacity,
- T represents technological efficiency,
- $\beta_1, \beta_2, \beta_3$ express the relative influence of each variable.

The formula illustrates how digital platforms maximize productivity through the integration of surveillance systems, real-time data collection, and technological optimization.

The socio-economic consequences of these transformations are particularly evident in the emergence of precarious labor conditions. Guy Standing's theory of

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the "precariat" becomes highly relevant within contemporary digital economies. Flexible contracts, temporary employment, freelance arrangements, and platform-based work contribute to the creation of economically insecure workers characterized by unstable incomes, weak social protections, fragmented professional identities, and reduced collective bargaining capacity.

The growth of precarious labor may be statistically visualized through the distribution of employment security levels across digital economies.

Figure 3. Employment security in digital labor markets

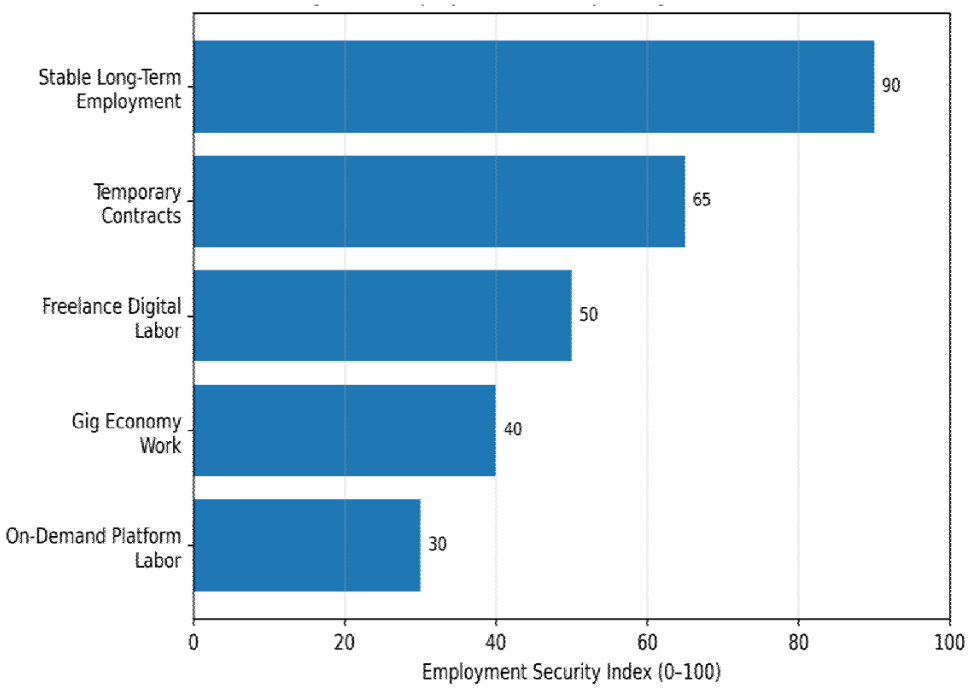


Figure 3. Employment security in digital labor markets. *Conceptual representation of employment security across different forms of labor in contemporary digital economies. Traditional long-term employment provides the highest level of job stability, whereas platform-based and on-demand work is characterized by greater employment insecurity. Values represent a conceptual*

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employment security index (0–100) and are intended exclusively for comparative visualization.

The fragmentation of labor structures also produces profound psychological and sociological consequences. Traditional industrial employment historically provided stable social identities, collective solidarity, and long-term professional trajectories. By contrast, digital labor markets increasingly reward flexibility, continuous adaptation, and individual competitiveness. Workers therefore experience growing uncertainty concerning career stability, income predictability, and social mobility.

This condition may be represented through a Gaussian distribution curve illustrating income polarization within digital economies.

Figure 4. Gaussian distribution of income polarization in digital capitalism

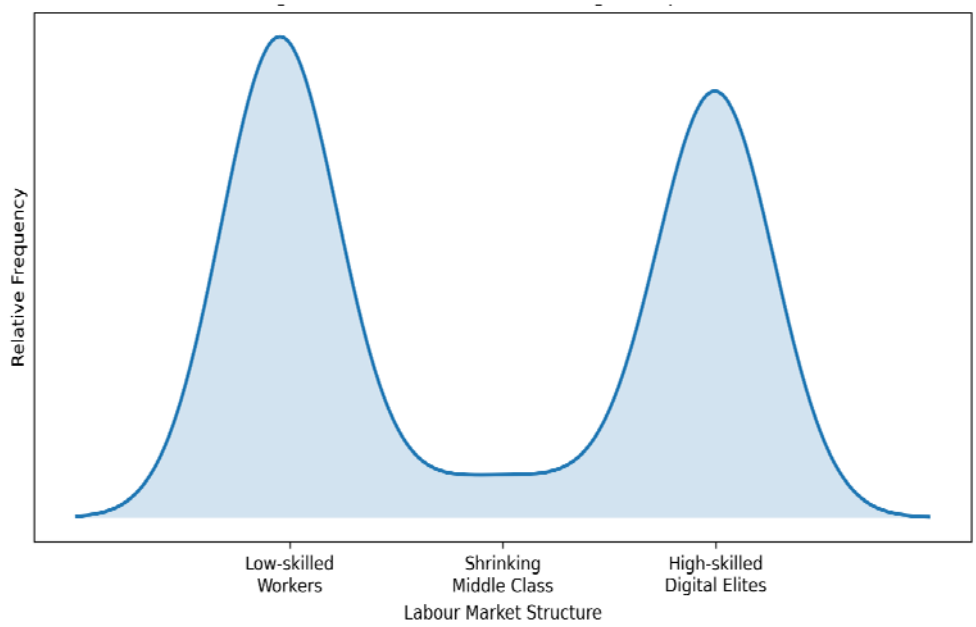


Figure 4. Income polarization in digital capitalism. *Conceptual illustration of labour market polarization associated with digital capitalism. The distribution highlights the contraction of the traditional middle class alongside the growing concentration of workers in low-skilled occupations and highly qualified digital professions. The figure is intended as a theoretical representation and does not correspond to an empirical statistical distribution.*

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The Gaussian curve demonstrates how the traditional middle class progressively contracts while income concentration increases among highly specialized technological elites. Simultaneously, large segments of low-skilled workers experience wage stagnation and precarious employment conditions.

The phenomenon of labor market polarization may also be analytically represented through a bimodal distribution model:

$$f(x) = \frac{1}{\sqrt{2\pi\sigma_1^2}} e^{-\frac{(x-\mu_1)^2}{2\sigma_1^2}} + \frac{1}{\sqrt{2\pi\sigma_2^2}} e^{-\frac{(x-\mu_2)^2}{2\sigma_2^2}}$$

$sigma_1$

mu_1

$sigma_2$

mu_2

This equation models the coexistence of two distinct labor groups:

- highly paid digital professionals,
- precarious low-income workers.

The disappearance of intermediate occupational categories constitutes one of the defining characteristics of digital capitalism.

The expansion of remote work further intensifies these transformations. Digital communication technologies enable transnational labor coordination independent of physical workplaces. Consequently, companies increasingly recruit workers through global labor markets, reducing territorial constraints while simultaneously intensifying international wage competition.

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Figure 5. Expansion of remote digital labor (2010–2025)

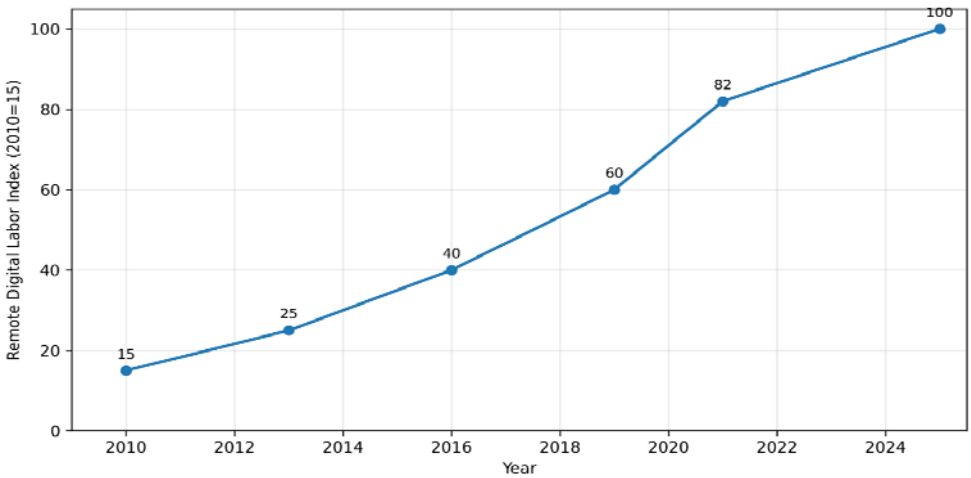


Figure 5. Expansion of remote digital labor (2010–2025). *Conceptual trend illustrating the rapid expansion of remote digital labor between 2010 and 2025. The figure highlights the acceleration of remote work adoption, particularly following the COVID-19 pandemic, and uses a conceptual index for comparative visualization rather than official statistical values.*

The COVID-19 pandemic accelerated this process dramatically, normalizing hybrid and remote organizational systems. However, access to remote work remains highly unequal because it depends on educational level, digital competencies, occupational sector, and technological infrastructure.

Ultimately, digital capitalism transforms not only production systems but also the sociological foundations of labor itself. Employment increasingly becomes fragmented, individualized, and algorithmically regulated. Technological innovation simultaneously generates productivity growth and social inequality, creating new hierarchies structured around access to digital competencies, informational resources, and technological infrastructures.

The transformation of labor within digital capitalism therefore cannot be interpreted exclusively as an economic phenomenon. It represents a broader

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reconfiguration of power relations, social stratification mechanisms, and collective identities within technologically mediated societies.

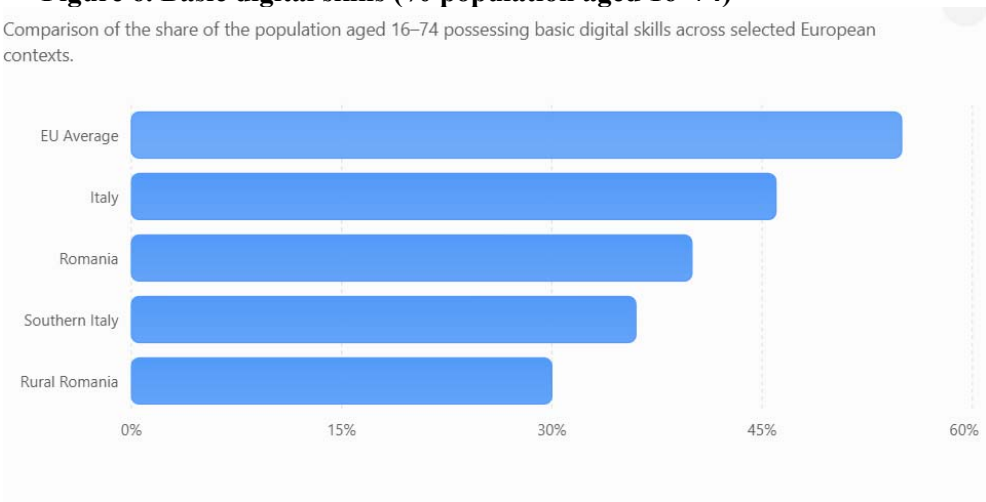
3. Italy and Romania within the European digital economy

Italy and Romania occupy distinct yet interconnected positions within the European digital landscape. Both countries are integrated into European Union digital policies and modernization programs, yet they display significant structural differences concerning productivity, innovation capacity, educational systems, and labor market organization.

Italy remains one of the largest economies in Europe, with a strong manufacturing tradition and extensive industrial districts. Nevertheless, the country continues to experience slow technological modernization, weak digital literacy, and persistent regional inequalities. According to Eurostat data, Italy remains below the European average concerning digital competencies, artificial intelligence adoption, and adult participation in lifelong learning programs.

Romania, conversely, has become one of Eastern Europe's most dynamic technological hubs, particularly in the ICT outsourcing sector. Bucharest, Cluj-Napoca, and Timisoara have attracted multinational digital companies and foreign investment. However, these technological advancements coexist with widespread rural poverty, labor migration, and educational inequalities.

Figure 6. Basic digital skills (% population aged 16–74)



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Figure 6. Basic digital skills (% population aged 16–74). *Comparison of the percentage of individuals aged 16–74 possessing at least basic digital skills across selected European contexts. The figure highlights the persistent digital divide between the European Union average, Italy, Romania, Southern Italy, and rural Romania, emphasizing the territorial disparities that continue to influence access to digital labour markets and digital inclusion.*

The digital divide represents one of the most important socio-economic challenges for both countries. Access to digital infrastructure alone is insufficient if populations lack educational resources, technological competencies, and economic security necessary to participate effectively in digital labor markets.

In Italy, the divide between Northern and Southern regions significantly affects employment opportunities and innovation capacities. Northern industrial regions benefit from stronger infrastructures, higher educational levels, and greater integration into international markets. Southern regions continue to suffer from unemployment, youth emigration, and lower technological investment.

Romania exhibits a similar polarization between urban technological centers and marginalized rural areas. While urban ICT sectors demonstrate strong growth, rural communities often lack adequate infrastructure, educational resources, and digital access.

4. Labor market polarization and automation

Automation constitutes one of the central dynamics of digital transformation. Artificial intelligence systems, robotics, and algorithmic management increasingly replace routine tasks within manufacturing, logistics, administration, and services. The consequences of automation are highly differentiated according to educational levels, occupational categories, and territorial contexts.

Low-skilled workers are particularly exposed to technological substitution because routine activities are more easily automated. Administrative employees, manufacturing workers, retail operators, and transport workers face growing risks of occupational displacement. By contrast, professions requiring creativity, strategic thinking, emotional intelligence, and advanced technological competencies remain more resistant to automation.

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Figure 7. Occupations most exposed to automation

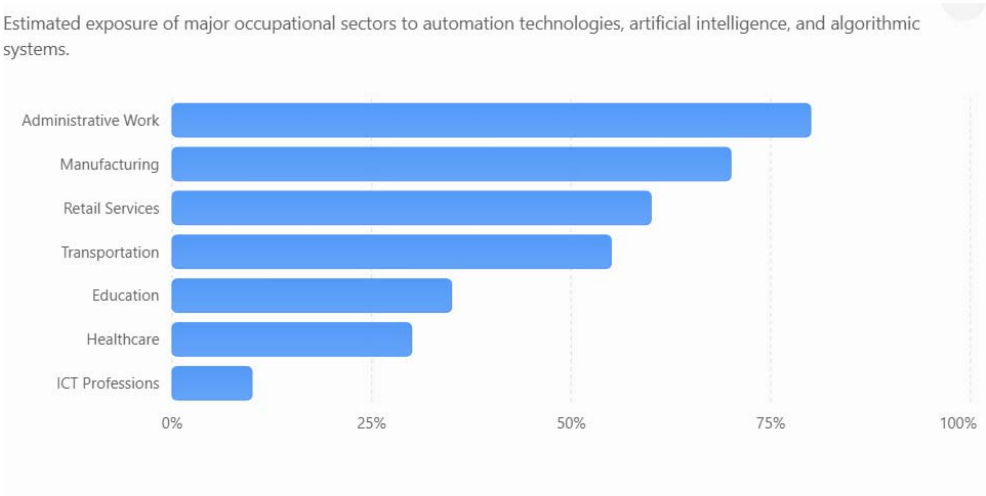


Figure 7. Occupations most exposed to automation. *Estimated exposure of major occupational sectors to automation technologies. Administrative work and manufacturing display the highest automation potential due to the predominance of routine and repetitive tasks, whereas education, healthcare, and ICT professions remain comparatively less exposed because they rely more heavily on cognitive, interpersonal, and creative competencies.*

Italy's industrial structure renders certain regions particularly vulnerable to automation. Traditional manufacturing sectors increasingly adopt robotics and AI systems to remain competitive within global markets. While productivity may improve, labor demand often decreases, particularly for medium-skilled workers.

Romania experiences a more contradictory process. On the one hand, technological sectors create employment opportunities for young educated workers. On the other hand, low wages and labor informality continue to characterize large portions of the economy. Automation risks may therefore intensify social fragmentation if labor protections remain weak.

The labor market polarization generated by digitalization contributes to increasing income inequality. High-skilled professionals benefit from rising wages and global mobility, while precarious workers experience unstable incomes and limited social mobility.

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Figure 8. Wage polarization in the digital economy

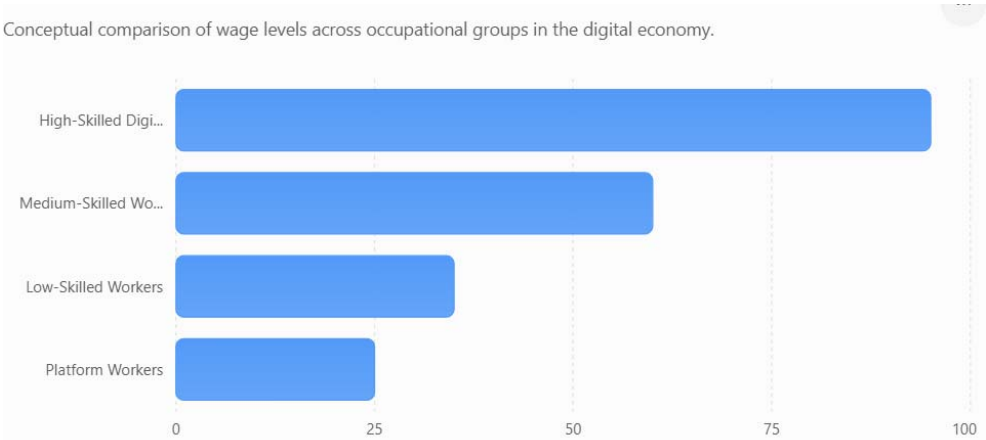


Figure 8. Wage polarization in the digital economy. *Conceptual representation of wage polarization across major occupational groups within the digital economy. High-skilled digital professionals capture a disproportionate share of economic gains, whereas medium-skilled, low-skilled, and platform workers experience progressively lower income levels. Values represent a conceptual wage index (0–100) for comparative visualization and do not correspond to official statistical measurements.*

The concentration of economic benefits among technologically skilled groups raises important questions concerning distributive justice and social cohesion.

5. Platform economies and new forms of precariousness

The growth of digital platforms has profoundly transformed labor organization. Food delivery services, ride-sharing applications, online freelance platforms, and remote digital marketplaces create new forms of employment characterized by flexibility and algorithmic management.

Platform work is frequently presented as a source of autonomy and entrepreneurial freedom. However, empirical research demonstrates that many platform workers experience unstable incomes, long working hours, weak social protections, and algorithmic surveillance. The absence of traditional labor contracts

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often limits access to healthcare, pensions, unemployment benefits, and collective bargaining mechanisms.

Italy has experienced rapid growth in delivery platforms and freelance digital services, particularly among young workers affected by unemployment and labor market instability. Many workers enter platform economies not because of entrepreneurial aspirations but due to limited alternatives within traditional labor markets.

Romania has become increasingly integrated into transnational outsourcing systems. Remote digital work enables Romanian professionals to participate in global labor markets, yet wage differentials and unequal bargaining power persist. Highly skilled workers may benefit from international contracts, while low-skilled platform workers remain economically vulnerable.

The diffusion of platform labor contributes to the normalization of economic insecurity. Digital capitalism therefore generates forms of labor flexibility that frequently transfer risks from employers to workers.

Figure 9. Characteristics of labor platform

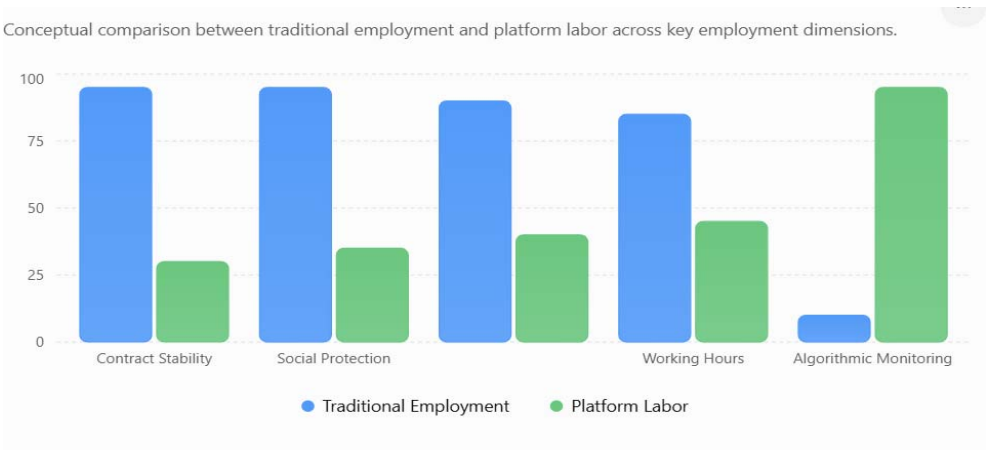


Figure 9. Characteristics of labor platform. *Conceptual comparison between traditional employment and platform labor across five key dimensions. Traditional employment is characterized by higher contractual stability, stronger social protection, greater income predictability, and more regulated working hours. In contrast, platform labor exhibits lower employment security and substantially*

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higher levels of algorithmic monitoring. Values represent a conceptual employment quality index (0–100) developed exclusively for comparative visualization.

6. Gender inequalities in digital labor markets

The digital economy does not eliminate gender disparities. On the contrary, technological labor markets often reproduce structural inequalities linked to education, family responsibilities, occupational segregation, and wage discrimination.

Italy and Romania both display significant gender employment gaps. Female participation in labor markets remains below European averages, particularly in technologically advanced sectors. Women continue to be underrepresented within STEM disciplines, engineering professions, and managerial positions.

Figure 10. Female employment rates

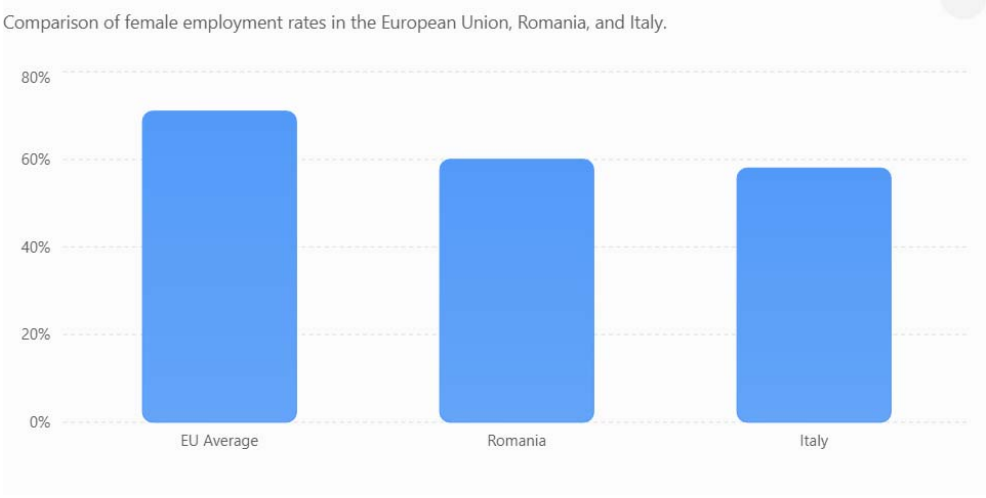


Figure 10. Female employment rates. *Comparison of female employment rates in the European Union, Romania, and Italy. Both countries remain below the European Union average, highlighting persistent gender disparities in labour market participation despite ongoing digital transformation and economic modernization.*

Digital labor markets frequently reward continuous availability, mobility, and flexible schedules. These characteristics may disadvantage women who continue to assume disproportionate care responsibilities within households. Remote work systems introduced

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during the COVID-19 pandemic intensified this contradiction by increasing the overlap between professional and domestic labor.

In Romania, rural women face particularly severe disadvantages concerning employment and digital inclusion. Limited educational opportunities, inadequate childcare systems, and infrastructural deficiencies reduce access to digital labor markets. Italy experiences similar patterns, especially in Southern regions characterized by lower female employment and weaker technological integration.

Figure 11. Women in STEM occupations

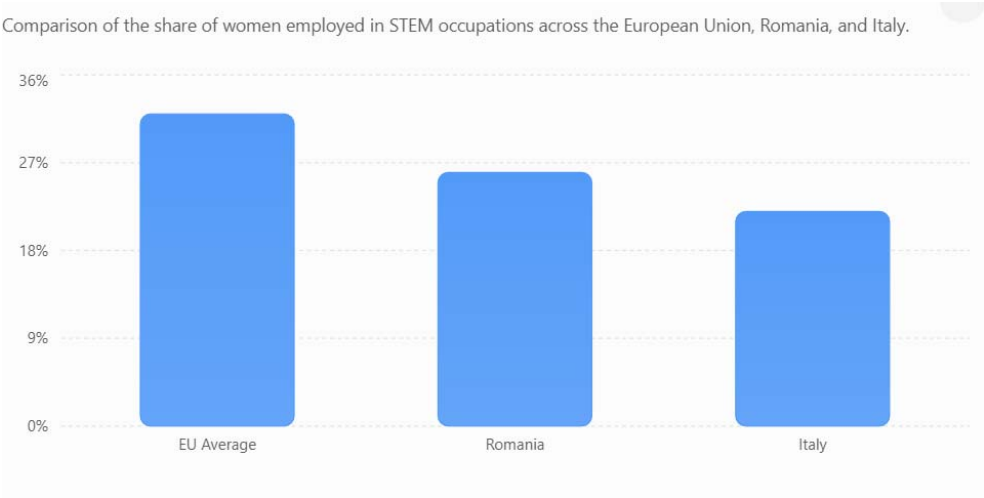


Figure 11. Women in STEM occupations. *Comparison of the percentage of women employed in science, technology, engineering, and mathematics (STEM) occupations across the European Union, Romania, and Italy. The figure illustrates the persistent underrepresentation of women in STEM careers, with both Italy and Romania remaining below the European Union average.*

The persistence of gender inequalities within digital economies demonstrates that technological innovation alone cannot transform deeply rooted social structures.

7. Regional disparities and territorial polarization

Digital transformation interacts strongly with territorial inequalities. Technological infrastructures, educational institutions, and innovation ecosystems

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are unevenly distributed across regions, contributing to new forms of spatial exclusion.

Italy's North-South divide represents one of the most persistent territorial inequalities in Europe. Northern regions benefit from stronger industrial networks, advanced research centers, and higher levels of digital investment. Southern Italy experiences lower productivity, weaker infrastructures, and higher unemployment rates.

Figure 12. Digital competencies by Italian region

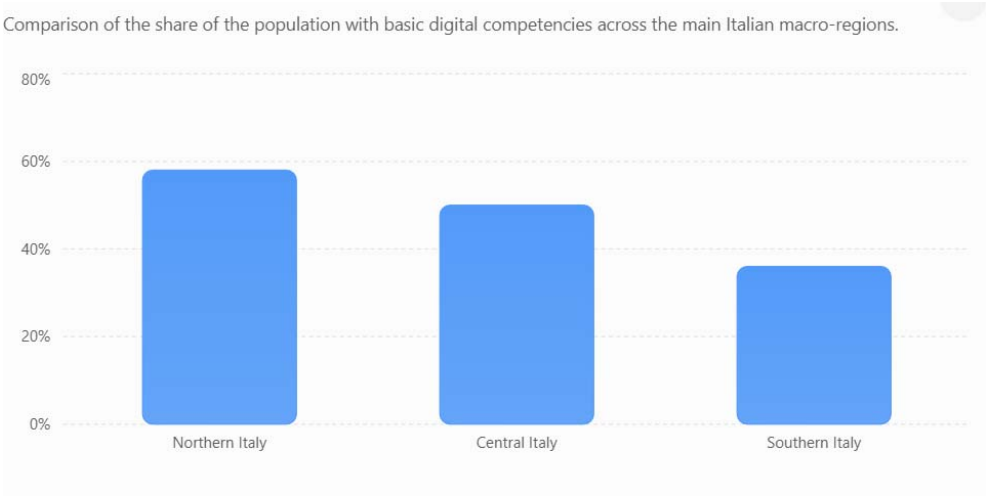


Figure 12. Digital competencies by Italian region. *Comparison of the percentage of individuals possessing at least basic digital competencies across the main Italian macro-regions. Northern Italy records the highest level of digital competencies, followed by Central Italy, whereas Southern Italy continues to display a substantial digital skills gap, reflecting persistent territorial inequalities in education, technological infrastructure, and labour market opportunities.*

Romania exhibits a similar urban-rural polarization. Major cities attract technological investment and skilled labor, whereas rural regions remain marginalized within digital development processes.

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Figure 13. Romania: urban-rural employment gap

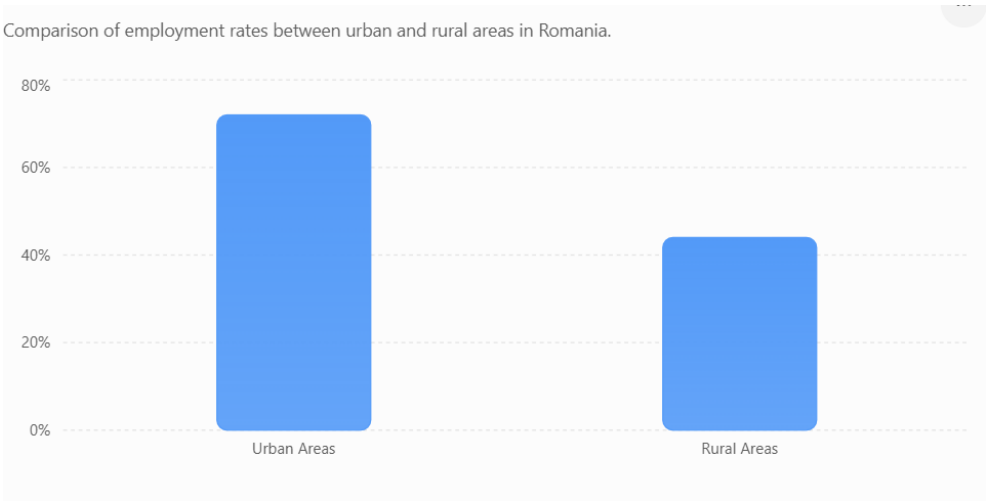


Figure 13. Romania: urban–rural employment gap. *Comparison of employment rates between urban and rural areas in Romania. The figure highlights the substantial territorial disparity in labour market participation, reflecting differences in economic development, educational opportunities, digital infrastructure, and access to qualified employment. The urban–rural divide represents one of the main structural challenges affecting Romania's inclusive digital transformation.*

Territorial inequalities contribute to migration flows toward metropolitan areas or foreign labor markets. Young educated individuals frequently leave economically disadvantaged regions in search of better opportunities abroad. Consequently, regional disparities become self-reinforcing because peripheral territories lose human capital and innovation capacity.

8. Youth unemployment and skilled migration

Youth represent one of the social groups most affected by digital labor transformations. Young workers often possess stronger technological competencies than older generations, yet they simultaneously experience unstable employment conditions and precarious career trajectories.

Italy continues to experience high levels of youth unemployment despite gradual economic recovery. Temporary contracts, internships, and freelance

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arrangements dominate entry-level employment. Many graduates emigrate toward Northern Europe or North America seeking better salaries and professional opportunities.

Emigration of Young Graduates from Italy was analysed by estimating the annual trend in the emigration of young Italian university graduates. The findings reveal a sustained increase in the emigration of highly skilled individuals, highlighting the continuing phenomenon of brain drain. This pattern is largely driven by the availability of broader career opportunities, higher salaries, and more advanced research and innovation ecosystems in destination countries.

Romania experiences one of the largest migration flows within the European Union. Highly educated workers, including engineers, healthcare professionals, and IT specialists, frequently migrate toward Western Europe. This phenomenon creates labor shortages and demographic imbalances within the national economy.

The digital economy facilitates transnational mobility because remote work systems allow professionals to participate in global markets regardless of physical location. Nevertheless, this flexibility may also weaken local economies if skilled workers disconnect from national labor systems.

9. Education, digital skills, and lifelong learning

Educational systems play a decisive role in determining the capacity of societies to adapt to digital transformation. Digital economies increasingly require advanced competencies related to technological literacy, critical thinking, creativity, and interdisciplinary problem-solving.

Italy and Romania both face difficulties concerning educational modernization and lifelong learning participation. Adult training systems remain underdeveloped compared with Northern European countries.

Figure 14. Participation in adult education programs



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Figure 14. Participation in adult education programs. *Comparison of adult participation in lifelong learning and continuing education programs across the European Union, Italy, and Romania. The figure highlights the substantial gap between Romania and both Italy and the European Union average, emphasizing the need to strengthen lifelong learning policies to support digital transformation, workforce adaptability, and social inclusion.*

Low participation in adult education reduces workforce adaptability and increases vulnerability to technological displacement. Workers lacking digital competencies may experience long-term exclusion from labor markets increasingly organized around technological systems.

Educational inequalities also intersect with social class and territorial disparities. Families with higher economic resources can provide better access to digital devices, private education, and extracurricular technological training. Consequently, digital inequalities frequently reproduce existing socio-economic hierarchies.

10. Artificial intelligence and future labor scenarios

Artificial intelligence constitutes one of the most transformative technologies within contemporary labor markets. AI systems increasingly perform tasks involving language processing, data analysis, predictive modeling, and administrative coordination.

Italy demonstrates relatively slow AI adoption compared with other European economies. Many small and medium-sized enterprises lack the financial resources and technological competencies necessary for advanced digital integration.

Romania exhibits faster growth in certain technological sectors, particularly outsourcing and software development. Nevertheless, structural inequalities limit the diffusion of digital opportunities across broader segments of society.

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Figure 15. Artificial intelligence adoption in enterprises

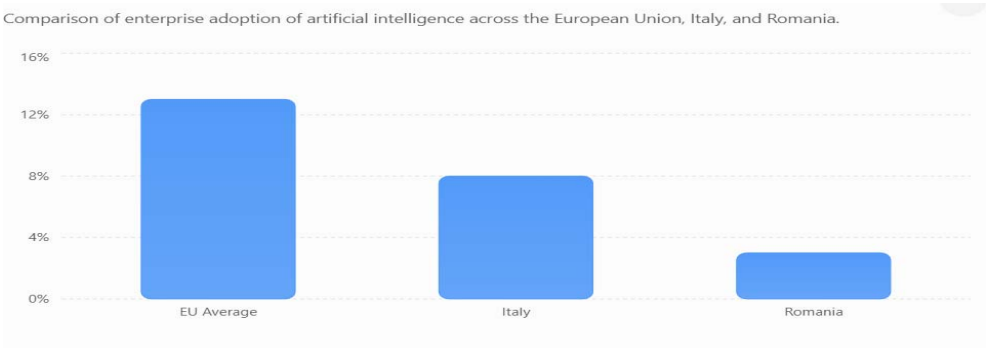


Figure 15. Artificial intelligence adoption in enterprises. *Comparison of the percentage of enterprises adopting artificial intelligence technologies across the European Union, Italy, and Romania. The figure highlights the technological gap affecting both countries, particularly Romania, where AI adoption remains substantially below the European Union average. These differences have important implications for productivity, innovation capacity, and long-term economic competitiveness.*

AI may produce contradictory consequences. Productivity gains and innovation could stimulate economic growth, yet occupational displacement may intensify inequality if redistributive mechanisms remain insufficient. The challenge therefore concerns not only technological development but also democratic governance and social regulation.

11. Social policies and inclusive digital transformation

The socio-economic consequences of digitalization demonstrate the necessity of integrated public policies capable of balancing innovation with social inclusion. Digital transformation cannot be understood exclusively as a technological process because it directly affects labor rights, educational systems, welfare structures, and democratic participation.

Italy and Romania require coordinated investments in digital infrastructure, educational modernization, labor protection, and regional development. Public institutions must support lifelong learning systems capable of facilitating professional adaptation throughout individuals' working lives.

The regulation of platform economies represents another fundamental issue. Gig workers require access to social protections, collective bargaining rights, healthcare systems, and pension contributions comparable to those available within traditional employment models.

Gender equality policies remain equally essential. Expanding childcare services, promoting women's participation in STEM fields, and combating wage discrimination constitute necessary conditions for inclusive digital economies.

Finally, territorial cohesion policies must address regional inequalities through targeted investments in rural and marginalized areas. Without balanced territorial development, digitalization risks intensifying spatial exclusion and demographic decline.

12. Conclusion

The digital economy constitutes one of the most complex socio-economic transformations of contemporary Europe. Italy and Romania illustrate how technological modernization interacts with historical inequalities, labor market structures, educational systems, and territorial disparities.

Digitalization generates opportunities for innovation, productivity, and global integration, yet it simultaneously intensifies labor precarity, occupational polarization, and social fragmentation. The expansion of platform economies, automation systems, and artificial intelligence reshapes employment relations while producing new forms of insecurity and exclusion.

The comparative analysis demonstrates that technological progress does not automatically produce social equality. On the contrary, digital transformation frequently reinforces existing asymmetries linked to class, gender, education, and territory. Italy experiences strong regional divides and slow digital adaptation, whereas Romania combines rapid technological growth with persistent rural marginalization and migration pressures.

The future sustainability of digital economies therefore depends on the capacity of democratic institutions to ensure inclusive modernization processes. Educational reform, labor protection, social investment, and equitable digital access represent essential conditions for reducing inequalities within technologically advanced societies.

Ultimately, the digital transition cannot be evaluated exclusively through economic indicators or productivity growth. Its success must also be measured according to its capacity to promote social cohesion, human dignity, and equitable participation within increasingly interconnected labor markets.

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FUTURE`S DILLEMA- HUMAN RIGHTS IN THE AGE OF CIVILIAN AND MILITARY DRONES

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Abstract

Technology is a reality in the life of the current generation, and its evolution is an indisputable reality. The appearance of drones in the technology of the moment represents progress. From time immemorial, every technological discovery was created and developed for its use by any being for its own good, for simplifying and easing the work of man, etc. In the case of unmanned aerial vehicles, defined as drones and used more and more often in modern aviation, unmanned aerial vehicles or drones proved useful during the Covid 19 pandemic of 2020. Everyone remembers the televised images from China, where drones brought, transported packages of food and medicine, emergency medical products in initially quarantined areas and then in neighborhoods and even cities. 20, 30 years ago, these were images of science fiction films, just as Jules Verne's writings about submarines were classified, in his generation, also in the SF category. Drones were created in the military field (unmanned combat aerial vehicle (UCAV), also known as a combat drone, fighter drone or battlefield UAV) and later expanded in civilian life, their significant potential to create new jobs and economic growth, being recorded in the specific European legislation. The study includes a synthesis of some unwanted events, generated by the use of drones in ongoing conflict situations, but also some stupid accidents that turned into tragedies with loss of human lives; with the aim of drawing attention to the use of drones in civilian life while maintaining the military purpose for which they were created, that of surveillance, with the violation of the right to private life of man.

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Keywords: *Unmanned aerial vehicles, unmanned combat aerial vehicle (UCAV), battlefield UAV, combat drone, fighter drone, drone, AI, military conflict, humanitarian law, right to private life, surveillance, civil, military.*

JEL Classification: K33, K42, O33, H56

Introduction

The topic of using drones in civilian life is welcome and useful. Initially, their use in the military sphere was argued, demonstrating their usefulness, by using them in military conflict zones, to protect the lives of pilots, but also of soldiers who use drones in combat in the field. Obtaining images from the spot, without human intervention in those conflict zones, saved many human lives in the theaters of war where they were used.

The delicate aspects appear when man uses these revolutionary devices in spying without the right of some areas, with interference in the private life of human communities, in peacetime. Thus, the issue of respecting human rights for espionage actions arises when their commercialization is free, and practically any person interested, without right, in the life of another person, can use a drone for research and aerial surveillance of the activity carried out by that person, as a form of unjustified aggression, to later cause him harm. Even if they do it just out of curiosity, without negative intentions, there is the issue of respecting privacy and the right to a private life, protected by all the international regulations in force and by the constitutions of modern states, which are not in dictatorial regimes. Ethical and moral aspects are also relevant in this subject, from the perspective of the training of the person who operates the drone, qualified (military drones) or not (personal civilian drones), but also from the perspective of airspace security.

Unfortunately, reality has also demonstrated the danger of these flying devices that affect peaceful life, in peacetime, in states neighboring war zones. Just one example “Ukrainian drone attacks caused the suspension of flights and the temporary closure of two airports east of Moscow. At the same time, the Russian authorities announced that attacks had taken place in several areas, with recordings being published on social networks of the moment a drone hits a residential building in the city of Kazan."[1]

[1]https://www.digi24.ro/stiri/externe/doua-aeroporturi-din-rusia-au-fost-inchise-temporar-in-urma-atacurilor-ucrainene-cu-drone-3055561- December 21, 2024- Ukrainian drone attacks caused the suspension of flights and the temporary closure of two airports east of Moscow

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From the perspective of humanitarian law, their use is justified in conflict zones, to investigate affected civilians who need help, in calamity zones following violent fires or earthquakes, these devices are also of great use that provide information in real time, in times of emergency, to increase the reaction capacity of the crews to save human lives.

An air accident on the territory of Romania was kept secret for three months. That was until someone found out the information from sources, and the authorities were forced to confirm it. (May 16, 2024) [2]

Another example reflected in the media: Two F-16 planes chased a drone in Romanian airspace (September 9, 2024). Moments of panic in Tulcea and Constanța counties in September 2024 after new explosions on the border with Ukraine led the authorities to send Ro-Alert messages. It was the moment when the MAE informed the NATO allies about the violation of Romania's airspace!

EU regulations - a brief history of regulations - Drones: reform of EU aviation safety[3]

Definition:" Unmanned aircraft*, or drones, represent a* ***rapidly developing sector of aviation*** *with a great potential to create* ***new jobs and economic growth*** *in the European Union. This is why the EU adopted a regulation to safely integrate remotely piloted drones into the European airspace.*

The regulation sets common rules for civil aviation safety and revises the mandate for the ***European Aviation Safety Agency (EASA)****. The new 'EASA regulation' replaces the legislative framework from 2008.*

On 26 June 2018, the Council adopted the new ***proportionate and risk-based*** *rules that will enable the EU aviation sector to grow and will make it more competitive."*[4]

Ensuring aviation safety and the safe use of drones: Council approves EASA reform[5]

The Council adopted updated aviation safety rules, which include a revised mandate for the European Aviation Safety Agency (EASA) and the first ever EU-

[2] https://www.youtube.com/watch?v=3i9gMMClN2E- May 16, 2024 - small planes or Russian drones fallen on the territory of Romania?!?
[3] https://www.consilium.europa.eu/ro/policies/drones/
[4] https://www.consilium.europa.eu/ro/policies/drones/
[5] https://www.consilium.europa.eu/ro/press/press-releases/2018/06/26/ensuring-aviation-safety-and-safe-use-of-drones-council-signs-off-on-easa-reform/ June 26 2018

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wide rules for civil drones of all sizes. The reform introduces proportionate and risk-based rules designed to enable the EU aviation sector to grow, make it more competitive and encourage innovation. A provisional deal was concluded with the European Parliament on 29 November 2017. "These rules will ensure that flying remains safe even when our skies become increasingly busy," said Ivaylo Moskovski, Bulgarian Minister for Transport, Information Technology and Communications.

The rules on drones lay down the basic principles to ensure safety, security, privacy, data protection and environmental protection. The text establishes the registration threshold for drone operators: operators must be registered if their drones can transfer more than 80 Joules of kinetic energy upon impact with a person. The other detailed rules on drones will be set by the Commission with help from EASA, based on the principles outlined in this regulation.

The evolution of European regulations: "On March 12, 2019, the European Commission adopted rules at the EU level establishing technical requirements for drones.

In accordance with the EASA Regulation, the new rules establish the basic principles to ensure the safety, security and protection of privacy, as well as the protection of personal data. They also aim to cut red tape and encourage innovation. The regulation also removes certain rules that could inhibit entrepreneurship. This is expected to bring legal certainty to a sector comprising many small and medium-sized enterprises and start-ups.

In addition, the regulation introduces a risk-based and performance-based approach to safety. This means that the regulation recognizes the various risks that arise in different sectors of civil aviation. For example, helicopters or light recreational aircraft are subject to simpler and cheaper approval procedures than commercial aviation.[6]

Tragic examples of the use of drones in times of peace or war

The attacks against Ukraine killed one person and injured 16. A drone flew in the direction of Romania, the press wrote on 17.01.2025.

"Ukrainian forces shot down 33 of 50 drones, including Shahed attack drones, launched by Russia overnight, the Air Force reported. Another nine were "lost", and one drone flew in the direction of Romania. (...) Debris from the downed drones injured a 12-year-old boy in the Kiev region, according to the statement of

[6] https://www.consilium.europa.eu/ro/policies/drones/

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the interim head of the regional military administration. The debris caused a 200 square meter fire in a cafe and the adjoining boiler room, and the explosion shattered windows in a nearby building.

Russian drones targeted the port infrastructure near the city of Izmail, in the Odesa region, according to Governor Oleh Kiper, the residential building was damaged, (...) without casualties. According to The Kyiv Independent, a Russian drone struck the road in the city of Kharkiv, injuring three men aged 44, 46 and 48, Governor Oleh Syniehubov reported. Five cars were damaged. In the Sumî region, three people were injured following a drone attack, according to the region's military administration. The attack also damaged an apartment building and a car. Two people were injured in the town of Rodynske in the Donetsk region, Governor Vadim Filashkin said. In the Kherson region, Russian forces targeted 37 localities, including the regional center of Kherson. Seven people were injured in the last day, Governor Oleksandr Prokudin reported. A Russian drone also attacked a bus station in the village of Antonivka in the Kherson region, killing a man in the early hours of January 17, Prokudin said.

The Romanian Ministry of National Defense has confirmed that it has discovered traces of a possible drone impact near the Plauru location in Tulcea County, near the border with Ukraine, informs Radio Romania Actualităită. Residents of the area were warned around 01:46, through an RO-Alert message, to take shelter in safe areas. According to a press release from the relevant ministry, Russian forces resumed the series of drone attacks on civilian targets and port infrastructure in Ukraine, in the morning of January 17, in the vicinity of the border with Romania, Tulcea county. The monitoring and surveillance systems of the Ministry of National Defense signaled violations of Romanian airspace, and two F-16 aircraft took off to monitor the aerial situation in the area. The fallen drone was monitored and did not pose any risk to the safety of Romanians, said the prime minister from Bucharest, Marcel Ciolacu, quoted by Rador. He is convinced that after the expertise that will be done by the Ministry of Defense, the result will show that this drone was hit by Ukrainian artillery. [7]

[7] https://moldova1.md/p/42509/atacurile-impotriva-ucrainei-au-ucis-o-persoana-si-au-ranit-16-in-ultimele-24-de-ore - 17.01.2025- Attacks against Ukraine killed one person and injured 16. A drone flew in the direction of Romania

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For a fair analysis of the destruction caused by drones in the Russia-Ukraine conflict, Ukraine also produced significant destruction on Russian territory, the press report in January 2025.

"Unprecedented attack on the Russian energy infrastructure. More than 100 Ukrainian drones struck strategically. Ukraine has launched a massive drone attack on Russia to destroy its oil and electricity production infrastructure. Russian air defense systems were activated and destroyed 11 drones targeting the Smolensk nuclear power plant, the largest electricity production facility in northwestern Russia. Remains of a destroyed drone caused a fire at a refinery in Kstovo, in the Nizhny Novgorod region, located about 800 km east of Ukraine. Later, the Russian group Sibur announced that it had suspended production at its plant in Nizhny Novgorod due to a Ukrainian drone attack. One person was injured and hospitalized following the incident. In total, according to the Ministry of Defense of Russia, nine regions in the west of the country were targeted by the raids of 104 Ukrainian drones, and more than half of them were shot down over the Kursk region, reports Reuters. Air traffic monitoring agency Rosaviatia has suspended flights from Kazan Airport in the Russian Republic of Tatarstan and Pulkovo Airport in the Leningrad Region due to fears of possible interference with aviation systems.[8]

Summarizing, it is unacceptable that the "collateral victims" so present in the military language, in the statistics from the conflict zones, become a normality, in the conditions where, out of the desire to conquer other nations by sick minds, we forget that the most precious and irreplaceable value is human life!

To get out of the sphere of conflict, another situation was one step away from generating a tragedy - when "An Airbus A320 belonging to the Air France company, which was making a flight on the Barcelona-Paris route, narrowly avoided a drone, during the landing at Roissy airport in France. The incident raised suspicions, as drones are not allowed to fly over airports or residential areas."[9]

[8] https://www.digi24.ro/digieconomic/energie/atac-fara-precedent-la-adresa-infrastructurii-energetice-din-rusia-peste-100-de-drone-ucrainene-au-lovit-strategic-44267 - Alexandru Gologan- 29.01.2025, sursa: shutterstock.com/

[9] https://www.romaniatv.net/incident-aviatic-deasupra-aeroportului-roissy-provocat-de-o-drona_278286.html?uord=OqEljV20tIcjHB%3D4O20iPWSFTUNQUSfh/s8%3DQr75lYFctlf%3DIS3tM22LW4-mJEV7JRixPtFAUbVyrXFCkXgIH%3DitNptnQpR%3DIUVQVCje9s84PbihiVhztlvvJ6C

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"While the aircraft was at an altitude of 1,600 meters, the co-pilot saw a drone on the left side of the aircraft, indicated the BEA[10]*, (which investigated the case) (...) The co-pilot immediately disconnected the autopilot and performed an avoidance maneuver, at the same time informing the flight commander of the presence of the drone. The commander, who was able to observe the drone in turn, estimated that it was about five meters below the left wing of the aircraft. The crew immediately informed the control tower of the presence of the drone and continued the landing maneuver without further incident. BEA did not provide details on the number of people on board the aircraft, nor on the dimensions of the drone. An A320 can carry around 160 people.*

Drones are not allowed to fly in the vicinity of airports, fly overpopulated areas and are limited to a ceiling of 150 meters, without the right to leave the operator's field of vision.

Several incidents related to the flight of drones over nuclear power plants or Paris took place in the fall of 2014, recalls AFP - picked up by Romania TV on March 4, 2016.

In this situation, the question is who navigates the drone? Trained, qualified personnel are needed to avoid mistakes that can cause casualties!

Consequently, the regulation of the use of these flying devices, defined as unmanned aerial vehicles, is a necessity already realized in European legal practice.

Moreover, the issue of international air security is rightly criticized by the current American President Donald Trump, on the January 2025 air tragedy - No survivors in the Washington plane crash: Trump questions diversity.[11]

"Sixty-four people were on the plane that collided with a Black Hawk helicopter of the American army, with three soldiers on board[12]*, over the Potomac River. On board the passenger plane were several members of the skating community, and*

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yN27j9WJYUnKJ- Aviation incident over Roissy airport, caused by a drone - March 4, 2016

[10] The Bureau of Investigation and Analysis (BEA), which described the incident as "serious".

[11] https://www.radioiasi.ro/stiri/international/niciun-supravietuitor-in-accidentul-aviatic-din-washington-trump-pune-sub-semnul-intrebarii-diversitatea/ 30 Jan 2025- - No survivors in the Washington plane crash;

[12] A Pentagon official said three soldiers were on board the helicopter. He was performing a 'training flight';

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the TASS agency reported that the pair of skaters, Evghenia Şişkova and Vadim Naumov, world champions in 1994, who became coaches for the Federation of American figure skating. They were returning from a U.S. Figure Skating Championships national development camp in Kansas and were traveling with a group of young skaters. (13 skaters), many of them children of Russian immigrants to the United States. What happened is terrible. The best people were taken from us." Inna Volyanskaya, a former figure skater who competed for the Soviet Union before 1991, was also reportedly on board the plane, TASS news agency said. She was a coach at the Washington Figure Skating Club, according to its website.

More than 180 athletes competed at the Jan. 20-26 championships in Kansas, where the plane came from[13]*, and the Development Camp was held Jan. 27-28 for nearly 150 budding skaters of all performance levels, the Federation's website said. The International Skating Union (ISU) said it was "deeply shocked by the tragic accident.*[14]

Even if in this situation the aviation tragedy was not caused by a drone, the need to regulate at international level the legal regime of the operation of these flying vehicles, but especially the responsibility for the damage, tragedies caused by them, is reiterated!

In the era of military drones, situations arise that escape human control, willingly or unwillingly, by mistake or incompetence, and then other situations arise in practice that create material damage and kill!

Protective measures are taken against the drone attack, airports are closed, but as you can see, the effect is not entirely the expected one.

The proof, the event that took place in a quiet area, far from the conflict zone, due to the closure of the Russian Makhachkala airport, which was closed due to the threats of Ukrainian drones and reported by the press.

The investigation after the aviation catastrophe that happened on December 25, 2024, will be led by the Aviation Authority of Kazakhstan, the country on whose territory the crash took place. 32 of the 67 people on board the aircraft survived, local authorities announced.

[13] The plane, which was coming from Wichita, Kansas, in the central United States

[14] https://www.g4media.ro/fostii-patinatori-americani-de-origine-rusa-siskova-si-naumov-se-aflau-la-bordul-avionului-prabusit-la-washington-si-sunt-prezumati-morti.html- Jan 30, 2025- Russian former US figure skaters Shishkova and Naumov were on board the plane that crashed in Washington and are presumed dead

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The preliminary cause that led to the crash of the aircraft is the emergence of an "emergency situation" on board, after the aircraft struck a bird, the institution responsible for the regulation of aviation in Russia announced on Telegram.

The plane, which was traveling from the Azerbaijani capital Baku to Groznyi, had to deviate from its original route due to dense fog at the airport in the capital of the Chechen region, and make an emergency landing.

Commercial aviation tracking sites recorded the flight moving north along its scheduled route along the west coast of the Caspian Sea before disappearing from radar. It later resurfaced on the east coast, circling near Aktau Airport before finally crashing.

"According to preliminary reports, the plane requested land at another airport, due to the dense fog in Grozny, before the accident," said Iulia Shapovalova, Al Jazeera correspondent in Moscow. "The reasons for the crash are not yet known"

Azerbaijani President Ilham Aliyev announced that, based on the information he received, the AZAL plane, which was flying on the Baku-Groznî route, "changed its course due to worsening weather conditions and started heading towards Aktau airport, where the accident occurred during landing." The deviation from the route was realized due to the fact that the nearest Russian airport, Makhachkala, was closed due to threats from Ukrainian drones.

Strong GPS jamming in the region, which has caused incidents in the past, may have further complicated navigation and contributed to the crash, according to an online post by the aviation website FlightRadar24.

The event was also reported in the Western press, writes The Aviation Herald website.

"Due to GPS jamming and spoofing in the region, existing radar data does not indicate the true flight path and cannot be used to analyze the aircraft's problems," writes The Aviation Herald website. Assumptions regarding the possible accidental downing of the civilian plane with 67 people on board by Russian air defense are premature, the same website writes.[15]

Another example from an Asian area on the border with a dictatorial, tyrannical state, even where human rights do not exist, happened in Dec 2022, *when North Korea sent five drones across the border with South Korea. One reached Seoul, all five returned north, despite a five-hour chase involving fighter jets and attack*

[15] https://www.gds.ro/Actualitate/2024-12-26/noi-informatii-despre-accidentul-aviatic-din-kazahstan/ New information on the plane crash in Kazakhstan - December 26, 2024

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helicopters, with about 100 rounds fired. A South Korean KAI KT-1 Woongbi[16] *crashed, although crew survived. The Joint Chiefs of Staff (South Korea) released a statement saying that while it can stop attack drones, its ability to stop smaller spy drones is "limited". A senior official, Kang Shin-chul, said: "Our military's lack of training has caused great concern to people... it actively uses detection devices to identify the enemy's drone early on and aggressively deploy attack means."*

South Korea's Ministry of Defense has announced a new series of anti-drone measures, (...) One is an airborne laser that will be used to destroy larger drones, while a jammer would be used on smaller drones. Also, a new anti-drone unit would be created, consisting of two squadrons. The laser is already in the testing phase and is expected to become operational in 2027. The jamming system has been described as a "soft kill"[17]

The majority of the ROKAF's[18] *fleet can be armed with both gun pods and rockets, which are intended to be used for weapons training!*

What seems like a joke in bad taste, here is what happened in October 2024 when a drone released a North Korean balloon full of waste above the presidential complex in Seoul, in a context of strong tensions between the two countries, *The balloon "exploded in the air and the remains were dispersed around the offices in Yongsan.*

The contents of the balloon "posed no risk", but since May 2024, North Korea has regularly bombarded Seoul with balloons loaded with waste, in retaliation, it says, for propaganda sent by activists in the South. According to South Korean publication Chosun Daily, the balloon contained leaflets ridiculing the South Korean president and his wife Kim Keon Hee, with photos of the couple paired with the comments "Fortunately, President Yoon and his wife have no children" and "South Korea is Keon Hee's kingdom". South Korea's first lady is accused of participating in a stock-rigging scheme and meddling in the nomination of candidates for the conservative ruling People Power Party ahead of April's general election. It is the second time that the offices of the South Korean leader, located in the center of Seoul and in a no-fly zone, have been directly hit by balloons launched from the North, the first such incident taking place in July. This new incident comes days after Kim Yo Jong, the sister of North Korean leader Kim

[16] Model KT-1 has a glass cockpit with tandem seating for two crew members (student pilot and instructor)
[17] https://en.m.wikipedia.org/wiki/Unmanned_combat_aerial_vehicle
[18] The Air Force of the Republic of South Korea

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Jong Un, accused activists in the South of sending anti-Pyongyang documents to the North and Seoul of launching drones into the North Korean capital. [19]

Conclusion

From the dictionary definition of drone – *"An unmanned combat aerial vehicle (UCAV), also known as a combat drone, combat drone or battlefield UAV, is an unmanned aerial vehicle (UAV) that is used for intelligence, surveillance, target acquisition and reconnaissance and carries aircraft munitions such as missiles, anti-tank guided missiles (ATGMs) and/or fixed points for drones.* [20] The purpose for which it was created can be seen. Its use in civil life is an advantage if it does not fall into the hands of individuals who use it against another person for immoral, unethical purposes, flagrantly violating the individual rights of the person guaranteed by all national, European and international regulations in force.

This is the essential reason why the regulation must be detailed, in order to prevent the obtaining of information by illegal means, the abusive and illegal surveillance of the person, their properties, the company headquarters, etc. (because they can also be used in the sense of eliminating competition in the field of business relations), but also for arson of goods and valuables, energy infrastructures, fueling in this case and creating and fueling crises artificially.

It is more than urgent that these criminal methods disappear, to be sanctioned by international legislation to use drones and related technology to extinguish fires... for example.

This firefighting drone can be connected by the flexible pipe to the water tank of the fire truck and can quickly start the lift, through the efficient foam/water inside the high-strength fire truck, the basic fire extinguishing agent is absorbed into the drone platform. It has good flight stability, a stable platform at 200 m altitude.

The firefighting drone is powered by a ground generator for uninterrupted stalling. And it can also be used as a solar panel cleaning drone and roof cleaning drone to clean exterior walls and solar panels with pressurized water. It can be remotely controlled by connecting the water wheels to the ground, set the altitude through the ground station, achieve one-button take-off and landing, one-click

[19] https://www.digi24.ro/stiri/externe/un-balon-nord-coreean-plin-cu-gunoaie-a-explodat-in-aer-si-resturile-au-fost-dispersate-in-zona-complexului-prezidential-din-seul-2980451 - 10/24/2024 - North Korean trash balloon 'exploded in mid-air and scattered debris' in Seoul presidential complex area.

[20] https://en.wikipedia.org/wiki/Unmanned_combat_aerial_vehicle

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altitude change, and one-click course change. The maximum cleaning height can reach 100m height. It has centimeter-level accurate positioning, simple operation, one-button automatic takeoff and landing, and automatic retractable cable. High safety and reliability. Support manual control mode and automatic flight mode, in manual control mode, control the drone movement by joystick, automatic landing protection in case of power failure and loss of control.[21]

It is known that artificial intelligence is part of our lives and gradually it seems that it will replace us. A question arises...rhetorical at this moment, extrapolating the topic...will we have the courage to board a plane without a pilot? Driverless cars are already tested and a reality that may be part of our lives in the future... (in big cities, means of travel without a driver) in this context, we invite the reader to reflect... analyzing the statements of one of the so-called "godfathers of AI": *"Max Tegmark, professor at the Massachusetts Institute of Technology and president of the Future of Life Institute, and Yoshua Bengio, one of the so-called "godfathers of A.I." and professor at the Université de Montréal, issued the warning on the latest episode of the Beyond The Valley podcast hosted by financial broadcaster CNBC. Two of the most prominent artificial intelligence scientists warn that the development of artificial general intelligence (AGI) "agents" comes with major risks, as their creators could lose control of the systems*

***"It's absolutely insane that we humans would build something much smarter than ourselves before we've figured out how to control it**," (...) "At least now, a lot of people are talking about this topic. We must see if we can get them to move from words to action. (...) The companies working on these models present them as technologies that will allow chatbots to act as assistants or 'agents', helping people with work and everyday life."*

The statement on the use of AI is striking: *"I think, if we want to be optimistic, we can get almost all the benefits of AI... if we simply insist that there be minimum safety standards before people can sell powerful AI systems*"

In the same spirit, we consider that it becomes mandatory to establish minimum safety standards before civilians can use drones! And their sales should become a monopoly for the sale of drones used for military purposes. (only the army can sell/purchase drones equipped with attack systems).[22]

[21] https://ro.satuav.com/multi-rotor-drone-rotary-wing-drone/fire-fighting-drone.html

[22] https://hotnews.ro/cercetatori-de-top-avertizeaza-impotriva-unui-nou-pericol-din-domeniul-inteligentei-artificiale-este-absolut-nebunesc-1896793 - February 7, 2025-

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The reason for this proposal concerns the very current European legislative provisions where it was considered that the reform of the rules in the field of aviation was necessary and because an increase in air traffic in the EU is expected by 50% in the next 20 years. The European Commission estimates that, by 2035, the European drone sector will:

• will directly provide jobs for over 100,000 people

• will have an economic impact of more than EUR 10 billion per year, especially in the field of services

As the use of drones expands, so will the need to find a balance between their advantages and the problems they generate. For example, unmanned aerial vehicles can provide added value when used to collect and interpret data in various sectors of the economy. But drones can also create data protection, privacy, noise and CO2 issues.

Also in the European documents, interesting aspects are presented: "Although some drones are as heavy and fast as an airplane, they can also take the form of **very small electric "toys"**, available to consumers on a large scale. After 2008, smaller drones created regulatory problems for the EU, whose powers were limited to unmanned aerial vehicles heavier than 150kg.

Lighter drones were only subject to different and fragmented national safety rules at EU level. Moreover, certain essential safety measures were not applied consistently.[23]

However, advantages and disadvantages in the use of drones, their use in military actions generates efficiency, changes the tactics and techniques of war, placing the classic war in the area of history, and promoting the tactics and modern techniques to the advantage because the equipment fights on the battlefield, and human life is protected! However, if things will evolve like this? What is the purpose of conflicts on a global scale?

Of course, these devices are derived from the initial name of the drone, as a military flying device, without a pilot, but life offers us daily the opportunity to choose our own actions, to discern responsibly between good and bad, between attack and defense, between evolution and regression, between life and death!

Sebastian Jucan- Top researchers warn against a new danger in the field of artificial intelligence: "It's absolutely crazy" - their creators could lose control of the systems

[23] https://www.consilium.europa.eu/ro/policies/drones/

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BARRIERS THAT IMPEDE BUSINESS GROWTH IN RURAL COMMUNITIES: INFORMAL MICRO-BUSINESSES

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Abstract

Informal micro-businesses in rural areas of South Africa, faces obstacles that impede the growth. Despite the governmental potential to improve the micro-businesses, informal rural micro-business struggle to grow. Quantifying the number of informal micro-businesses in Mahikeng proved challenging due to their unregulated status and lack of government registration. They have low involvement in governmental activity and need more access to empowerment programmes, and there need to be community-based structures that aid equitable business growth. This paper presents a framework for action designed for barriers that impede business growth for informal micro-businesses. The framework draws on in-depth interviews conducted to elucidate the experiences of micro-business owners in the rural communities and to identify the barriers they face, thereby offering a more profound understanding of the research problem. The in-depth interviews are used to inform the development of our micro-business' framework, which can be applied in rural communities for business growth and community empowerment. The framework reflects a persistent obstacle is the deficiency in business expertise, particularly in marketing, lack of funding, stiff competition and inadequate knowledge regarding governmental infrastructure requirements.

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Keywords: *business growth, rural communities, informal businesses*
JEL Classification:M11, M31

1. Introduction

The sustainability of informal micro-businesses in the rural communities has emerged as a strategic priority in the economic development and growth of both developed and developing countries, as has been well documented (Choi et al., (2020), Hieu et al. (2021), Ye (2025), and Zahoor & Nwoba, 2024). In principle the informal sector has been thoroughly examined in various today's economies, including China and India. It indicates that this sector is an essential element of their economies (Gupta and Kanungo, 2022). However, these conclusions cannot be generalised to the Sub-Saharan African setting, particularly South Africa, due to local complexity such as distinct legal and regulatory frameworks and market structures. Previous study on informal micro-businesses in South Africa has encountered restricted access to information (Smidt & Jokonya, 2022). In contrast to other regions, South Africa exhibits a deficiency in marketing skills within informal businesses, attributable to factors such as inadequate human capital development, an unfavourable business environment, and the absence of policies aimed at enhancing skills for informal micro-business and their employees (Choi et al., 2020).

Young individuals constitute a significant percentage of the unemployed in South Africa, with many initiating informal micro-businesses including car washes, hair salons, and poultry ventures and spaza shops, to combat poverty (Vilijoen & Ledingoane 2020). The unemployment issue in South Africa continues to be significantly elevated, with the official unemployment rate recorded at 24.7% in the third quarter of 2024 (Stats SA, 2024). Therefore, the present study considered how informal micro-businesses could become more actively and sustainably involved in the business and produce a solution for business growth and implementing them in practice to alleviate poverty in the rural communities.

According to Fourie (2018), South Africa, township and rural communities are marked by the dominance of informal micro-businesses, driven by a combination of entrepreneurial prospects and economic hardship. Ekobi (2022) further argue that informal micro-businesses aid severely low-income individuals in meeting their fundamental needs, hence improving their overall financial well-being. Since most informal micro-businesses in the community are excluded from governmental support according to Juta and Olutade (2021), failed dismally to achieve one of its

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developmental goals: to tackle the elevated poverty levels and exponentially increase in unemployment in the rural communities in Mahikeng, South Africa. Moreover, micro-businesses in the informal sector encounter institutional voids and experience minimal government oversight, which impede business expansion (Adu-Gyamfi et al., 2023).

Although research exists on micro-businesses, the majority concentrates on the formal sector inside industrialised and developing countries. This article, therefore, present a new literature for the obstacles impeding the growth of informal micro-businesses in the rural communities, designed to foster business growth and sustainable informal business participation in the community. The results components are drawn from the literature review and in-depth interviews on informal micro-business by linking and expanding the idea of growth impediments to encompass the behaviours of micro-businesses from an African viewpoint and their utilization of information to facilitate micro-business operations. It structures a template for effective policymaking and interventions aimed at promoting social transformation and economic growth through the integration of the informal sector that will enrich their businesses and enhance growth strategies.

2. Theoretical background and context

This paper and the framework are grounded with the stakeholder's theory, chosen for its prominence, as evidence by Pedrini and Ferri (2019), for example, focusing on the ways to execute, develop, and measures the results of adopting this strategic approach with all stakeholders. Stakeholder theory was created to comprehend organizational issues and demonstrate that managing an organization involves much more than merely overseeing its clients, workforce, and suppliers while turning a profit that will enhance business growth. It proposes a paradigm shift in business that involves the outside environment and overlooked groups for the organization's success (Roloff, 2008). This theory is based on three principles: which are for organizations to succeed, they must be sensitive to the diverse needs of the stakeholders involved followed by management must have an obligation to all stakeholders that is equal and fair to all; and lastly decision-making is centred on an understanding of the stakeholder groups' needs (Chinyio and Olomolaiye, 2010, Richter and Dow 2017). The theory upholds the importance of considering all interests and places stakeholder representatives at the core of its principles (Richter and Dow, 2017). The theory has helped identify stakeholders in the informal micro-business sector, their complicated relationships, and potential power dynamics. It has been described as crucial for educating managers about

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informal micro-business stakeholders' demands, perceptions, and motivations and their capacity to affect the rural community's business operations (Pedrini and Ferri (2019). Stakeholder theory, which offers superior and inventive conflict resolution strategies to ecologically and culturally sensitive areas by demystifying stakeholder power dynamics and enhancing long-term planning and sustainable micro-business growth development, has therefore also been embedded in the design of our framework.

3. Literature Review

Viability of Informal Micro-business

Informal micro-businesses deliver products and services to the rural community. These minor entities substantially enhance employment and innovation. The expansion of informal business is influenced by a customer base comprising individuals from low, middle, and high-income demographics. The expansion of micro-businesses can be attributed to SEDA, which assists them in obtaining financing. The expansion of informal micro-businesses relies on connectivity infrastructure and supply chain dynamics (Vilijoen and Ledingoane 2020). The principal factor contributing to the expansion of micro-businesses in the rural community is the accessibility of skilled and semi-skilled labour that can be promptly engaged. The expansion of micro-businesses is attributable to digital payment systems and the proliferation of e-commerce. The micro-business in Mahikeng include Spaza shops, car washes, poultry operations, and restaurants. These micro-businesses are concentrated in local markets and possess a longstanding history of existence. By utilising the city's resource infrastructure, informal micro-businesses can prosper and substantially contribute to South Africa's economic progress.

Chakraborty & Chakrabarti (2024) examined the informal sector in India, elucidating its competitive or collaborative dynamics. The primary aim of the study was to examine the literature regarding the informal sector in India, with an emphasis on competitiveness. Research indicates that India's informal sector is expanding, with several micro-businesses lacking access to institutional loans and legal safeguards. Furthermore, informal micro-businesses do not collaborate; instead, they compete against one another. Jangili (2024) examined the concerns and obstacles associated with quantifying the informal economy in India. The study aimed to investigate the measuring challenges of the informal sector, emphasizing difficulties in data collecting and statistical discrepancies. The national accounting methodology for assessing the informal economy was evaluated. The informal

economy is characterised by significant diversity. Nnamdi et al. (2021) examined the function of entrepreneurship within South Africa's informal sector, emphasising the opportunities and problems associated with these businesses. They encountered difficulties pertaining to funding, rules, inadequate infrastructure, and lack of institutional recognition. Simultaneously, they saw numerous opportunities, including job creation, economic contribution, and future digital revolution. They advocated for the necessity of skill development programs for informal businesses. This study examines the barriers that hinder business expansion in the informal sector.

Characterises of informal micro-businesses

Modern research underscores that micro-businesses should be assessed along a continuum from entirely formal to entirely informal, with informality in business manifesting globally and varying among countries and businesses in degree (Bhoite 2025). Research indicates that elevated levels of informal relationships are prevalent among micro-businesses that lack awareness of the necessity for legal business registration, perceive informal nature as customary, and exhibit distrust towards official institutions (Williams et al., 2020). Egoli (2022) examined informal micro-businesses whose proprietors were unable to secure official work while possessing suitable skills, with many being well educated and skilled. The primary factors influencing the degree of informality comprise a combination of the attributes of the business, the enterprise, and the overarching institutional context. The literature study demonstrates that informal businesses employ unstructured marketing and management tactics. As micro-businesses, their resources are constrained, and their attributes result in initially inadequate access to supportive formal institutions that facilitate business growth. Furthermore, the expansion approach is impossible to be their primary or initial objective, given it relies on further formalisation. In practice, they encounter both self-imposed and societal limitations. They exhibit entrepreneurial insight and passion while pursuing prospects for profitability, sustainability, and expansion.

Barriers of micro-business success

Literature indicates that the issues encountered by informal micro-businesses in developing nations are equivalent to those encountered by their counterparts in developed countries. The sole distinction between the barriers faced by micro-businesses in developing and developed nations is that the nature of these obstacles tends to be greater in developing countries. Previous research has indicated that various variables impede the survival and expansion of informal micro-businesses.

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The expansion and sustainability of micro-businesses are jeopardised by barriers that may arise within the operational and managerial domains of the business (Fourie 2018; Ekobi 2022).

Multiple studies have identified factors such as lack of expertise in business, insufficient technical knowledge, inadequate managerial skills, deficient planning abilities, and lack of market research skills as primary obstacles impeding the success of micro-businesses in developing countries (Egobi 2022; Jangili 2024; Bhoite 2025). In addition, previous research has indicated that informal micro-businesses with technical expertise may encounter difficulties in handling operational and managerial functions (Nnamdi et al., 2021; Chakraborty and Chakrabarti, 2024). Poor financial processes frequently hinder the viability of informal micro-businesses (Fourie 2018). The survival and growth of micro-businesses may be impeded by environmental problems, including competition, an unfavourable business environment, governmental regulations and legal issues, as well as economic conditions.

Ekobi (2022) asserts that the primary problem for micro-businesses in numerous developing countries is competing with both local and global established businesses. The competitiveness of informal micro-businesses in developing nations is impeded by insufficient human resources, inadequate development skills, and limited access to financing. Jangili (2024) asserts that regulatory and legal challenges pose significant difficulties for informal micro-businesses. Micro-business operators frequently lack comprehension of legal regulations, thereby incurring penalties and fines. Previous study (Nnamdi et al. 2021; Chakraborty and Chakrabarti 2024) has indicated that the absence of microeconomic policies and other regulatory frameworks in developing nations impedes the growth of informal micro-businesses.

In addition, informal micro-businesses frequently have challenges in obtaining suitable technologies and information (Ekobi 2022). Bhoite (2025) contends that, in numerous instances, informal micro-businesses employ foreign technology that they lease or co-own with other business partners. Jangili (2024) posits that despite the availability of the internet, its sustained utilisation in micro-businesses is impeded by insufficient electricity, particularly in rural regions, and load shedding in urban locations. Additional recognised obstacles that adversely impact the development of informal micro-businesses encompass limited access to equipment, corruption, inadequate infrastructure, and restricted access to international markets (Chakraborty and Chakrabarti 2024). Jangili (2024) asserts that the absence of support services hinders informal micro-businesses in enhancing their

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management, as consulting firms frequently lack suitable and cost-effective management solutions for these businesses. Furthermore, despite the existence of various institutions offering training and advising services to informal micro-businesses, a skills gap exists throughout the informal sector overall. Current research has emphasized rural community participation in informal business as a means of equitable development in rural communities in South Africa.

4. METHODOLOGY

This study employed a qualitative research approach to assess micro-business owners' distinct perspectives on the various obstacles their businesses face and the factors that impede business growth in the rural communities. The informal sector plays a crucial role and possesses substantial potential in rural communities. Qualitative data were obtained via semi-structured interviews with micro-businesses in the informal sector in the rural community. A qualitative method elucidates how micro-businesses perceive restrictions and constraints, and how these factors influence their growth strategy. The interviews were done in Mahikeng, focusing on micro-businesses within the informal economy. Micro-businesses are generally small in scale, frequently managed by a person or a small collective, characterised by limited capital investment and a lack of access to formal funding, as elucidated by Nkwinika (2023). Micro-businesses often employ fewer than ten individuals and generate an annual turnover of less than five million rands, as indicated by De Wet (2019) and Gherhes et al. (2021). Moreover, micro-businesses in the informal sector frequently lack formal organisational frameworks and may function on a casual or ad-hoc basis, without official registration or legal documentation.

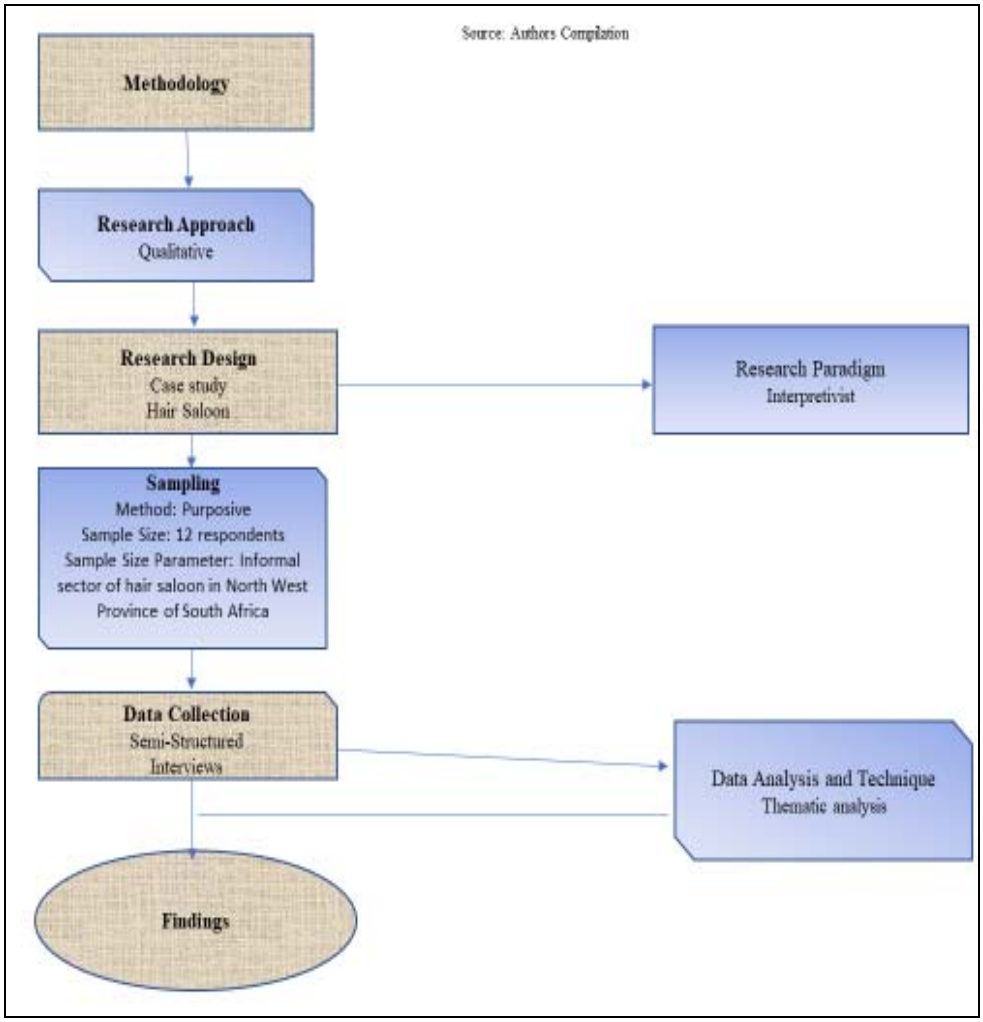
The informal micro-business functions outside established social conventions and lacks government regulation or registration, resulting in tax exemption (Etim & Daramola, 2020). Informal micro-businesses in South Africa participate in several economic activities, including street vending, informal trade, small-scale manufacturing, services (such as hairdressing or tailoring), car washes, and home-based businesses as noted by Ekobi (2022). The Mahikeng Local Municipality is located inside the Ngaka Modiri Molema District Municipality in South Africa's North West Province. Mahikeng has 35 wards, encompassing 103 villages, six townships, and several suburbs. Roughly 75% of the region is rural (Ekobi, 2022). Quantifying the number of informal micro-businesses in Mahikeng proved challenging due to their unregulated status and lack of government registration. Despite the challenges in obtaining reliable data, Coetzer et al. (2022) estimated that South Africa possessed about 2.6 million informal micro-businesses. Excerpts from

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the respondent's transcripts were utilized to provide thematic material, aiding in the summarization of findings and the formulation of conclusions (See Figure 1 below).

Figure 1: Research flowchart



Source (s): Authors` compilation

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Study Area

This study was conducted in Mahikeng (Tswana: Mmasepala wa Mahikeng) 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 of Mahikeng (Stats 2022) and it has a population growth rate of approximately 1.90%.



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.

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5. Data analysis and thematic process

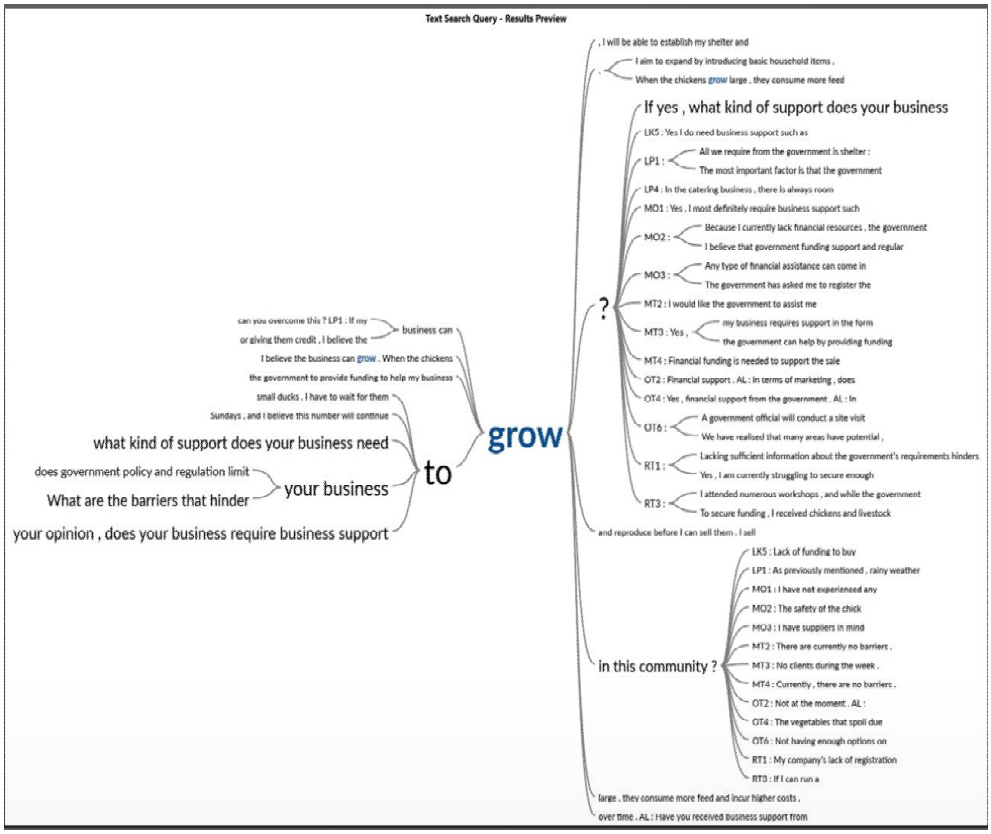
Thematic analysis is a method for examining qualitative data. The findings provided in this study were derived using the six steps of the reflective thematic analysis approach. The methodologies employed utilised NVivo 12, a software application that provides a platform and tools for the reduction and analysis of qualitative data. The dialogue was documented properly during the interview using note-taking and audio recording. This study utilised reflexive thematic analysis as the approach for data reduction and interpretation in order to achieve the research objectives. Facilitating the categorisation of data into themes and categories via description, data unitisation, relationship recognition, and theme development to identify commonalities and correlate findings with existing literature to derive themes and conclusions (Van Rensburg & Pellisier, 2020). Yin (1989) posits that data analysis is a multi-stage process involving the examination, classification, tabulation, and recombination of information to fulfil the study's initial purpose. The data was analysed using a thematic approach, appropriate for the study's objective of understanding a variety of experiences within the dataset.

Informal enterprises in the rural communities in South Africa function within a multifaceted and frequently paradoxical environment. Their informality facilitates flexibility, accessibility, and cultural congruence. Conversely, the inherent characteristics of informality create obstacles that hinder sustained growth and stability. Utilising the word cloud as a preliminary data reduction technique enabled the assessment of the predominant terms and concepts within the data. To compare developing analytical concepts with semantic themes derived from annotations and data reviewing, word tree maps were employed to assess thought patterns for concepts deemed central to the data.

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Figure 1: World tree



Source: Compiled using NVivo 12

To ensure that the coding corresponded to the meanings attributed to the data's phenomena, trends in the utilisation of key terms or codes within the data have been compared with the semantic codes utilising word or concept tree maps, as illustrated in Figure 2. A dendrogram generated with the NVivo 12 platform has been enhanced by a preliminary study of the co-occurrence of concepts or key phrases within the discussions in the data.

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6. Empirical Results and Discussion of Findings

Demographic profile of the respondents

The demographic details are an important element within research studies, as they present the traits and characteristics of the target population and how these ensure the understanding of the research problem (Maree, 2015). The study captured demographic details such as age, gender, work experience, and line of business sector. These are summarized in Table 1 (see annexure). 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. About 16% of the participants specialize in the car wash business, 25% in salons, 25% in poultry, 17% in restaurants, and 17% in spaza shops, respectively. 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, most participants were from the salon and poultry business sectors.

7. Research Results

An assessment of the findings' parallels and differences with prior research is presented, accompanied by a discussion of the results in relation to the existing literature. The biggest challenges that impede business growth in informal sector as illustrated are financial exclusion as a structural constraint, infrastructure deficiencies and business vulnerability, market inequality and competitiveness, skills deficiencies and limited business development, and government support and stakeholder exclusion.

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Theme 1: Financial exclusion as a structural constraint

The results reveal that financial exclusion remains one of the most significant obstacles to the growth of informal micro businesses. Participants reported difficulties accessing loans, banking services and training opportunities because their businesses were unregistered and lacked formal financial records. The question asked was: **What are the current obstacles facing your business?**
As noted by participant one:

> *My company's lack of registration hinders financial loans approval for my business to growing in this community. I have a mobile kitchen, but I am unable to attend events because I sometimes lack the funds to purchase stock and cover petrol costs.*

This was confirmed by participant two who noted that:

> *I face several challenges in my poultry business. The biggest one is to secure financial aid. Another one many customer does not pay on time, while others fail to pay altogether, which negatively impacts my cash flow. Additionally, my chickens sometimes get sick, preventing me from selling them and forcing me to destroy their eggs.*

This finding supports previous studies that identified restricted access to finance as a critical obstacle for informal enterprises in developing economies (Nnamdi et al., 2021).

The issue extends beyond the absence of capital. Financial exclusion creates a cycle of informality whereby entrepreneurs cannot access funding because they are informal, yet they remain informal because they lack the resources needed to formalise their businesses. This finding advance understanding of how institutional barriers reinforce economic marginalisation within rural communities. From a stakeholder perspective, financial institutions and government agencies are important stakeholders whose limited engagement restricts opportunities for business expansion and sustainability.

Theme 2: Infrastructure deficiencies and business vulnerability

Participants consistently highlighted poor road conditions, unreliable electricity supply, inadequate trading spaces, and exposure to crime as factors limiting

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business performance. The evidence suggests that infrastructure is not merely a physical challenge but a determinant of market access, operational efficiency and customer retention. For example, poor roads reduced customer access to businesses, while electricity interruptions affected refrigeration, product quality and service delivery. Some business owners have experienced difficulties with essential services like as refrigeration and electricity, while others function from informal buildings that are susceptible to weather conditions and criminal activity. The question asked was: **What are the current challenges facing your business?**

As noted by participant four noted that:

> *At the moment, I would focus on building my clientele and retaining them. My competitors are foreigners that offer relatively low prices, leading some customers to opt for their services.*

This was confirmed by participant seven who noted that:

> *If the government repairs the roads, it would encourage people to avoid travelling on gravel, which currently offers the only access to my car wash. Additionally, I am considering selling bunnies, as customers might appreciate having something to eat while they wait for their cars to be washed.*

Participant 12 noted that:

> *Road infrastructure issues and inadequate marketing caused by lack of funding.*

This comment underscores the environmental and infrastructural hazards faced by informal micro-businesses owners operating in temporary structures such as shipping containers. The results were consistent with Dodge (2025) which postulate that the absence of weather-resilient infrastructure is evidenced by the owner's incapacity to maintain operations during rainfall or elevated temperatures, directly affecting income stability and business continuity. The mention of stock degradation signifies insufficient access to proper air or refrigeration, adversely affecting operations and finances

The interviews revealed that infrastructure deficiencies increase business vulnerability and reduce the ability of entrepreneurs to compete effectively. This supports the argument that business growth in rural areas depends not only on entrepreneurial capability but also on the quality of the enabling environment. Stakeholder Theory suggests that local municipalities and infrastructure providers

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have a significant role in creating conditions that facilitate business development. Their limited effectiveness contributes directly to business stagnation.

Theme 3: Market inequality and competitiveness

The study found that many participants perceived competition from foreign-owned businesses as unfair because these businesses often benefited from stronger supplier networks, lower purchasing costs, and established customer bases. Participants believed that such advantages enabled competitors to offer lower prices while maintaining profitability. The present pattern matches that described by Mukwarami (2017), who indicates that foreign-owned establishments often establish cooperative networks, affording them stock and pricing advantages that local micro-businesses cannot compete with due to their limited capital and isolation.

Question asked was: **What are the barriers that hinder your business to grow in this community?**

As noted by participant three:

> *At the moment, I would focus on building my clientele and retaining them. My competitors are foreigners that offer relatively low prices, leading some customers to opt for their services.*

This was supported by participant six:

> *Members of the community tend to be quite stingy and often hesitate to spend money on hair services.*

The participant's comment highlights the primary obstacles informal micro-business owners encounter in competing with foreign-owned businesses. It signifies a perception of inequitable competition and market exclusion, since consumers have grown used to foreign-owned establishments due to their reliability and pricing, hence complicating local businesses efforts to attract customers.

The analysis suggests that the challenge is not competition itself but unequal access to resources and supply-chain networks. Local micro-businesses often operate independently and lack collective purchasing mechanisms, reducing their ability to achieve economies of scale. This finding aligns with literature that emphasises the importance of social and business networks in determining enterprise success (Mensah et al., 2026). The issue highlights how stakeholder

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relationships extend beyond government support to include wholesalers, suppliers, and business associations that influence market opportunities.

Theme 4: Skills deficiencies and limited business development

The interviews revealed that many entrepreneurs lacked formal business training, particularly in financial management, marketing, and customer development. Some participants expressed a desire for training but lacked resources to access such opportunities. Others indicated limited awareness of available support programmes. The question asked: **In terms of marketing, does the people know of your business?**

As noted by participant eleven:

I don`t have the funds to go for training.

This result demonstrates that human capital development remains a critical requirement for business growth. While entrepreneurs displayed strong motivation and resilience, inadequate managerial and technical skills constrained their ability to expand operations, attract customers, and respond strategically to market challenges. The findings therefore support previous research emphasising the importance of business development services in promoting enterprise sustainability.

Theme 5: Government support and stakeholder exclusion

A central finding emerging across all themes is the limited interaction between informal micro businesses and government institutions. Participants reported difficulties accessing support programmes, limited awareness of available assistance and uncertainty regarding registration procedures. These challenges contribute to the continued exclusion of informal businesses from development initiatives. Numerous participants conveyed uncertainty concerning the registration procedure and contended that the administrative stress surpassed the advantages, in addition to facing semantic obstacles. The question asked was that: **Have you received business support from government? If yes, what kind of business support have you received?**

As noted by participant four:

No, we have not received funds from government.

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Participant five confirmed that:

> *As previously mentioned, I aim to establish a mobile salon, and if I can secure the necessary funds, I plan to undergo training in nail techniques. This training is important as it can be complicated due to clients' specific requirements and to design hair with artificial hair.*

Participant eight supports the same:

> *I am open to partnership, but it is essential that my partner shares the same vision as I do. If we have differing perspectives on the business, it can lead to misunderstandings and ultimately divert us from our objectives.*

This informal status complicates the acquisition of credit and banking services from the government. The majority of micro-business owners are prohibited from the prerequisites of banking institutions, which often encompass formal business registration, financial statements, or collateral this was in line with the study by (Aluko, 2025).

This finding is particularly significant because the study is grounded in Stakeholder Theory. The evidence suggests that key stakeholders including municipalities, training providers, financial institutions, and development agencies are not effectively engaging informal entrepreneurs. Consequently, informal businesses remain disconnected from resources that could facilitate growth. The findings therefore extend Stakeholder Theory by demonstrating how stakeholder exclusion can impede enterprise development in rural informal economies.

The findings indicate that the barriers facing informal micro businesses are interconnected rather than independent. Financial exclusion limits access to training and infrastructure improvements. Inadequate infrastructure reduces customer access and business productivity. The results is consistent with Sari and Setiawati (2025) and Rashid et al (2025). Skills deficiencies constrain competitiveness and innovation. Limited stakeholder engagement prevents access to support mechanisms that could address these challenges. Consequently, business growth cannot be achieved through isolated interventions. An integrated approach involving government agencies, financial institutions, business development organisations, community structures, and entrepreneurs themselves is required. The evidence suggests that sustainable growth depends on strengthening stakeholder relationships while simultaneously addressing structural constraints within the rural business environment.

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8. Contribution to Existing Knowledge

The study demonstrates that growth barriers operate as an interconnected constraint system rather than as isolated challenges, suggesting that single-policy interventions are unlikely to produce sustainable business growth. The study extends Stakeholder Theory by demonstrating that stakeholder engagement is not only important for organisational performance but also for business survival and growth among informal micro-businesses operating in resource-constrained rural environments. The study reveals that informal micro-business owners pursue hybrid survival-growth strategies, challenging the assumption that informal enterprises operate solely as subsistence activities. The study provides context-specific evidence that rural informal micro-business growth is strongly shaped by infrastructure accessibility, stakeholder relationships, and institutional support structures, factors that may be less pronounced in urban settings.

This study contributes to the literature on informal entrepreneurship and rural economic development in several ways. First, it introduces the concept of stakeholder exclusion as a mechanism explaining the persistent marginalisation of informal micro-businesses in rural communities. The findings demonstrate that entrepreneurs experience simultaneous exclusion from financial services, government support programmes, infrastructure development initiatives, and formal market networks, collectively constraining business growth. The study advances understanding of informal enterprise growth by demonstrating that barriers operate as an interconnected system rather than as isolated challenges. The findings reveal that financial exclusion, infrastructure deficiencies, skills shortages, market inequalities, and limited institutional support reinforce one another, creating a cycle of constrained growth.

The study extends Stakeholder Theory to the context of rural informal micro-businesses. While the theory has traditionally been applied to formal organisations, this study demonstrates its relevance in explaining how stakeholder relationships influence business sustainability and growth within informal economies. The study challenges the perception that informal micro-businesses are solely survivalist enterprises in line with Zahoor and Nwoba (2024) study. The findings indicate that entrepreneurs actively pursue growth-oriented strategies through diversification, customer retention, reinvestment, and opportunity seeking despite operating in highly constrained environments. The study contributes empirical evidence from rural Mahikeng, a context that remains underrepresented in entrepreneurship research. By highlighting the unique interaction between institutional conditions

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and entrepreneurial behaviour, the study provides a foundation for developing more contextually relevant policies and support interventions for informal enterprises in South Africa and other developing economies.

The study provides first-hand insights from informal micro-business owners regarding infrastructure challenges, perceived unfair competition, financial exclusion, limited government engagement, lack of business development support supported by (Sari & Setiawati, 2025). These findings enrich a better understanding of how rural communities' factors shape entrepreneurial outcomes in South Africa.

The study extends Stakeholder Theory by demonstrating how the growth of informal micro-businesses is influenced not only by traditional stakeholders such as customers and suppliers but also by local government institutions, infrastructure providers, community structures, and informal market actors. While Stakeholder Theory has largely been applied to formal organisations, this research adapts the theory to the context of rural informal businesses in South Africa, highlighting the complex stakeholder relationships that shape business growth.

Furthermore, the findings reveal that stakeholder exclusion particularly from government support programmes, formal business networks and financial institutions acts as a significant growth constraint with consistent to Haqqani et al (2026) study. This broadens the theoretical understanding of stakeholder participation in informal economies. The study therefore shifts the discussion from isolated barriers to a systemic understanding of business growth challenges in rural informal economies.

9. Conclusion and Recommendations

The conclusion is supported by several findings obtained from the thematic analysis of interviews conducted with informal micro-business owners in Mahikeng. Financial exclusion limits business growth interview participants repeatedly highlighted the lack of access to finance, banking services and training as major barriers to growth. Many business owners indicated that they could not access loans because they operated unregistered businesses with lack of formal financial records and lacked collateral. One participant expressed the desire to expand a salon business and acquire specialised skills but acknowledged that funding constraints prevented this development. These findings demonstrate that financial exclusion restricts or limits business expansion opportunities and further investment in business improvement.

Inadequate infrastructure constrains operations evidence from the interviews revealed that poor road conditions, inadequate trading facilities, unreliable

electricity, and weather vulnerable structures negatively affect business operations. For example, a car wash owner reported that damaged roads discouraged customers from accessing the place of work, while others noted losses associated with inadequate storage and load shedding. These findings support the conclusion that infrastructural deficiencies reduce business continuity, profitability and customer access. Market inequalities create competitive disadvantages several participants reported difficulty competing with foreign-owned businesses that benefit from stronger supplier networks, establish customer bases and lower prices. One participant stated that customers preferred competitors offering lower prices, making it difficult to retain clientele. These findings provide evidence that market inequalities contribute to the competitive disadvantages experienced by local informal micro-businesses.

Limited government support restricts development the study found that all participants operated informal, unregistered businesses and experienced difficulties accessing government support programmes. Respondents reported limited knowledge of registration procedures and perceived administrative barriers to formalisation. This evidence supports the conclusion that insufficient government engagement and institutional support hinder business development and growth opportunities. Skills deficiencies reduce growth potential participants identified a need for training in areas such as customer service, marketing, technical skills, and business management. The literature review and empirical findings consistently indicate that inadequate business knowledge constrains innovation, competitiveness and market expansion. This evidence supports the conclusion that skills development interventions are essential for sustainable business growth. Entrepreneurial resilience demonstrates growth potential despite numerous challenges, participants described strategies such as product diversification, customer retention, reinvestment of profits, and exploring additional income generating activities. For example, one respondent considered diversifying into rabbit farming to complement an existing car wash business. These responses demonstrate entrepreneurial resilience and support the conclusion that informal micro businesses possess growth potential when provided with appropriate support mechanisms.

Collectively, the evidence indicates that business growth among informal micro businesses is not constrained by a single factor but rather by an interconnected system of financial, infrastructural, institutional, and market-related barriers. The findings further demonstrate that, although entrepreneurs exhibit resilience and adaptive strategies, sustainable growth requires coordinated support from financial

institutions, government agencies, community organisations, and other stakeholders. This empirical evidence justifies the study's recommendation for promoting business growth and community empowerment in rural South Africa.

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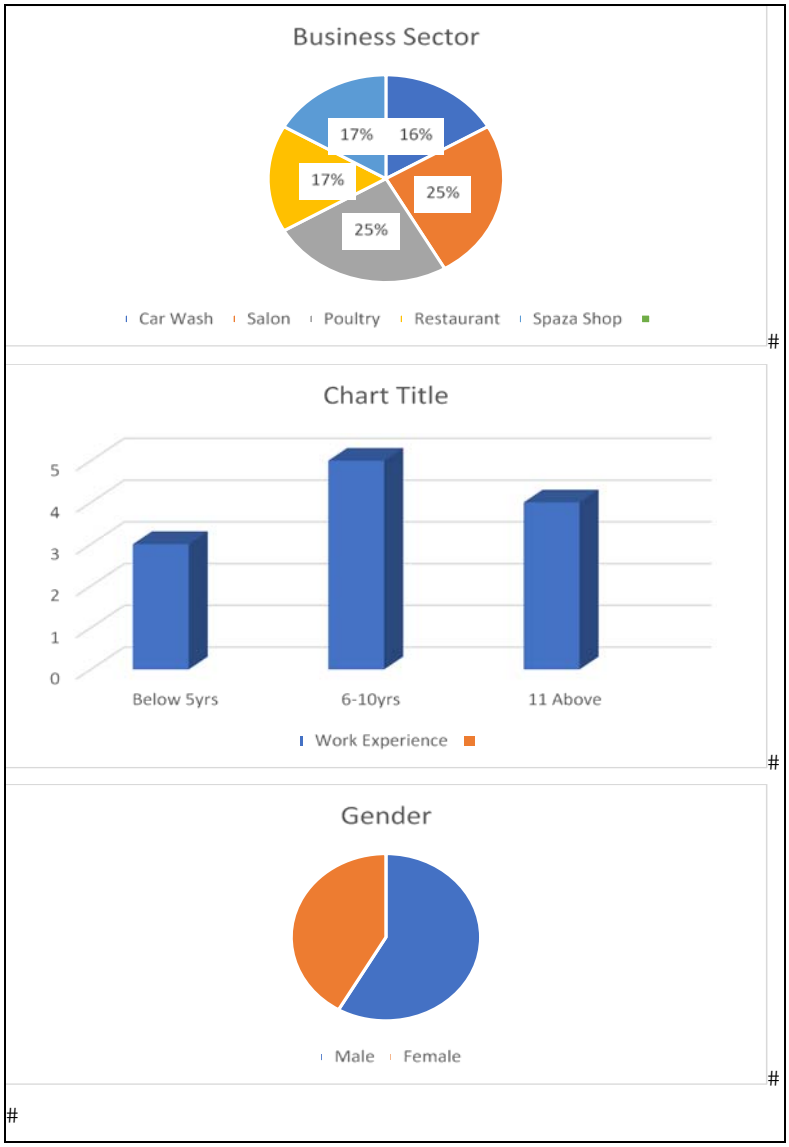
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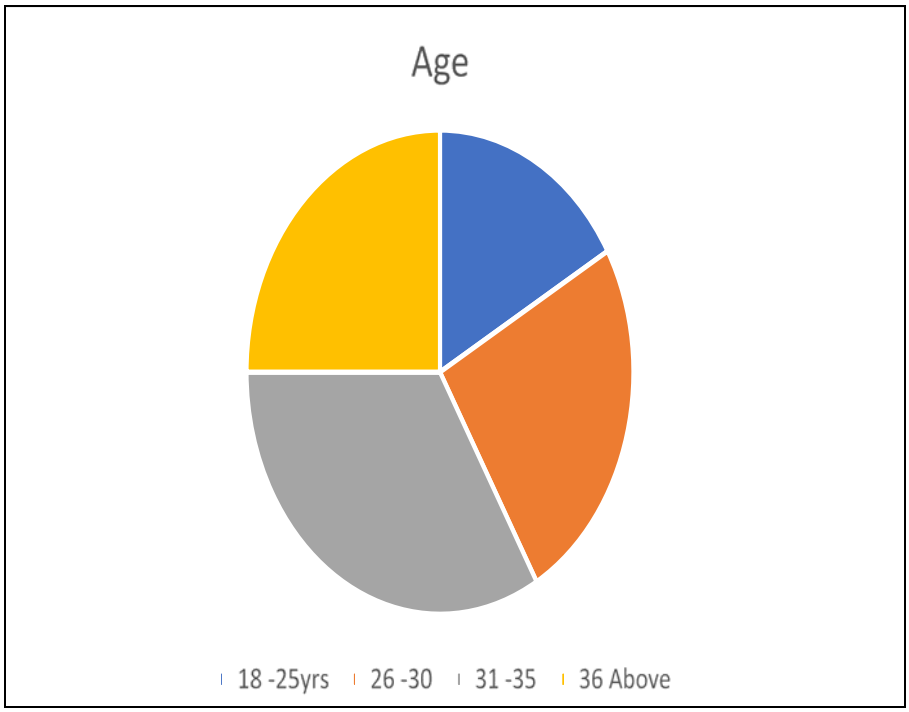
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Annexure Results



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FROM GRASSROOTS TO GROWTH. UBUNTU ECONOMICS IN ACTION: COMMUNITY-CENTRIC SPORTS ENTREPRENEURSHIP AS A SUSTAINABLE DEVELOPMENT PATHWAY

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Abstract

This paper examines community-centric sports entrepreneurship through the lens of the Ubuntu philosophy, exploring how grassroots football clubs in African contexts embody indigenous principles of communal interdependence, reciprocal value creation, and collective well-being as sustainable development pathways. Employing a qualitative single-case study methodology, the investigation centres on a non-league football club in Johannesburg, South Africa, deeply embedded within local community structures.

Primary data were collected through semi-structured interviews with five managerial personnel and subsequently analysed using thematic analysis. The findings reveal that the club employs community initiatives — including clean-up programmes, school outreach, and local business collaborations — reflecting Ubuntu principles wherein organisational success is inseparable from community welfare.

Community engagement functions as a reciprocal value creation mechanism, conferring legitimacy and sustainability upon the club whilst fostering social cohesion, youth development, and environmental stewardship. This reciprocity exemplifies Ubuntu economics, wherein trust, collective identity, and relational norms constitute strategic organisational assets.

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The study contributes original insights into Afrocentric entrepreneurship by demonstrating how Ubuntu philosophy manifests in contemporary organisational practice, challenging individualistic entrepreneurship paradigms and affirming communal approaches as viable orientations towards holistic, multidimensional sustainability.

Keywords: *Ubuntu philosophy, community-centric entrepreneurship, Afrocentric innovation, social capital, sustainable development*

JEL Classification: L31, L83, M13, O35, O55, Q01, R11, Z13

1.0 Introduction

1.1 Background of the study

The dominance of Western entrepreneurship paradigms, which emphasise individualism, profit maximisation, and competitive advantage, has increasingly been challenged by scholars advocating for contextually grounded theoretical frameworks that reflect diverse cultural worldviews and economic philosophies (Nkomo, 2015; Vertigans *et al.*, 2019). Within African contexts specifically, the Ubuntu philosophy, expressed through the Nguni proverb "umuntu ngumuntu ngabantu" (a person is a person through other people), offers an indigenous conceptual foundation for understanding economic activity, organisational behaviour, and sustainable development rooted in communal interdependence, reciprocity, and collective well-being rather than individualistic accumulation (Metz, 2015; Mligo, 2021). This relational ontology posits that community welfare and individual prosperity are inextricably intertwined, suggesting that sustainable economic development emerges through strengthening communal bonds, fostering reciprocal relationships, and prioritising collective flourishing alongside organisational success (Kamwangamalu, 2019; Ncube, 2021).

Within grassroots sports contexts, Ubuntu principles are manifested through community-embedded organisations whose value propositions extend beyond sporting performance or commercial objectives to encompass social cohesion, youth development, environmental stewardship, and community empowerment (Burnett, 2015; Schulenkorf & Spaaij, 2018). Non-league football clubs operating within marginalised African communities often position themselves as integral community assets, whose success is fundamentally intertwined with community welfare, embodying relational economics wherein organisational sustainability depends upon, and contributes to, broader community development (Banda *et al.*, 2021). This community-centric orientation reflects Ubuntu economics, wherein

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trust, reciprocity norms, and social capital constitute valuable organisational resources enabling collective action, resource mobilisation, and mutual advancement despite severe financial constraints (West, 2014; Venter, 2019).

1.2 Problem Statement

Despite growing recognition of the relevance of indigenous knowledge systems for sustainable development, entrepreneurship scholarship remains dominated by Western theoretical frameworks that inadequately capture communal economic practices, reciprocal value creation, and collective orientations characterising African organisational contexts (George *et al.*, 2016; Nkomo *et al.*, 2015). This theoretical gap proves particularly problematic for understanding community-based sports organisations in African contexts, where Ubuntu principles fundamentally shape strategic decisions, stakeholder relationships, and sustainability pathways yet remain under-theorised within mainstream sports entrepreneurship literature (Banda, 2010; Burnett, 2015).

Moreover, existing sustainable development frameworks predominantly emphasise either environmental sustainability or economic growth, insufficiently addressing the centrality of social sustainability within African development contexts, where community cohesion, collective identity, and reciprocal relationships constitute essential foundations for holistic well-being (Magee *et al.*, 2016; Ncube, 2021). Grassroots sports organisations offer potentially valuable contexts for examining how Ubuntu principles manifest in contemporary organisational practice, while illuminating alternative sustainability pathways that integrate social, environmental, and economic dimensions through community-centric approaches (Schulenkorf *et al.*, 2016; Welty Peachey *et al.*, 2015).

However, empirical research examining Ubuntu economics within grassroots sports entrepreneurship remains conspicuously limited, with scholarly attention concentrated predominantly on professional sports in developed economies rather than community-based organisations in African contexts where indigenous philosophies fundamentally shape organisational behaviour (Banda *et al.*, 2021). This knowledge gap hinders the understanding of Afrocentric entrepreneurship, limiting the capacity of sustainable development discourse to incorporate diverse cultural paradigms and alternative economic logics.

1.3 Study Objectives

i. To examine how non-league football clubs employ community engagement initiatives reflecting Ubuntu principles of reciprocity, collective identity, and communal well-being.

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ii. To analyse how community-centric positioning creates distinctive value propositions enabling competitive differentiation despite resource constraints.
iii. To explore social capital's role as an organisational resource within Ubuntu economics frameworks, examining how trust relationships, reciprocity norms, and network connections enable resource mobilisation, stakeholder engagement, and organisational sustainability.
iv. To demonstrate community-based sports organisations' potential as holistic sustainable development vehicles integrating social cohesion, environmental stewardship, and economic resilience through Ubuntu-informed approaches.

2.0 Literature Review

2.1 Theoretical Framework: Ubuntu Philosophy and Communal Economics

2.1.1. The Ubuntu Philosophy

Ubuntu philosophy constitutes the foundational theoretical framework for examining community-centric sports entrepreneurship within African contexts. Metz (2015) provides a comprehensive philosophical analysis, defining Ubuntu through its core relational principle: "umuntu ngumuntu ngabantu" (a person is a person through other people). This ontological stance posits that individual identity, worth, and flourishing emerge fundamentally through communal relationships rather than autonomous individuality. Unlike Western liberal philosophies emphasising self-sufficiency and individual rights, Ubuntu foregrounds interdependence, reciprocity, and collective well-being as essential prerequisites for human flourishing (Metz, 2015; Moloketi, 2017).

2.1.2. The Intersection Between Ubuntu and Communal Economics

West (2014) extends Ubuntu's philosophical foundations into economic contexts, arguing that Ubuntu economics challenges neoliberal paradigms prioritising competitive individualism and profit maximisation. Instead, Ubuntu-informed economic activity emphasises communal wealth creation, resource sharing, and reciprocal exchange wherein economic success intertwines with community welfare rather than individual accumulation (West, 2014). This perspective aligns with Ncube's (2021) analysis, demonstrating that Ubuntu principles manifest organisationally through participatory decision-making, stakeholder inclusivity, and prioritisation of collective benefit alongside organisational objectives.

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Kamwangamalu (2019) situates Ubuntu within broader Pan-African philosophical traditions whilst acknowledging regional variations and contemporary contestations. His sociolinguistic analysis reveals that Ubuntu discourse has evolved significantly, with contemporary applications ranging from authentic cultural practices to strategic rhetoric that may be divorced from substantive communal commitment. This critical perspective proves essential for evaluating whether organisational invocations of Ubuntu reflect genuine philosophical alignment or merely performative cultural appropriation (Kamwangamalu, 2019; Venter, 2019).

Critically, whilst Ubuntu philosophy provides rich conceptual resources, its application within entrepreneurship scholarship remains limited. Nkomo *et al.* (2015) identify persistent Eurocentrism within management research, arguing that African philosophical frameworks remain marginalised despite their potential for generating contextually grounded theories. This theoretical gap constrains understanding of how indigenous knowledge systems shape organisational behaviour within African contexts, limiting entrepreneurship scholarship's capacity to accommodate diverse cultural logics and alternative economic paradigms (George *et al.*, 2016).

2.2 Conceptual Literature: Social Capital and Community-Based Entrepreneurship

2.2.1. Social Capital Theory

Social capital theory provides complementary conceptual resources for understanding the organisational manifestations of Ubuntu economics. Putnam's (2000) influential framework defines social capital as networks, norms, and trust enabling collective action and resource mobilisation. Within African contexts, Andriani and Christoforou (2016) demonstrate that social capital assumes heightened significance given limited institutional development and resource scarcity characterising many communities. Trust relationships, reciprocity norms, and network connections function as alternative resource configurations when formal markets and institutional support remain inadequate (Andriani & Christoforou, 2016; Egunjobi, 2022). Accordingly, Ubuntu philosophy and social capital theory converge as mutually reinforcing frameworks, collectively illuminating how community-embedded organisations in African contexts transform relational assets — trust, reciprocity, and collective identity — into strategic resources capable of sustaining organisational viability in the absence of conventional financial and institutional support structures.

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2.2.2. Community-based Entrepreneurship

Community-based entrepreneurship scholarship examines how organisations embedded within specific geographical communities leverage local relationships, cultural knowledge, and stakeholder networks for value creation (Peredo & Chrisman, 2006; Mahosi *et al*., 2024; Mpanza, 2025). Importantly, community-based ventures frequently pursue dual objectives encompassing social value creation alongside economic sustainability, positioning community welfare as a legitimate organisational goal rather than merely an instrumental means toward profit generation (Bacq & Alt, 2018). This dual-purpose orientation aligns closely with Ubuntu principles, wherein organisational success and community flourishing constitute mutually reinforcing rather than competing objectives.

Vertigans *et al.* (2019) explicitly connect Ubuntu philosophy with corporate social responsibility, arguing that Ubuntu provides an indigenous justification for stakeholder-oriented management transcending shareholder primacy doctrines. Their analysis suggests that Ubuntu-informed organisations naturally prioritise stakeholder welfare, environmental stewardship, and communal benefit because philosophical commitments position these concerns as intrinsic rather than instrumental. However, Vertigans *et al.* (2019) acknowledge tensions between Ubuntu's communal orientations and competitive market pressures, which may undermine the authentic philosophical application of Ubuntu.

Räikkönen and Hedman (2025) provide recent empirical evidence on the role of social capital within grassroots sports organisations, demonstrating that community engagement initiatives strengthen trust, build reciprocity norms, and create network relationships that enable resource mobilisation despite financial constraints. Their findings reveal that deliberate social capital cultivation through community programming generates tangible organisational benefits, including volunteer recruitment, stakeholder support, and institutional legitimacy (Räikkönen & Hedman, 2025).

Despite these conceptual advances, the literature inadequately examines how Ubuntu philosophy specifically shapes social capital dynamics within African organisational contexts. Existing frameworks predominantly reflect Western cultural assumptions, which may misrepresent the distinctive characteristics of communal relationships within Ubuntu-informed settings. This study addresses this gap by examining social capital cultivation through the lens of Ubuntu philosophy, thereby illuminating indigenous mechanisms for trust-building, establishing reciprocity, and fostering network development.

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2.3 Empirical Literature: Sports Organisations and Sustainable Community Development

2.3.1. Sports Organisations

Empirical research increasingly recognises grassroots sports organisations as vehicles for community development, social inclusion, and sustainable growth within marginalised contexts (Schulenkorf *et al.*, 2016; Welty Peachey *et al.*, 2015). Within African contexts specifically, Burnett (2015) demonstrates that community-based sports initiatives address multiple development objectives simultaneously, including youth empowerment, health promotion, social cohesion, and violence reduction. This multifunctionality positions sports organisations as holistic development platforms rather than single-purpose recreational entities.

Banda *et al.* (2021) provide crucial empirical evidence regarding the role of community sports within Zambian contexts, revealing that grassroots clubs function as social infrastructure, strengthening community bonds, providing safe spaces for youth, and offering pathways toward social mobility despite operating under severe resource constraints. Their research demonstrates that community integration rather than sporting excellence constitutes the primary value proposition for grassroots clubs in marginalised African communities (Banda *et al.*, 2021). These findings challenge Western sports development models, which emphasise competitive performance and talent identification as primary organisational objectives.

Schulenkorf and Spaaij (2018) examine sport-for-development initiatives globally, identifying critical success factors including local ownership, community participation, and cultural sensitivity. Their analysis reveals that externally imposed programs lacking community embeddedness frequently fail despite substantial resource investments, while locally driven initiatives with authentic community integration succeed even with minimal external support (Schulenkorf & Spaaij, 2018). This observation highlights the strategic importance of community embeddedness—a principle that is fundamentally aligned with Ubuntu's communal orientation.

2.3.2. Sports Organisations for Sustainable Community Development

Tacon (2021) introduces the concept of football clubs as "community anchors"—organisations whose social contributions, stakeholder relationships, and community integration position them as essential community infrastructure transcending sporting functions. His research demonstrates that community-anchored clubs generate multiple forms of value, including social cohesion, youth development, environmental improvement, and economic activity through

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employment and local spending (Tacon, 2021). This holistic value creation exemplifies sustainable development's triple bottom line, encompassing social, environmental, and economic dimensions simultaneously (Mahosi, 2025).

However, the empirical literature exhibits a significant geographical bias, concentrating predominantly on European and North American contexts while marginalising African grassroots sports organisations (Burnett, 2015; George *et al.*, 2016). This bias limits our understanding of how cultural contexts, philosophical frameworks, and socioeconomic conditions influence sports entrepreneurship within African settings. Moreover, existing research inadequately examines specific mechanisms through which Ubuntu principles manifest organisationally, leaving underexplored how indigenous philosophies shape stakeholder relationships, strategic decisions, and sustainability pathways.

Recent research by Magee *et al.* (2016) provides methodological guidance for measuring social sustainability through community-centred approaches, emphasising participatory assessment methods valuing community perspectives alongside objective indicators. Their framework proves particularly relevant for evaluating Ubuntu-informed organisations wherein community perceptions regarding organisational contributions constitute essential legitimacy and sustainability measures (Magee *et al.*, 2016).

2.4 Research Gaps and Study Positioning

The literature review reveals three interconnected gaps this study addresses. First, a theoretical gap exists regarding the application of Ubuntu philosophy within entrepreneurship scholarship, with indigenous African frameworks remaining marginalised despite their potential for generating contextually grounded theories that challenge Western-centric paradigms (Nkomo *et al.*, 2015; George *et al.*, 2016). Second, a conceptual gap persists regarding how Ubuntu principles specifically shape social capital dynamics, stakeholder relationships, and value creation processes within African organisational contexts (Kamwangamalu, 2019; Venter, 2019). Third, the empirical gap characterises the sports entrepreneurship literature, which predominantly concentrates on developed economies while marginalising grassroots organisations in African contexts, where indigenous philosophies fundamentally shape organisational behaviour (Banda *et al.*, 2021; Burnett, 2015).

This study addresses these gaps by examining community-centric sports entrepreneurship through the lens of Ubuntu philosophy, demonstrating how indigenous African frameworks illuminate organisational practices, stakeholder relationships, and sustainability pathways. The research extends the Ubuntu

philosophy from philosophical discourse into empirical organisational analysis, while contributing to the decolonisation of entrepreneurship scholarship by centring African knowledge systems. Moreover, the study positions grassroots sports as holistic vehicles for sustainable development, integrating social, environmental, and economic dimensions through Ubuntu-informed community-centric approaches, offering replicable models for marginalised community development within African contexts.

3.0 Research Design and Methodology

3.1 Research Paradigm and Design

This study adopted an interpretivist research paradigm, recognising that community engagement, the manifestation of Ubuntu philosophy, and sustainable development pathways constitute socially constructed phenomena shaped by cultural contexts, subjective interpretations, and relational meanings (Saunders *et al.*, 2019). Interpretivism posits that social reality emerges through the subjective experiences of actors and that knowledge is accessed by understanding the meanings individuals ascribe to their lived experiences within specific cultural contexts (Creswell & Poth, 2018). This philosophical stance proved particularly appropriate for examining Ubuntu-informed organisational practices, wherein cultural values, relational norms, and communal commitments fundamentally shape strategic decisions and stakeholder relationships (Lincoln *et al.*, 2018).

The research employed a qualitative single-case study design, which Yin (2018) identifies as particularly suitable for investigating contemporary phenomena within real-world contexts where contextual conditions prove central to understanding the phenomenon. Case study methodology facilitates an intensive and holistic examination of complex organisational and social processes, enabling researchers to capture the richness, depth, and contextual nuances characterising the manifestation of Ubuntu economics within grassroots sports contexts (Yin, 2018). The single-case design allowed for in-depth analytical engagement with how Ubuntu principles influence community engagement practices, stakeholder relationships, and sustainability outcomes within a specific cultural and geographical context (Eisenhardt & Graebner, 2007).

3.2 Research Approach

The study employed an inductive research approach, prioritising theory generation from empirical data rather than testing predetermined hypotheses (Bryman, 2016). This approach aligned with the research's exploratory objectives, examining how Ubuntu philosophy manifests organizationally—a domain that

requires empirical grounding, given the limited existing theoretical frameworks connecting Ubuntu principles with sports entrepreneurship practices (Nkomo *et al.*, 2015). Inductive approaches prove particularly valuable when investigating under-researched phenomena within specific cultural contexts, enabling the development of theory grounded in contextual realities rather than imposing external frameworks that potentially misrepresent indigenous practices (George *et al.*, 2016; Cunliffe & Karunanayake, 2013).

Moreover, the inductive approach facilitated decolonial research practice by centring participants' perspectives, cultural frameworks, and indigenous knowledge systems rather than privileging Western theoretical constructs (Chilisa, 2020). This methodological orientation proved essential for authentically examining Ubuntu-informed organisational behaviour without reducing indigenous philosophies to mere variants of Western entrepreneurship theories.

3.3 Research Method

The case organisation was a non-league football club operating within a marginalised community in Johannesburg, South Africa, selected through purposive sampling based on specific criteria: (1) active engagement in community initiatives reflecting Ubuntu principles, (2) operation within socioeconomically disadvantaged context, (3) embeddedness within strong community networks, and (4) willingness to participate in academic research (Palinkas *et al.*, 2015). This purposive selection ensured alignment between research objectives and case characteristics, while providing access to an information-rich context that illuminates Ubuntu economics within grassroots sports entrepreneurship.

The South African context presented valuable opportunities for examining the contemporary manifestations of Ubuntu philosophy within post-apartheid society, characterised by persistent inequality, vibrant community social capital, and ongoing negotiation between indigenous values and globalised economic pressures (Kamwangamalu, 2019). The club's operational environment, characterised by severe resource constraints yet strong community integration, exemplifies conditions in which Ubuntu principles assume practical strategic significance rather than merely rhetorical invocation.

3.4 Population and Sample

The study's target population comprised managerial personnel within the case organisation possessing direct involvement in community engagement planning, strategic positioning, and stakeholder relationship management. From this population, five participants were purposively selected: the club owner/head coach,

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club chairman, club secretary, assistant coach, and team manager (Patton, 2015). This sample size proved appropriate for qualitative case study research, prioritising depth over breadth, which enabled intensive engagement with participants' perspectives while ensuring data saturation regarding the manifestation of community engagement practices and Ubuntu principles (Guest *et al.*, 2020).

Participant selection emphasised diversity of organisational roles, ensuring a comprehensive understanding of community engagement across different functional perspectives and responsibility levels. The inclusion of both leadership positions (owner, chairman) and operational roles (secretary, coaches, manager) facilitated triangulation of perspectives, while capturing how Ubuntu principles permeate the organisational hierarchy rather than remaining confined to strategic rhetoric (Lincoln *et al.*, 2018).

3.5 Research Instrument

Primary data were collected through semi-structured interviews, employing an interview guide developed from literature on Ubuntu philosophy, social capital theory, and community engagement scholarship (Brinkmann & Kvale, 2015). The interview guide encompassed open-ended questions that explored community engagement motivations and philosophical underpinnings, specific initiatives implemented, stakeholder relationship-building approaches, reciprocal value creation mechanisms, the manifestation of Ubuntu principles in organisational practice, and perceived sustainability impacts across social, environmental, and economic dimensions.

Questions were formulated to encourage narrative responses, enabling participants to articulate their experiences, values, and strategic reasoning without constraint (Rubin & Rubin, 2012). Examples included: "How does the club understand its relationship with the community?" "What community initiatives does the club undertake and why?" "How do community engagement activities reflect the club's values?", and "In what ways does community integration contribute to the club's sustainability?" Probing questions enabled a deeper exploration of the specific manifestations, authenticity assessments, and reciprocal dynamics of Ubuntu principles.

Cultural sensitivity was prioritised throughout instrument development, with questions framed to respect the Ubuntu philosophy's relational orientation while avoiding the imposition of Western, individualistic frameworks (Chilisa, 2020). The interview guide underwent pilot testing with community development practitioners familiar with Ubuntu contexts, ensuring cultural appropriateness and conceptual clarity.

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3.6 Data Collection

Interviews were conducted in participants' preferred language (English or isiZulu) at locations and times convenient to participants, demonstrating respect and facilitating comfort (Creswell & Poth, 2018). Each interview lasted 50-80 minutes and was audio-recorded with informed consent, subsequently transcribed verbatim (Silverman, 2020). Field notes captured contextual observations, non-verbal cues, emotional tones, and preliminary analytical reflections, enriching subsequent interpretation (Phillippi & Lauderdale, 2018).

Data analysis employed thematic analysis following Braun and Clarke's (2019) six-phase framework: familiarisation through repeated transcript reading, initial code generation, theme searching, theme reviewing, theme defining and naming, and report production. Analysis was facilitated by ATLAS.ti version 24, which enabled systematic coding, pattern identification, and the maintenance of a transparent audit trail (Friese, 2019). The analytical process prioritised participants' cultural frameworks and indigenous concepts rather than imposing predetermined Western theoretical constructs, thereby maintaining decolonial methodological commitments (Chilisa, 2020).

3.7 Ethical Considerations

The research adhered to rigorous ethical standards governing social research. Ethical clearance was obtained from the University of Johannesburg's institutional research ethics committee under the ethical clearance code 24SOM/BM85 prior to the commencement of data collection. Participants received comprehensive information sheets detailing the study's purpose, procedures, potential risks, and benefits in clear and accessible language, ensuring that informed consent was freely given without coercion (Christians, 2018). Given Ubuntu's communal orientation, community leaders were consulted regarding the appropriateness of the research and its potential benefits to the community, respecting the norms of collective decision-making (Chilisa, 2020).

Confidentiality was assured through pseudonymisation, with organisational and participant identities protected in all research outputs. However, participants were offered a choice regarding anonymity versus attribution, respecting desires for recognition of community contributions—a consideration reflecting Ubuntu's communal orientation wherein individual invisibility may prove culturally inappropriate (Moloketi, 2017). Data were securely stored on password-protected devices accessible only to the research team, ensuring compliance with data protection regulations.

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Participants retained withdrawal rights throughout the study, and opportunities were provided to review interview transcripts, enhancing accuracy whilst respecting participant agency (Tracy, 2010). The research maintained sensitivity to power dynamics, adopting collaborative approaches that valued participants' expertise and indigenous knowledge, while acknowledging the researcher's positionality as an external observer who might potentially misinterpret cultural practices (Guillemin & Gillam, 2004). Findings were shared with participants and community members prior to publication, ensuring respectful representation and providing opportunities for correction or clarification—practices reflecting Ubuntu's relational ethics and reciprocal obligations (Chilisa, 2020).

4 Results and Findings

The analysis of interview data revealed that community engagement within the case organisation fundamentally reflects the core principles of Ubuntu philosophy, wherein organisational success and community welfare constitute mutually reinforcing rather than competing objectives. Participants consistently articulated community integration not merely as a strategic positioning tool but as an authentic philosophical commitment embodying relational economics wherein trust, reciprocity, and collective flourishing constitute both intrinsic values and organisational resources. This section presents findings that demonstrate the manifestation of Ubuntu economics through community-centric sports entrepreneurship, while illuminating sustainable development pathways that integrate social, environmental, and economic dimensions.

4.1 Ubuntu Principles Manifesting Through Community Engagement

Participants unanimously identified community engagement as foundational to organisational identity, positioning the club as an integral community asset whose value extends beyond its sporting functions. The club owner/head coach articulated this perspective explicitly: "We exist because of this community and for this community. Our success means nothing if the community is not thriving. When we help the community, we help ourselves—this is Ubuntu, we are because they are." This testimony exemplifies the core relational principle of the Ubuntu philosophy, wherein individual (organisational) flourishing emerges fundamentally through communal well-being (Metz, 2015; Ncube, 2021).

The club chairman elaborated on this philosophical foundation: "Everything we do asks: 'Does this serve the community?' If the answer is no, we do not do it. Our identity is inextricably linked to the well-being of our community. This is not a strategy; it is who we are." This statement reveals that Ubuntu principles function

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not merely as instrumental strategic frameworks, but as authentic ontological commitments that shape organisational decisions, stakeholder relationships, and value creation processes. The distinction proves theoretically significant: whilst Western corporate social responsibility frameworks position community engagement as a discretionary strategic choice, Ubuntu-informed organisations position community welfare as an intrinsic organisational purpose rather than an optional supplement to primary economic objectives (West, 2014; Vertigans *et al.*, 2019).

4.2 Reciprocal Value Creation Through Community Initiatives

Participants described multiple community engagement initiatives exemplifying Ubuntu's reciprocal economics, wherein organisational contributions generate community benefits that subsequently enable organisational sustainability. **Community clean-up programmes** emerged as particularly significant, with the assistant coach explaining: "Every month, we organise neighbourhood clean-ups—collecting rubbish, clearing drains, beautifying public spaces. This shows we care about our environment and community beyond football. People see us working for the community's benefit, and they reciprocate by supporting our club."

This practice demonstrates environmental stewardship integrated with social capital cultivation, wherein visible community contributions build trust and reciprocity norms enabling resource mobilisation (Andriani & Christoforou, 2016; Räikkönen & Hedman, 2025). Importantly, participants emphasised authentic commitment rather than performative engagement, with the team manager stating: "We clean the community because it is right, because we live here, because Ubuntu teaches us to care for our collective space. The community support we receive is not the reason we do it; it is the natural consequence of genuine care."

School outreach activities constituted a second crucial community engagement mechanism reflecting Ubuntu's intergenerational responsibility principles. The club secretary described: "We visit schools weekly, providing coaching, motivational talks, and educational support. This is not recruiting players; it is fulfilling our duty to nurture young people, to pass knowledge forward as Ubuntu requires." This testimony reveals that youth development functions simultaneously as both a cultural obligation and a strategic initiative—a dual character that distinguishes Ubuntu-informed entrepreneurship from purely instrumental Western approaches (Moloketi, 2017; Kamwangamalu, 2019).

Local business collaborations exemplified Ubuntu's network-building principles, with participants describing partnerships wherein mutual support strengthens collective capacity. The club chairman explained: "Local businesses

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support us with equipment, transport, and venue access. We reciprocate by promoting their services, bringing community members to their establishments, and helping them connect with residents. This mutual support strengthens everyone—Ubuntu economics in practice."

These initiatives collectively demonstrate reciprocal value creation wherein organisational community contributions generate trust, reciprocity norms, and stakeholder support, enabling sustained operations despite severe financial constraints. This reciprocity differs fundamentally from transactional exchange: participants emphasised that community support emerges naturally from authentic care rather than explicit quid pro quo arrangements, reflecting Ubuntu's gift economy principles rather than market exchange logics (West, 2014; Venter, 2019).

4.3 Social Capital as Organisational Resource

A critical finding concerned how Ubuntu-informed community engagement cultivates social capital, functioning as an organisational resource that substitutes for absent financial capital. The club owner/head coach articulated: "We do not have money, but we have community trust. This trust gives us access to facilities, volunteers, support, and partnerships—resources that money cannot buy, even if we had it. Ubuntu teaches that relationships are wealth."

This perspective exemplifies alternative resource configurations wherein social capital enables collective action and resource mobilisation despite financial constraints (Putnam, 2000; Andriani & Christoforou, 2016). Participants provided specific examples: volunteer labour substituting for paid personnel, community facility access replacing expensive infrastructure investments, local business donations providing equipment, and stakeholder advocacy attracting partnership opportunities. These tangible benefits demonstrate the practical strategic value of social capital, validating the proposition that relational assets constitute genuine wealth, thereby enabling organisational sustainability (West, 2014).

Importantly, participants emphasised that social capital cultivation requires sustained authentic engagement rather than short-term performative gestures. The assistant coach noted, "Community trust is not built overnight. It requires years of consistent presence, genuine care, and demonstrated commitment. Once established, it becomes the foundation for everything we do." This observation aligns with the social capital literature, which emphasises that trust relationships develop gradually through repeated positive interactions and demonstrated reliability (Räikkönen & Hedman, 2025; Tacon, 2021).

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4.4 Holistic Sustainable Development Through Community-Centric Approaches

The findings reveal that Ubuntu-informed community engagement simultaneously advances multiple sustainability dimensions, including social cohesion, environmental stewardship, and economic resilience, demonstrating holistic sustainable development that transcends single-dimension approaches. The club secretary explained: "Our community work addresses social needs through youth development and inclusion, environmental needs through clean-ups, and economic needs by creating opportunities and supporting local businesses. These are not separate programmes; they are interconnected aspects of community well-being."

This integration exemplifies what Magee *et al.* (2016) term community-centred sustainability, wherein development initiatives address multiple dimensions simultaneously through community participation and locally defined priorities. Participants consistently rejected Western sustainability frameworks that separate social, environmental, and economic concerns, instead articulating holistic perspectives wherein these dimensions constitute inseparable aspects of collective flourishing—a characteristic worldview that reflects Ubuntu's integrative philosophy (Metz, 2015; Moloketi, 2017).

The club chairman articulated aspirations extending beyond organisational sustainability toward broader community development: "Our ultimate goal is not just club survival; it is community transformation. We succeed when our community thrives socially, environmentally, and economically. This is Ubuntu—individual success through collective flourishing."

5.0 Managerial Implications

5.1 Theoretical Implications

This study makes significant theoretical contributions to the scholarship of entrepreneurship, the discourse on sustainable development, and African management research. First, the research extends Ubuntu philosophy from philosophical discourse into empirical organisational analysis, demonstrating how indigenous African knowledge systems manifest practically within contemporary entrepreneurial contexts (Metz, 2015; Ncube, 2021). By illuminating specific mechanisms through which Ubuntu principles shape community engagement, stakeholder relationships, and value creation processes, the study validates indigenous frameworks as viable alternatives to Western-centric entrepreneurship

theories that inadequately capture communal orientations and reciprocal economics (Nkomo *et al.*, 2015; George *et al.*, 2016).

Secondly, the findings challenge individualistic entrepreneurship paradigms, positioning profit-maximisation and competitive advantage as universal entrepreneurial principles. The research reveals that communal well-being, reciprocal value creation, and collective flourishing constitute legitimate—indeed, strategically effective—organisational objectives enabling sustainable development within resource-constrained contexts (West, 2014; Vertigans *et al.*, 2019). This contribution proves essential for decolonising entrepreneurship scholarship through demonstrating that alternative ontological foundations generate distinctive yet viable entrepreneurial logics.

Thirdly, the study extends social capital theory by demonstrating how Ubuntu-informed community engagement cultivates trust, reciprocity, and networks that function as organisational resources, substituting for financial capital. This finding refines our understanding of alternative resource configurations while highlighting the influence of cultural contexts on social capital formation mechanisms (Andriani & Christoforou, 2016; Räikkönen & Hedman, 2025).

5.2 Managerial and Practical Implications

The research yields multiple practical implications for grassroots sports organisations, community development practitioners, and social entrepreneurs operating within resource-constrained African contexts. First, the findings demonstrate that authentic community engagement, rooted in Ubuntu principles, creates sustainable competitive advantages that are unavailable through purely commercial strategies. Clubs should therefore position community welfare as an intrinsic organisational purpose rather than an instrumental marketing strategy, recognising that genuine philosophical commitment generates stakeholder trust and reciprocal support more effectively than performative gestures (Tacon, 2021; Vafeas & Hughes, 2021).

Secondly, the study reveals that social capital cultivation through sustained community presence, consistent engagement, and demonstrated care enables resource mobilisation despite financial constraints. Organisations should therefore invest deliberately in relationship building, community participation, and stakeholder dialogue, recognising these activities as strategic imperatives rather than peripheral social responsibilities (Schulenkorf *et al.*, 2016).

Thirdly, the research demonstrates the viability of holistic sustainable development through integrated programming addressing social, environmental, and economic dimensions simultaneously. Organisations should resist Western

frameworks separating these concerns, instead pursuing community-centred approaches wherein multiple sustainability objectives reinforce one another (Magee *et al.*, 2016).

6.0 Recommendations

6.1 Recommendations for Policymakers

Support Indigenous Knowledge Integration: Policymakers could explicitly recognise and support Ubuntu-informed organisational practices within sports development frameworks, acknowledging indigenous philosophies as legitimate strategic orientations rather than requiring conformity to Western business models. Policy instruments should accommodate diverse entrepreneurial logics reflecting cultural plurality.

Provide Community Engagement Infrastructure: Government agencies should consider investing in community sports infrastructure—facilities, equipment, training programmes—enabling grassroots clubs to implement community engagement initiatives effectively. Such investments recognise the broader development contributions of community-based sports beyond purely recreational functions.

Create Social Capital Recognition Mechanisms: Funding frameworks could acknowledge social capital as a legitimate organisational asset, evaluating clubs based on community integration, stakeholder relationships, and social value creation alongside financial metrics. This recognition validates communal approaches while enabling resource allocation that reflects holistic performance assessment.

Facilitate Multi-Stakeholder Partnerships: Policymakers should consider brokering partnerships connecting grassroots clubs with schools, businesses, NGOs, and civic organisations, reducing relationship-building barriers while creating platforms for collaborative community development initiatives that embody Ubuntu's principles of collective action.

6.2 Recommendations for Stakeholders and Aspiring Club Owners

Embrace Ubuntu Philosophy Authentically: Stakeholders establishing community-based clubs should ground organisational identity in Ubuntu principles genuinely rather than invoking indigenous concepts performatively. Authentic philosophical commitment requires consistent community prioritisation, participatory decision-making, and genuine care for collective well-being beyond organisational self-interest (Kamwangamalu, 2019; Moloketi, 2017).

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Prioritise Community Integration Over Commercial Success: Aspiring club owners could recognise that sustainable growth within marginalised communities emerges through community embeddedness rather than competitive excellence or commercial sophistication. Strategic planning should therefore prioritise community engagement, stakeholder relationships, and social value creation as foundational objectives enabling long-term viability.

Cultivate Social Capital Systematically: Clubs should consider implementing deliberate social capital-building practices, including regular community initiatives, participatory programming, transparent communication, and consistent stakeholder engagement. Social capital cultivation requires sustained commitment and authentic relationships rather than episodic interventions.

Implement Holistic Sustainability Programming: Organisations could develop integrated initiatives addressing social cohesion (youth development, inclusion programming), environmental stewardship (clean-ups, conservation activities), and economic resilience (skills training, local business support) simultaneously, recognising the interconnection of these dimensions within Ubuntu-informed development frameworks.

Build Reciprocal Partnerships: Clubs should consider establishing collaborative relationships with community organisations, businesses, and institutions based on mutual benefit and reciprocal support rather than transactional exchanges. Ubuntu economics emphasises relationship quality and collective advancement over extractive resource acquisition.

Invest in Cultural Competence: Stakeholders should develop a deep understanding of Ubuntu philosophy, local cultural contexts, and community-specific needs through sustained engagement, respectful listening, and participatory learning. Practical, community-centric entrepreneurship requires cultural sensitivity and a genuine commitment to indigenous values.

These recommendations collectively position Ubuntu-informed community engagement as a strategic pathway toward sustainable development, offering actionable guidance for diverse stakeholders seeking to leverage grassroots sports for holistic community transformation within African contexts.

7.0 Conclusions and Future Research

7.1 Conclusions

This study examined community-centric sports entrepreneurship through the lens of Ubuntu philosophy, demonstrating how grassroots football clubs in South African contexts embody indigenous principles of communal interdependence,

reciprocal value creation, and collective well-being as sustainable development pathways. The research reveals that Ubuntu economics manifests practically through community engagement initiatives, wherein organisational success and community welfare constitute mutually reinforcing rather than competing objectives, challenging Western entrepreneurship paradigms that emphasise individualism and profit maximisation as universal principles.

The findings demonstrate that Ubuntu-informed community engagement, encompassing cleanup programs, school outreach, and local business collaborations, cultivates social capital, functioning as an organisational resource that enables resource mobilisation, stakeholder support, and sustained operations despite severe financial constraints. This reciprocal value creation exemplifies an alternative economic logic wherein trust relationships, reciprocity norms, and collective identity constitute genuine wealth, substituting for absent financial capital. Importantly, participants emphasised authentic philosophical commitment rather than performative engagement as essential for generating social capital, revealing that genuine Ubuntu principles, rather than instrumental strategic rhetoric, generate stakeholder trust and reciprocal support.

The research makes significant theoretical contributions by extending Ubuntu philosophy from philosophical discourse into empirical organisational analysis, validating indigenous African knowledge systems as viable frameworks for entrepreneurship scholarship. The study challenges the inadequacy of Western-centric theories in capturing communal orientations and reciprocal economics, demonstrating that alternative ontological foundations generate distinctive yet strategically effective entrepreneurial logics. Moreover, the findings position grassroots sports organisations as holistic vehicles for sustainable development, integrating social cohesion, environmental stewardship, and economic resilience simultaneously (Ungureanu & Ungureanu, 2020)—a characteristic that reflects Ubuntu's integrative worldview, wherein these dimensions constitute inseparable aspects of collective flourishing.

Practically, the research demonstrates that community-embedded sports clubs pursuing authentic Ubuntu-informed engagement create sustainable competitive advantages that are unavailable through purely commercial strategies, enabling organisational resilience while advancing community welfare. This dual benefit validates community-centric entrepreneurship as a viable pathway toward inclusive, sustainable development within marginalised African contexts, offering replicable models for organisations, policymakers, and development practitioners seeking culturally grounded approaches to community transformation.

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In conclusion, this study demonstrates that Ubuntu economics in action, as exemplified through grassroots sports entrepreneurship, presents a compelling alternative to Western entrepreneurship paradigms. It reveals that communal well-being, reciprocal relationships, and collective flourishing constitute not merely philosophical ideals but actionable strategies that enable sustainable development. By centring indigenous African knowledge systems, the research contributes to decolonising entrepreneurship scholarship whilst illuminating pathways toward holistic sustainability, integrating social, environmental, and economic dimensions through authentic community-centric approaches rooted in cultural values and relational ontologies.

7.2 Future Research Directions

This study opens numerous promising avenues for future scholarly inquiry, advancing the understanding of Ubuntu economics, Afrocentric entrepreneurship, and the applications of indigenous knowledge systems within contemporary organisational contexts.

Comparative Ubuntu Manifestations: Future research should examine the manifestation of Ubuntu principles across diverse African contexts, geographical regions, and organisational types, illuminating how cultural variations, historical trajectories, and socioeconomic conditions shape the practical applications of indigenous philosophies. Comparative analysis across South Africa, Zimbabwe, Kenya, and other Ubuntu-influenced contexts would reveal both universal principles and context-specific adaptations whilst addressing whether Ubuntu manifestations differ systematically across regions.

Longitudinal Ubuntu Sustainability Studies: Research tracking organisations over extended periods could reveal how Ubuntu-informed strategies affect long-term sustainability trajectories, whether authentic philosophical commitments prove durable amid commercial pressures, and how intergenerational knowledge transmission maintains cultural continuity. Longitudinal designs would illuminate the temporal dynamics of Ubuntu economics while assessing the sustained competitive advantages derived from communal orientations.

Quantitative Ubuntu-Performance Relationships: Whilst this qualitative study illuminated Ubuntu manifestation mechanisms, quantitative research could assess relationships between Ubuntu principle adherence, social capital levels, and organisational performance indicators across large samples. Such studies would provide statistical evidence regarding the organisational benefits of Ubuntu economics, while identifying optimal configurations that balance communal commitments with operational viability.

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Community Perspectives on Ubuntu Authenticity: This study examined managerial perspectives on the concept of Ubuntu authenticity. Future research should investigate community members' perceptions regarding organisational Ubuntu authenticity, distinguishing genuine philosophical commitment from performative rhetoric. Understanding community authenticity assessments would illuminate trust-building mechanisms whilst revealing potential gaps between organisational self-perceptions and stakeholder evaluations.

Ubuntu Economics Scaling Challenges: Research should examine whether Ubuntu principles maintain authenticity and effectiveness as organisations grow, exploring potential tensions between communal orientations and institutional formalisation, professionalisation, or geographical expansion. Understanding scaling dynamics would inform organisations seeking growth whilst preserving cultural integrity and community embeddedness.

Indigenous Knowledge Integration Frameworks: Future studies should develop comprehensive frameworks that integrate multiple indigenous African knowledge systems, such as Ubuntu, Ujamaa, and Harambee, with contemporary entrepreneurship practices, advancing decolonial scholarship while providing actionable guidance for culturally grounded organisational development. Such frameworks would contribute to reimagining entrepreneurship theory beyond Western paradigms.

Ubuntu and Digital Technologies: Research investigating how Ubuntu principles manifest through digital platforms, virtual communities, and technology-mediated engagement would address increasingly relevant questions regarding the adaptation of traditional relational philosophies to contemporary technological contexts, revealing whether digital mediation enhances or undermines authentic communal relationships.

Policy Evaluations of Ubuntu-Informed Interventions: Rigorous assessments of programmes explicitly supporting Ubuntu-informed entrepreneurship would provide evidence-based guidance for policy design and resource allocation, revealing which interventions most effectively strengthen indigenous knowledge applications whilst advancing sustainable development objectives within African contexts.

These research directions collectively advance scholarly understanding of Ubuntu economics while contributing to broader decolonial projects that reimagine entrepreneurship, sustainable development, and organisational practice by centring indigenous African knowledge systems, cultural plurality, and alternative ontological foundations.

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INFORMAL TRADING AS A STRUCTURAL CUSHION AGAINST GENDER-BASED VIOLENCE: EVIDENCE FROM BLACK WOMEN TRADERS IN DEVELOPING ECONOMIES

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Abstract

This article argues that informal trading by Black women in South Africa functions not only as a livelihood strategy but as a structural cushion against gender-based violence (GBV). Drawing on a critical integrative literature review spanning economics, sociology, gender studies, public health, social work, law, urban planning, and development studies, the article addresses a gap in GBV scholarship: the failure to recognise informal economic activity as a multi-dimensional protective mechanism. Five categories of GBV-cushioning effect are identified: economic independence that dissolves abusive financial dependency; social embeddedness that enables collective surveillance and mutual protection; spatial occupation of public space that reduces the isolation in which violence intensifies; psychological agency that rebuilds self-worth after victimisation; and political voice that empowers women to demand institutional accountability. Four conditions under which the cushion fails are identified: deepest poverty, immigrant exclusion, regulatory destruction, and escalation risk. A six-pillar multi-sector action framework is proposed, directing recommendations to enterprise development agencies, financial

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regulators, municipalities, social development departments, health services, and digital authorities. The article is addressed to practitioners, scholars, and community organisations across these sectors.

Keywords: *informal trading, gender-based violence, economic independence, social protection, intersectionality*

JEL Classification: J16, O17, I31, D63, J71, Z13, H53, O55

1. Introduction

Gender-based violence (GBV) in South Africa is simultaneously a public health crisis, a human rights emergency, an economic development failure, a social cohesion catastrophe, and a constitutional governance deficit. The country records femicide rates five times the global average (SAPS, 2023). Over two hundred sexual offences are reported every day, and intimate partner violence prevalence cuts across every province, income level, and community type (SAPS, 2023). Yet for all the multidisciplinary attention GBV attracts, the responses it generates remain largely disciplinary silos. Counselling programmes address trauma but not income (Dlamini, 2021). Law enforcement initiatives target perpetrators but not the economic dependency that traps victims in abusive relationships a structural gap that Jewkes (2002) identifies as central to any effective GBV prevention framework. Enterprise development programmes provide business training while ignoring the GBV context in which women build their businesses (Ayandibo, 2024). The result is a fragmented landscape of interventions that has consistently failed to move the needle on GBV prevalence in any sustained direction.

This article proposes a different entry point into this fragmentation: not the legal framework, not the perpetrator psychology programme, not the counselling intervention but the market stall. More precisely, it argues that the daily economic activity of Black women informal traders in South Africa constitutes a form of structural cushioning against GBV that has been overlooked precisely because it does not fit neatly into any single disciplinary frame. The spaza shop owner whose trading income cannot be seized by an abusive partner because it is immediately reinvested in new stock demonstrates how financial independence creates exit options (Vyas & Watts, 2009). The street food vendor whose daily public presence means her neighbours will notice and respond if she disappears illustrates how spatial visibility generates social safety (Skinner & Watson, 2021). The stokvel member who can access emergency savings when violence destroys her business shows the protective power of informal financial networks (Ajemunigbohun,

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2023). These are not romantic metaphors of resilience; they are structurally grounded, documentable mechanisms through which informal trading reduces the impact of GBV on Black women's lives.

The cushioning thesis advanced here is not a counsel of complacency. It does not claim that informal trading solves GBV, or that Black women should be expected to self-fund their own protection against structural violence. The cushion is real but partial, powerful but fragile, and unevenly distributed across the heterogeneous population of Black women who trade informally. Gqola (2015) grounds this argument in the South African context, demonstrating that separating women's economic agency from GBV policy is not merely administratively inconvenient but analytically mistaken and practically costly.

The article is structured in ten sections. Section 2 establishes conceptual and theoretical foundations. Section 3 provides a contextual portrait of Black women informal traders. Section 4 maps the GBV landscape they navigate daily. Section 5 develops the five dimensions of the cushioning effect. Section 6 identifies the structural conditions under which the cushion fails. Section 7 presents the key findings synthesised from the literature. Section 8 proposes the six-pillar multi-sector action framework. Section 9 discusses cross-national applicability. Section 10 concludes. Disciplinary Lens boxes are embedded throughout to make the relevance of each argument explicit to readers from specific professional backgrounds.

2. Literature Review

2.1 Conceptual Foundations: The Cushioning Thesis

2.1.1 What a Cushion Does

A cushion, in the material sense, absorbs and distributes force: it reduces the impact of a blow without necessarily eliminating the blow itself. Applied analytically, the cushioning metaphor captures this dynamic in the relationship between informal trading and GBV. Informal trading does not make violence disappear; it reduces its impact on women's bodies, minds, finances, and futures by creating multiple layers of absorptive capacity operating simultaneously. Financial independence creates material options for exit (Vyas & Watts, 2009). Social network density creates collective awareness and solidarity (Omolekan & Omole, 2020). Public space occupation creates visibility-based safety (Skinner & Watson, 2021). Psychological identity as a trader creates an agentic self-concept that resists victimisation (Musara & Nieuwenhuizen, 2020). Political organisation creates a voice that can demand institutional accountability (Omolekan & Omole, 2020).

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Folke (2006) and Walker et al. (2004) establish the resilience framework underlying the concept of multi-layered absorptive capacity that these five dimensions collectively form. Chibber et al. (2022) extend this resilience lens to urban informality in southern Africa, confirming that informal economic activity generates multi-dimensional adaptive capacity that formal social protection systems do not capture.

The cushioning thesis integrates three established bodies of scholarship into a new analytical configuration. The resilience literature documents how informal traders survive and adapt under conditions of acute adversity (Chibber *et al.,* 2022; Musara & Nieuwenhuizen, 2020). The feminist economics literature establishes that women's economic independence is a structural determinant of GBV prevalence and intensity (Vyas & Watts, 2009; De Wet-Billings & Billings, 2024). The social capital literature demonstrates that network embeddedness generates protective resources inaccessible to isolated individuals (Coleman, 1988; Omolekan & Omole, 2020). The cushioning thesis does not merely summarise these streams; it recombines them to generate a specific analytical claim about informal trading as a GBV-protective mechanism, with direct implications for policy design across multiple sectors.

2.2 Four Theoretical Pillars

2.2.1 Intersectionality

Intersectionality (Crenshaw, 1989) is the non-negotiable starting point for analysis of Black women informal traders. Crenshaw (1989) establishes that Black women's experiences cannot be understood by adding "being Black" to "being a woman" to "being poor": the intersection of these identities produces unique vulnerability and resource configurations that require their own analytical vocabulary. Nguse (2023) applies this framework directly to the South African public health context, confirming that the intersection of race, gender, and poverty produces compounded forms of vulnerability that single-axis policy frameworks cannot address. The cushioning effect of informal trading is itself intersectionally differentiated: a well-established township spaza shop owner embedded in a stokvel network occupies qualitatively different cushioning terrain from a recently arrived migrant vendor with no local connections, despite both falling under the same broad analytical category (Chinomona & Maziriri, 2015). Policy that treats Black women informal traders as a homogeneous group will distribute cushioning resources unevenly, leaving the most vulnerable sub-populations migrant women, very young traders, and women in deep rural areas with the thinnest protection.

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2.2.2 Feminist Political Economy

The feminist political economy situates women's informal trading in the broader structure of a gendered economy in which women's labour is systematically undervalued and under-protected. Ayandibo (2024) confirms in the South African context that gender-focused enterprise support programmes are constrained by structural barriers, and that women entrepreneurs must work against patriarchal institutional norms even within programmes designed to help them. From this perspective, the cushioning effect of informal trading is not a private solution to a private problem but a collectively produced social good that the state has failed to recognise, invest in, or protect. When formal institutions fail to prevent GBV, the informal trading networks of Black women partially absorb the resulting harm, performing a social protection function without recognition or remuneration. Gqola (2015) demonstrates that women's economic contributions in conditions of structural violence are consistently rendered invisible by policy frameworks. Skinner and Watson (2021) develop this invisibility in the South African urban policy context, showing how municipal frameworks routinely treat informal trading as a regulatory problem rather than a social protection asset.

2.2.3 Social Protection Theory

Social protection theory encompasses the formal and informal mechanisms through which societies protect members against livelihood loss, health crisis, and social marginalisation (Devereux & Sabates-Wheeler, 2004). Devereux and Sabates-Wheeler (2004) argue that transformative social protection must address the structural power relations that produce vulnerability, not merely the symptoms of deprivation. Informal trading networks stokvels, savings clubs, and trader associations that Black women build and sustain constitute informal social protection systems that partially substitute for the formal safety nets absent from most GBV survivors' lives in South Africa. Ajemunigbohun (2023) documents how these informal financial networks provide emergency capital that formal social protection systems do not reach. Chibber *et al*. (2022) confirm that such community-embedded adaptive structures generate multi-dimensional protective capacity that formal systems consistently fail to replicate. Recognising these networks as social protection infrastructure is the first step toward the policy investment they deserve.

2.2.4 Capabilities Approach

The capabilities approach (Sen, 1999; Nussbaum, 2000) provides the normative anchor for this analysis. Sen (1999, 18) argues that development must be measured by the real freedoms people enjoy, not merely their income or resource levels.

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Nussbaum (2000) extends this framework to women specifically, identifying bodily integrity and affiliation as central capabilities that GBV directly destroys. The capabilities approach evaluates whether informal trading genuinely expands Black women's substantive freedoms their real ability to live without violence, make genuine economic choices, form relationships of dignity, and participate in political life or merely maintains bare survival. The cushion is adequate when it expands capabilities; it is inadequate when it absorbs shocks without changing the structural conditions that produce them. This distinction drives the framework proposed in Section 8.

3. Black Women Informal Traders: A Contextual Portrait

South Africa's informal economy employs approximately 2.9 million people, of whom women constitute approximately 56%, with Black women accounting for the overwhelming majority (Statistics South Africa, 2023). Skinner and Watson (2021) document the diverse spatial landscape across which informal traders operate: spaza shops in township residential areas, street food stalls at taxi ranks, agricultural produce markets along rural corridors, domestic goods vending in residential neighbourhoods, and informal personal services including hairdressing, childminding, and cleaning. This spatial footprint is vast, covering urban townships, peri-urban settlements, secondary central business districts, and deep rural villages (Mokoena & Liambo, 2023).

The motivations for entering informal trading are heterogeneous. Musara and Nieuwenhuizen (2020) challenge the assumption that all women's informal trading is purely survivalist, documenting growth-oriented, innovation-driven, and network-embedded enterprises that demonstrate genuine entrepreneurial orientation. Maduku and Kaseeram (2021) confirm that success indicators among Black-owned informal SMMEs frequently reflect deliberate strategic choices rather than bare necessity. Radebe and Smith (2023) add that Black African women's unemployment in South Africa stands at 39.9%, situating informal trading not merely as economic choice but as structural necessity driven by gendered exclusion from formal employment. Cloete, Maistry and Singh (2023) document that escape from unsafe domestic environments is among the lived motivations women cite for entering and sustaining informal trading, confirming its function as both economic strategy and a means of creating safe distance from abusive relationships.

Structural conditions compress the operating environment. Low capitalisation and regulatory insecurity erode the margins available to women traders, as documented consistently in the South African SMME literature (Maduku &

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Kaseeram, 2021; Musara & Nieuwenhuizen, 2020). Statistics South Africa (2023) records unemployment exceeding 32% in the period under review, reflecting macro-level pressure that intensifies competition in already thin informal trading markets. Dlamini (2021, p. 584) situates these structural pressures within the broader GBV landscape, showing how economic stress and intimate partner violence escalation are empirically linked in the South African context. Zharima et al. (2024) confirm this link in a cross-sectional South African study conducted during 2021–2022, establishing that economic hardship directly predicts intimate partner violence perpetration among young men.

Disciplinary Lens: Economics and Enterprise Development

Section 3 provides the macroeconomic and structural context that enterprise development practitioners need. The SMME challenge literature (Maduku & Kaseeram, 2021; Musara & Nieuwenhuizen, 2020) is directly engaged. SEDA, SEFA, and provincial agency practitioners will find the structural barriers described here directly relevant to the redesign of support programmes for GBV-affected traders.

4. GBV Landscape: What Black Women Traders Navigate Every Day

The GBV landscape confronting Black women informal traders is a layered architecture of violence operating simultaneously at the household, community, market, and institutional levels. No single discipline captures the GBV landscape fully. Understanding the full architecture is essential for appreciating both why the cushion is needed and how trading provides it.

4.1 Intimate Partner Violence: The Domestic Foundation of Constraint

Intimate partner violence is the most prevalent form of GBV in South Africa, and its effects on Black women informal traders are simultaneously personal and economic. Jewkes (2002) establishes that conflict over finances and women's perceived gender role transgressions are among the strongest contextual predictors of intimate partner violence, placing economically active women in a structurally precarious position. The HSRC National GBV Study (2024) confirms that Black African women in South Africa experience the highest rates of physical and economic violence of any demographic group in the country, with 35.5% reporting lifetime physical violence. Vyas and Watts (2009) demonstrate that independent income is the single greatest material enabler of exit from abusive relationships in low- and middle-income countries, making economic independence a direct structural threat to abusive partners' control. Physical injury reduces trading

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capacity, and psychological trauma diminishes the confidence and social engagement that market trading requires (Dlamini, 2021). Economic abuse the deprivation of financial resources, destruction of stock, and incurring of debts in women's names is now formally recognised under South Africa's Domestic Violence Amendment Act 14 of 2021 as a distinct form of domestic violence directly targeting the financial independence that trading generates (De Wet-Billings & Billings, 2024). That women rebuild and return to the market after such destruction is the first evidence of the cushion's power.

4.2 Community and Market Violence: The Daily Public Risk

Beyond the domestic sphere, Black women informal traders face GBV in the commercial environments in which they work. Chinomona and Maziriri (2015) document xenophobic violence targeting immigrant women traders as a systemic feature of South African informal trading environments. Irish-Qhobosheane (2024) records how township enterprise extortion networks gangs forcing informal traders to pay protection fees under threat of violence operate as a normalised criminal economy in South African townships, directly targeting the financial margins of women traders. Cloete, Maistry and Singh (2023) confirm that women street traders in South Africa face continuous exposure to harassment, criminal violence, and official extortion that imposes hidden costs on their businesses, erodes margins, and constrains the spatial choices available to them. Omolekan and Omole (2020) establish that this violence tax compounds the already disproportionate economic burden on Black women in the informal sector, operating as a form of market-based gendered exclusion.

4.3 Institutional and Regulatory Violence: The State as Risk Factor

The South African state, which bears constitutional responsibility for protecting citizens, is itself a source of GBV for many Black women informal traders. Skinner and Watson (2021) document that municipal law enforcement officers confiscate trading stock and destroy informal market infrastructure as routine enforcement practice, constituting institutional economic violence against traders. Dlamini (2021) analyses how police who fail to respond to GBV reports, courts that are geographically and linguistically inaccessible, and social welfare systems unable to provide safe housing compound the institutional failure. Irish-Qhobosheane (2024) records instances in which enforcement officers exploit the vulnerability of unprotected traders, including through demands that traders pay unofficial fees or face regulatory action. Jewkes (2002) situates this within the broader pattern of how institutional inadequacy sustains the conditions in which intimate partner violence escalates, unreported and unaddressed.

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Disciplinary Lens: Public Health and Social Work

Section 4's multi-level model of GBV, spanning household, community, and institutional levels, mirrors the ecological framework used in public health violence research. Social workers will recognise in these dynamics the system factors they encounter daily in GBV casework. Section 5.4 offers a clinically relevant insight: the market stall as a non-clinical environment that supports psychological agency and identity reconstruction in trauma recovery.

5. Five Dimensions of the Cushioning Effect

This section constitutes the central analytical contribution of the article. Five distinct dimensions through which informal trading generates a cushioning effect against GBV are identified and elaborated. Each dimension is analytically separable but practically interconnected; the cushion's protective power derives from all five operating simultaneously and reinforcing one another.

5.1 Dimension One: Economic Independence and the Dissolution of Dependency

The most direct and widely documented mechanism through which informal trading cushions Black women against GBV is the generation of independent income that dissolves the economic dependency trapping women in abusive relationships. Vyas and Watts (2009) identify economic dependency as one of the strongest predictors of women's inability to leave intimate partner violence situations globally, drawing on a systematic review across fifteen low- and middle-income countries. De Wet-Billings and Billings (2024) confirm this in the current South African context, establishing that financial dependence on partners and caregivers is among the most significant proximate drivers of ongoing GBV vulnerability. Informal trading provides income generated by the woman herself, paid directly into her hands or mobile money account, and not subject to appropriation by an abusive partner in the same way formal wages might be. Ajemunigbohun (2023) documents how women traders who build savings through stokvels or informal savings clubs accumulate emergency capital enabling exit from abusive households, payment for temporary accommodation, and business restocking after violent destruction. The financial cushion is not a permanent solution to intimate partner violence, but it is the material precondition for the exercise of genuine choice — and choice is, in the theoretical framework of the capabilities approach, the foundation of freedom and dignity (Sen, 1999; Nussbaum, 2000).

The economic independence dimension also creates behavioural deterrence effects. Jewkes (2002) documents that women's economic independence reduces

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intimate partner violence risk by raising the implicit costs of violent control for perpetrators. Zharima et al. (2024) demonstrate conversely that economic hardship in the household significantly predicts violence perpetration by male partners, confirming the bidirectional relationship between financial dynamics and GBV risk. Stern and Heise (2024) note that this bidirectionality requires enterprise development agencies to treat safety planning as inseparable from business support: the woman whose income expands the household's resource base may simultaneously shift the household power balance in ways that elevate short-term risk before reducing long-term vulnerability.

5.2 Social Embeddedness and Collective Surveillance

The second dimension is social: informal trading embeds Black women in dense networks of relationships with fellow traders, customers, suppliers, and community members that provide collective surveillance, solidarity, and rapid response capacity when GBV occurs. Omolekan and Omole (2020) demonstrate in the Nigerian context that the daily presence of a woman trader in a market means that her absence, injury, or visible distress is noticed by a community of people who respond. Ajemunigbohun (2023) documents how the stokvel that meets weekly to manage collective savings functions simultaneously as a welfare check-in system and a conduit for emergency support, illustrating that these social structures are not designed as GBV interventions but function as them.

Social capital theory provides the analytical vocabulary. Coleman (1988) distinguishes bonding social capital dense ties within homogeneous communities providing solidarity and rapid response for women in immediate GBV situations: a neighbour who walks a battered woman to the clinic, a fellow trader who manages a stall during a court hearing, a market committee that confronts a known harasser. Omolekan and Omole (2020, p. 52) document bridging social capital connections across social groups including links to NGOs, government agencies, and formal business networks as providing access to institutional resources: knowledge of legal rights, referral to shelters, and access to enterprise development support. The social density created by active informal trading markets reduces the conditions of isolation and silence in which GBV thrives, making private perpetration harder to sustain invisibly.

Disciplinary Lens: Sociology and Community Development

Section 5.2 engages the sociological literature on social capital, community cohesion, and collective efficacy as determinants of violence. Community development practitioners will recognise stokvels and trader associations as

existing community structures that can serve as platforms for GBV prevention programming. Investment in what already exists is both cheaper and more effective than creating parallel structures from scratch.

5.3 Spatial Occupation and the Safety of Visibility

The third dimension is spatial: informal trading places Black women in public space on a regular, predictable basis, reducing the spatial isolation in which domestic violence is most dangerous and most invisible. Gqola (2015) argues that for women whose mobility has been restricted by violent partners, the act of occupying commercial public space is simultaneously an economic act and a spatial rights claim. Skinner and Watson (2021) document how the township woman who leaves home every morning to trade is structurally safer from the worst consequences of intimate partner violence than the woman who never leaves home, because prolonged confinement or severe injury cannot be sustained without the knowledge of others.

Informal markets concentrate women's economic activity in shared physical space, generating community-produced safety through numbers. The urban planning principle that safety emerges from "eyes on the street" (Jacobs, 1961), applied to the South African township context through Mokoena and Liambo (2023), holds that informal trading environments where women are present in large numbers during trading hours create overlapping fields of social observation that deter predatory violence. Mokoena and Liambo (2023) confirm that active, occupied commercial environments in South African townships are associated with lower rates of predatory violence than inactive, isolated ones. The inverse is equally documented: Skinner and Watson (2021) show that the enforced removal of women from trading spaces not only destroys their income but eliminates the safety their visibility had been providing.

The spatial cushion is, however, conditional on the quality and safety of the trading environment itself. Yaneva et al. (2023) demonstrate that infrastructure deficits inadequate lighting, isolated pitches, and unsafe access routes can reverse the spatial cushion into a spatial risk. The implication for urban planners and local government is direct: investment in the physical infrastructure of informal trading markets is simultaneously investment in GBV prevention.

Disciplinary Lens: Urban Planning and Local Government

Section 5.3 reframes informal market infrastructure investment as GBV prevention investment. The Integrated Urban Development Framework and municipal safety plans should incorporate informal market design criteria derived

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from GBV prevention principles. Planners and municipal officials will find Section 8.3 directly actionable, with specific minimum design standards proposed for GBV-safe informal trading spaces.

5.4 Dimension Four: Psychological Agency and the Reconstruction of Self

The fourth dimension is psychological. GBV assaults not only the body and economic security but the self. The HSRC National GBV Study (2024) documents that psychological and emotional abuse is among the most prevalent forms of GBV against women in South Africa, with a third of women surveyed reporting lifetime physical violence and substantial proportions reporting emotional and economic abuse. Dlamini (2021) connects this psychological damage directly to the social and economic dimensions of GBV in South Africa, arguing that the systematic undermining of women's agency by abusive partners produces conditions that compound across time and are rarely addressed in clinical settings. Zharima et al. (2024) establish that anxiety, stress, and diminished wellbeing associated with economic hardship and violence create lasting psychological effects that reduce women's capacity for effective economic and social action.

Informal trading provides a daily counter-environment. The identity of "trader" or "business owner" directly counters the identity of "victim" that GBV imposes, providing a daily context in which women make decisions, manage resources, serve customers, solve problems, and build something that is theirs. Musara and Nieuwenhuizen (2020) find that women who describe their businesses speak in terms of pride, ownership, and forward momentum that are clinically significant in trauma recovery contexts. Cloete, Maistry and Singh (2023) document how the acquisition of financial and business skills by women street traders in South Africa generates a self-concept of competence and agency that extends beyond the business itself, supporting psychological recovery from adversity. Ayandibo (2024) confirms that this agentic identity, once built through enterprise engagement, reshapes women's self-perception in ways that extend into their household and community relationships.

Disciplinary Lens: Psychology and Clinical Social Work

Section 5.4 maps onto the empirically supported therapeutic principles of behavioural activation, meaning making, and identity reconstruction in trauma recovery. The market stall functions as a non-clinical therapeutic environment. Social work practice that integrates livelihood support with trauma counselling is directly indicated by this analysis.

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5.5 Political Voice and Institutional Accountability

The fifth dimension is political. Omolekan and Omole (2020) establish that informal trading organisations trader associations, stokvel federations, women's cooperatives, and civic engagements constitute one of the most organisationally capable constituencies in South Africa's township and informal settlement communities. This organising capacity, sometimes built over decades of collective self-management in contexts of institutional neglect, positions women traders as a political force capable of demanding accountability from local government, law enforcement, and enterprise development institutions on both trading conditions and GBV response (Omolekan & Omole, 2020; Ayandibo, 2024).

The National Strategic Plan on Gender-Based Violence and Femicide (NSP-GBVF, 2020–2030) identifies economic empowerment as one of its five strategic pillars, yet implementation has focused primarily on formal employment and formal entrepreneurship (Department of Social Development, 2020). The political voice of informal trader organisations, if formally recognised and institutionally supported, could drive a reorientation of the NSP-GBVF economic empowerment pillar toward the informal-sector contexts where the majority of economically marginalised GBV survivors operate. Gqola (2015) demonstrates that women's political voice in South Africa has historically been undermined precisely when it emerges from informal and non-institutional spaces; recognising trader associations as legitimate policy actors is therefore both a practical and a political act. This reorientation will not happen without deliberate political advocacy by the organisations themselves, supported by researchers, civil society, and development practitioners.

Disciplinary Lens: Law and Policy Studies

Section 5.5 speaks directly to legal scholars, public policy analysts, and governance practitioners. The gap between the NSP-GBVF's formal commitments and their informal sector implementation is a governance failure addressable through constitutional litigation and policy advocacy. Legal aid organisations and GBV law reform advocates will find the institutional exclusion arguments here directly actionable through existing legal frameworks on equality, dignity, and the right to trade.

6. Where the Cushion Fails: Four Critical Conditions

The cushioning effect is real but uneven and fragile. Four critical failure conditions are identified below, each of which leaves Black women traders exposed to GBV without the mitigation that trading ordinarily provides.

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6.1 Deepest Poverty and the Null Cushion

The cushioning effect requires a minimum threshold of economic activity sufficient to generate financial independence, social capital, and public visibility. For the most marginalised women those whose trading consists of selling a few items intermittently from a plastic bag in an isolated area these threshold conditions are not met. Devereux and Sabates-Wheeler (2004) establish that transformative social protection must target those below the threshold of informal social protection, not merely those already embedded in functioning networks. Ajemunigbohun (2023) confirms from a risk finance perspective that the most marginalised informal traders fall outside all existing risk-pooling and savings structures, leaving them exposed to both economic shocks and GBV without any protective buffer. The HSRC National GBV Study (2024) confirms that poverty and structural inequality are among the most consistent drivers of GBV vulnerability in South Africa. Policy must target this sub-group with graduated entry support, deliberate network integration, and market placement to extend the cushion downward to those who need it most.

6.2 Immigrant Exclusion from the Cushion

Immigrant Black women traders often fall outside the social trust networks that generate the embeddedness and political voice dimensions of the cushion. Chinomona and Maziriri (2015) document xenophobic exclusion from established trader associations as a systemic feature of South African informal market environments. Irish-Qhobosheane (2024) confirms that extortion networks in South African townships specifically target immigrant traders, who are less able to resist or report extortion due to precarious documentation status and exclusion from the community solidarity structures that buffer local traders. These women may have stronger individual entrepreneurial drive, yet their social capital deficits leave them among the most GBV-exposed sub-population of informal traders. Extending the cushion to immigrant women requires deliberate inclusion in trader associations and targeted outreach in multiple languages.

6.3 Regulatory Destruction of the Cushion

Municipal law enforcement actions that confiscate stock, destroy market infrastructure, and remove traders from their locations simultaneously destroy all five cushion dimensions at once. Skinner and Watson (2021) document how stock confiscation destroys financial independence and market displacement severs social networks and community visibility. Irish-Qhobosheane (2024) adds that the removal of traders from established market locations can expose them to criminal

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extortion in new, unprotected settings where community solidarity has not yet formed. Cloete, Maistry and Singh (2023) document how the psychological damage inflicted by humiliating enforcement encounters including instances where officials exploit regulatory power over traders mirrors the dynamics of GBV itself, compounding the harm that the cushion was meant to buffer. Regulatory violence is not merely an economic harm; it is a direct, simultaneous dismantling of the entire protective structure.

6.4 The Escalation Risk: When the Cushion Provokes

A critically important failure mode is the escalation risk: women's growing economic independence, social embeddedness, and public visibility can provoke rather than deter GBV from partners or community actors who perceive women's empowerment as a threat to patriarchal order. Jewkes (2002) establishes that relationships in which conflict arises over women's economic activity and perceived gender role transgressions are significantly more violent than those without such conflict. Stern and Heise (2024) document in a cross-contextual review that women's economic empowerment interventions must carefully monitor and mitigate the risk that improved economic status provokes male backlash, particularly where women's economic participation challenges established household power arrangements. Zharima et al. (2024) confirm in a South African cross-sectional study that economic hardship and perceived threat to male provider identity are significant predictors of violence perpetration. Programmes supporting women's entry into informal trading must incorporate safety planning for the escalation risk as a standard component of business start-up support, not an optional add-on.

7. Key Findings

The critical integrative literature review synthesized in Sections 2 through 6 generates a set of coherent empirical and analytical findings that, taken together, constitute the evidentiary basis for the multi-sector framework proposed in Section 8. These findings are presented below as distilled propositions derived from the reviewed literature.

7.1 Informal Trading Generates Measurable GBV-Protective Effects Across Five Dimensions

The reviewed literature across economics, sociology, public health, psychology, and urban planning consistently supports the proposition that informal trading generates GBV-protective effects in five distinct domains. Vyas and Watts (2009),

drawing on a systematic review of fifteen low- and middle-income countries, confirm that women who maintained independent income showed lower intimate partner violence exposure than comparable women without independent income directly validating the economic independence dimension. Omolekan and Omole (2020) provide empirical grounding for the social embeddedness dimension in an African context, demonstrating that trader network density correlates with collective accountability and rapid community response to violence. Skinner and Watson (2021) document the spatial dimension in South African cities, confirming that women's market presence reduces the isolation in which violence intensifies. Musara and Nieuwenhuizen (2020) and Cloete, Maistry and Singh (2023) ground the psychological dimension in South African informal trader experiences, documenting the identity-rebuilding function of market participation for women recovering from adversity. Omolekan and Omole (2020) and Ayandibo (2024) together substantiate the political dimension, establishing that organised trader associations and women's enterprise networks constitute a documented advocacy capacity capable of demanding institutional accountability.

7.2 The Cushion Is Heterogeneous, Not Universal

A consistent finding across the reviewed literature is that the cushioning effect is not evenly distributed across the population of Black women informal traders. Chinomona and Maziriri (2015) document that immigrant women traders experience significantly lower social embeddedness and substantially higher exposure to both xenophobic violence and extortion, placing them outside the social dimensions of the cushion even when they maintain independent income. Devereux and Sabates-Wheeler (2004) and Ajemunigbohun (2023) together establish that the most marginalised traders those operating below the threshold of network integration and stable market presence do not benefit from the risk-pooling and solidarity mechanisms that generate the cushion for more established traders. Radebe and Smith (2023) confirm that the intersection of youth, rurality, and deep poverty compounds this heterogeneity, leaving specific sub-populations of women traders with a null or near-null cushion. This heterogeneity finding has direct policy implications: support programmes that treat Black women informal traders as a homogeneous group will systematically underfund the sub-populations at greatest risk.

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7.3 Regulatory and State Conduct Is a Primary Cushion Destruction Mechanism

A finding that emerges with notable consistency across the reviewed literature is that state and municipal conduct rather than private violence alone constitutes a primary mechanism of cushion destruction. Skinner and Watson (2021) document that stock confiscation and market clearances by municipal law enforcement simultaneously eliminate all five cushion dimensions, not merely the financial one. Irish-Qhobosheane (2024) demonstrates that involuntary market relocation not only disrupts income but severs the social and spatial networks that provide collective protection. Cloete, Maistry and Singh (2023) confirm that official harassment and informal extortion by enforcement personnel produce psychological harm structurally equivalent to the GBV the cushion was designed to buffer. The implication is analytically significant: interventions that strengthen the cushion without simultaneously reforming regulatory conduct will be partially undermined by the very institutions responsible for their implementation.

7.4 Escalation Risk Is Under-Addressed in Existing Interventions

The reviewed literature consistently identifies the escalation risk the possibility that women's economic empowerment provokes increased intimate partner violence from threatened partners as a real and documented failure mode that existing enterprise development and GBV prevention programmes do not adequately address. Jewkes (2002) establishes this dynamic in foundational terms, identifying economic empowerment as a potential trigger for violence in households structured around male provider identity. Stern and Heise (2024) confirm it across multiple contexts in a more recent cross-contextual review. Zharima et al. (2024) quantify it in the South African context, establishing a statistically significant relationship between perceived male provider role threat and violence perpetration. Despite this evidence base, safety planning for the escalation risk remains largely absent from South African SMME support programmes, as Ayandibo (2024) confirms in her analysis of barriers facing women entrepreneurs in the developmental state context. Safety planning integration is a low-cost, high-impact intervention that enterprise development agencies can implement without structural redesign.

7.5 The Cushion Performs Unrecognised Social Protection Functions

Across the theoretical and empirical literature reviewed, informal trading networks perform social protection functions emergency capital provision, survivor support, trauma mitigation, economic continuity through adversity that are

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structurally equivalent to formal social protection mechanisms but are neither recognised nor funded as such (Devereux & Sabates-Wheeler, 2004; Ajemunigbohun, 2023). Ajemunigbohun (2023) documents that stokvel federations provide emergency capital that formal financial institutions do not reach. Omolekan and Omole (2020) establish that trader associations provide legal rights information, shelter referral, and institutional access that formal social work services do not consistently deliver in township environments. The NSP-GBVF (2020–2030) identifies economic empowerment as a strategic pillar but operationalises it through formal employment and formal entrepreneurship channels that bypass this existing informal infrastructure entirely (Department of Social Development, 2020). The state is funding parallel formal structures while the most cost-effective, community-embedded social protection infrastructure already exists in the informal trading networks of Black women.

7.6 Cross-National Evidence Validates the Cushioning Framework Beyond South Africa

The cushioning thesis is not solely a South African phenomenon. Vyas and Watts (2009) provide systematic review evidence across fifteen low- and middle-income countries confirming the economic independence dimension. Olung'o et al. (2022) document from Kenya that market women's associations function as primary GBV information and referral providers where formal infrastructure is absent. Omolekan and Omole (2020) establish from Nigeria that social networking among women traders generates collective accountability frameworks that reduce intimate partner violence visibility and increase community response. These cross-national findings confirm that the cushioning framework carries transferable policy implications beyond South Africa, with relevance for sub-Saharan African countries where women constitute most informal traders and formal GBV response infrastructure remains limited.

8. A Six-Pillar Multi-Sector Action Framework

Strengthening the cushion requires coordinated action across six sectors simultaneously. The framework below organises that action by sector and institutional actor, with each pillar addressing specific dimensions of the cushion and specific failure conditions. The framework is designed for application at national, provincial, and municipal levels, with adaptation for rural, peri-urban, and urban contexts.

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8.1 Enterprise Development: SEDA, SEFA, and Provincial Agencies

National and provincial enterprise development agencies must redesign SMME support programmes to incorporate GBV awareness, referral, and business continuity support as standard service components. Ayandibo (2024) establishes that effective women's entrepreneurship support in South Africa requires addressing not only business skills but the structural and normative barriers including GBV that constrain women's economic participation. Ajemunigbohun (2023) establishes that loan product rigidity is a particular barrier, arguing that repayment flexibility provisions for documented GBV disruptions are a minimum requirement for financial products targeting women traders. Stern and Heise (2024) confirm from cross-contextual evidence that integrated business and safety support produces substantially better outcomes than either intervention delivered alone. The objective is integration, not the transformation of enterprise officers into counsellors.

8.2 Risk Finance and Insurance: Treasury, FSCA, and Insurers

The National Treasury and the Financial Sector Conduct Authority should develop a dedicated microinsurance product category for Black women informal traders, including business interruption cover triggered by GBV-related events. Ajemunigbohun (2023) provides the technical foundation for this proposal, documenting the risk financing needs of informal traders and the inadequacy of existing formal insurance products for this population. Stokvel and savings group structures provide an existing institutional infrastructure for product distribution and servicing, as documented by Ajemunigbohun (2023) in the risk finance context and Omolekan and Omole (2020) in the social capital context. Microinsurance products would simultaneously strengthen the financial dimension of the cushion and extend formal financial coverage to a population currently excluded from all insurance products.

8.3 Safe Trading Spaces: Municipalities, CoGTA, and DPW

Municipal governments and relevant national departments must invest in the physical infrastructure of informal trading markets as GBV prevention infrastructure. Yaneva et al. (2023) provide design principles for this investment, establishing minimum standards for adequate lighting, secure storage, and emergency communication systems. Skinner and Watson (2021) document the specific failures of current informal market infrastructure in South African cities. Trading space allocation processes must be transparent, corruption-free, and accessible to women without unofficial fees to patriarchally invested gatekeepers a

governance requirement that Ayandibo (2024) confirms extends beyond physical infrastructure to the institutional norms governing access. Irish-Qhobosheane (2024) warns that market relocation without adequate security infrastructure simply transfers traders from one risk environment to another.

8.4 Social Organisation: DSD, NGOs, and Cooperative Development

The Department of Social Development, civil society, and cooperative development agencies should invest in the collective organising capacity of associations for Black women informal traders as a primary GBV prevention strategy. Omolekan and Omole (2020) establish the GBV prevention function of trader associations empirically, showing that organised trading communities generate collective accountability frameworks that reduce intimate partner violence visibility and increase community response. Ajemunigbohun (2023) documents how stokvel federations function as informal social protection institutions, providing a basis for matched savings subsidies as an efficient public investment in existing community infrastructure. Formal inclusion of trader associations in NSP-GBVF implementation structures would provide the political voice dimension with the institutional access it currently lacks.

8.5 Integrated Health and Trauma Support: DoH and Social Work

The Department of Health, in partnership with social work services and civil society, should develop integrated service delivery models combining clinical GBV support with livelihood and business support. Dlamini (2021) identifies the gap between the clinical GBV response system and the enterprise development system as a primary driver of poor outcomes for GBV survivors in South Africa. Thuthuzela Care Centres offer an existing institutional platform for this integration, given their mandate to provide comprehensive GBV survivor support under one roof (Department of Social Development, 2020). Stern and Heise (2024) provide cross-contextual evidence that integrated responses combining economic and safety support produce better long-term outcomes than siloed clinical or economic interventions delivered in isolation.

8.6 Digital Access and Platform Safety: DCDT and Regulators

The Department of Communications and Digital Technologies and digital platform regulators must ensure the digital economy strengthens rather than undermines the cushion. Yaneva et al. (2023) document the infrastructure gaps that currently exclude most women informal traders from digital market participation. Kuleto et al. (2023) establish that digital literacy curricula must integrate safety

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with e-commerce skills to produce sustainable outcomes for SMME digitalisation. USSD-based access to enterprise support and financial services is a practical requirement for ensuring that women without smartphone access are not excluded from digital cushion tools a design principle validated by mobile financial inclusion programmes across sub-Saharan Africa (Olung'o et al., 2022). Emergency GBV reporting mechanisms accessible via basic mobile technology warrant feasibility assessment for the South African township and rural contexts.

9. Beyond South Africa: Cross-National Reach of the Cushioning Framework

The cushioning thesis has applicability across sub-Saharan Africa and other developing economy contexts where women constitute most informal traders and GBV is a structural feature of the economic environment. Olung'o et al. (2022) document from Kenya that market women's associations function as primary GBV information and referral providers where formal infrastructure is absent, confirming the social embeddedness dimension operates outside South Africa. Omolekan and Omole (2020) and Irish-Qhobosheane (2024) together establish from Nigeria and southern Africa respectively that social networking among women traders generates collective accountability frameworks that reduce intimate partner violence visibility and increase community response. Vyas and Watts (2009) provide systematic review evidence from fifteen low- and middle-income countries that women who maintained independent income showed lower intimate partner violence exposure than comparable women without independent income, directly confirming the economic independence dimension across diverse contexts. These findings confirm that the cushioning framework carries transferable policy implications well beyond the South African context and warrants adaptation and testing in BRICS+ and Global South contexts where informal women's trading is similarly structured.

10. Conclusions

This article has argued that the daily economic activity of Black women informal traders in South Africa constitutes a structural cushion against gender-based violence operating across five interconnected dimensions: economic independence, social embeddedness, spatial occupation, psychological agency, and political voice. This cushioning effect is not a romantic projection onto resilient women; it is a structurally grounded, theoretically elaborated, and empirically supported account of how informal trading generates GBV-protective effects in the social ecology of South African township and rural communities.

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The article has been deliberately written for multiple audiences because the cushion is itself a multi-sectoral phenomenon. The economist designing SMME support programmes, the urban planner designing informal markets, the social worker supporting GBV survivors, the public health professional mapping violence risk factors, the legal scholar evaluating regulatory frameworks, the community organiser building trader associations, and the clinical psychologist treating trauma are all, in their different ways, working on the same cushion from different angles, with different tools, and without sufficient awareness of what the others are doing. Dlamini (2021) grounds this argument in the clinical and policy realities of South African GBV response, demonstrating that fragmented disciplinary approaches consistently underperform integrated ones. This fragmentation is not merely a coordination failure but a conceptual failure: the failure to recognise that informal trading and GBV prevention are two faces of a single integrated challenge.

The six-pillar multi-sector action framework proposed here offers a programmatic architecture for the integrated response this challenge demands. Implementing it requires political will at national, provincial, and municipal levels; institutional redesign across enterprise development, social protection, health, and urban governance; and investment in the financial infrastructure of informal trading and the organisational infrastructure of trader associations. South Africa has the institutional architecture, the policy commitments including the NSP-GBVF and the National Small Business Amendment Act, and the civil society capacity to deliver on these commitments if the political will is activated.

The Black women who rise before dawn to set up their market stalls, who navigate violent homes and hostile enforcement to serve their communities, who build stokvels and trader associations in the gaps of institutional neglect, have always known the cushioning function of their labour. They have not named it in academic language, but they have lived it as fact. What they are waiting for is the institutional, financial, and spatial investment that transforms a fragile, self-funded, community-maintained cushion into a robust, publicly supported social protection system worthy of their contribution. Investing in the cushion is not charity. Vyas and Watts (2009) and Jewkes (2002) both establish from systematic and cross-sectional evidence respectively that economic investment in women's independence is among the most cost-effective GBV prevention strategies available. It is justice, sound public health, effective social work, evidence-based urban planning, and the most cost-effective GBV prevention policy South Africa is not yet making.

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NAVIGATING GOVERNANCE COMPLEXITY: THE COMPASS FRAMEWORK FOR LEADERSHIP AND SUSTAINABLE COMMUNITY-BASED TOURISM

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Abstract

Community-based tourism (CBT) is widely promoted as a tool for inclusive economic development and sustainable resource governance in rural areas. However, many initiatives underperform due to weak leadership, fragmented decision-making, and limited governance structures. This study investigates how leadership styles and decision-making processes influence governance

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effectiveness, performance, and sustainability of CBT enterprises in Botswana's Ngamiland District.

Using a qualitative exploratory case study, data were collected through 16 semi-structured interviews and four focus group discussions with 18 participants, including community organisations, traditional leaders, tourism operators, and advisory stakeholders. Thematic analysis shows that leadership style significantly shapes governance outcomes: transformational leadership improves project completion, participatory leadership enhances community volunteerism, while poorly structured decision-making leads to delays in nearly half of projects.

The findings also reveal persistent skills gaps in negotiation, conflict management, and strategic planning, alongside power imbalances that limit local decision autonomy. Although participatory approaches strengthen legitimacy and ownership, excessive consultation without clear protocols results in decision fatigue and inefficiencies.

The study proposes the COMPASS framework, integrating transactional efficiency, participatory legitimacy, and transformational adaptability. It contributes to leadership and governance scholarship and provides practical guidance for managing CBT in resource-constrained environments.

Keywords: *Community-based tourism; leadership; decision-making; governance; sustainability; Botswana; community enterprises; COMPASS framework*

JEL Classification: O15, Q01, Q26, D73, R11

Introduction

Tourism plays a significant role in Botswana's economy, contributing approximately 13.1 per cent of national GDP and supporting more than 50,000 jobs (Botswana Tourism Statistics Report, 2020; Ngami Times, 2024). Nowhere is this more visible than in the Okavango Delta in Ngamiland District, one of southern Africa's premier wildlife destinations. Yet despite substantial tourism inflows, the distribution of benefits at the community level remains uneven, with rural communities bearing disproportionate environmental and social costs while capturing limited economic value (Mbaiwa & Kolawole, 2022; Ramaano, 2025; Masunga & Thebe, 2021). This persistent disparity highlights critical governance and leadership challenges within community-based tourism enterprises.

Community-based tourism (CBT) has become a central policy instrument for inclusive economic development across the Global South, particularly in rural and

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conservation-dependent economies where local participation is positioned as both a developmental and governance imperative (Goodwin & Santilli, 2009; Moscardo, 2019; Sofronov, 2018). In Southern Africa, and Botswana in particular, CBT has been promoted as a mechanism for addressing rural poverty, strengthening community ownership of natural resources, and aligning tourism growth with conservation objectives (Mbaiwa & Kolawole, 2022; Lepetu, Makopondo, & Darkoh, 2008). Despite these ambitions, the performance of CBT initiatives remains uneven, with many enterprises failing to translate participatory ideals into effective governance and sustainable outcomes (Bramwell & Lane, 2020).

Emerging evidence suggests that these failures are not primarily driven by a lack of tourism assets or market demand, but by weaknesses in leadership capacity, decision-making structures, and institutional coordination at the community level (Dangi & Jamal, 2016; Cloete & Van Vuuren, 2020; Kimbu et.al, 2021; Sofronov 2017). Community-based organisations operating CBT enterprises are required to function simultaneously as social institutions, business entities, and custodians of cultural and environmental resources. This creates distinctive management challenges, as leaders must balance inclusivity with operational efficiency, reconcile traditional authority systems with formal organisational requirements, and manage complex power relations involving government agencies, NGOs, and private-sector partners (Ansell & Gash, 2008; Jamali & Keshishian, 2009; Sofronov, 2017).

This study addresses this gap by examining how leadership styles and decision-making processes shape governance effectiveness and performance within community-based tourism enterprises in the Ngamiland District of Botswana. Drawing on qualitative evidence from community leaders, traditional authorities, tourism operators, and advisory stakeholders, the study adopts an exploratory case study approach to analyse leadership practices in situ (Yin, 2018). Rather than privileging a single leadership model, the study conceptualises leadership as situational and decision-contingent, shaped by contextual constraints, stakeholder configurations, and institutional pressures.

Literature Review

In rural tourism contexts such as Ngamiland District in Botswana, these governance challenges are further intensified by limited managerial skills, infrastructural constraints, and high dependence on external stakeholders for funding, regulation, and market access (Mbaiwa & Kolawole, 2022; Masunga &

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Thebe, 2021). While participation is widely celebrated in CBT discourse, unstructured participatory processes often lead to decision delays, conflict, and implementation paralysis, particularly when leadership roles and decision rights are poorly defined. This exposes a persistent tension between normative models of community empowerment and the practical realities of managing complex, time-sensitive tourism enterprises.

Much of the existing CBT literature has prioritised participation, empowerment, and sustainability outcomes (Reed, 2008; Nyaupane & Poudel, 2017; Phasumane et al., 2023), often treating leadership as an implicit or normative construct rather than a core management function. Where leadership is examined, participatory and transformational approaches are frequently advocated without sufficient attention to the operational trade-offs involved in everyday decision-making (Moscardo, 2019; Khunou, 2016). As a result, limited empirical work has examined how different leadership styles are combined, sequenced, or adapted in practice to address varying decision contexts, particularly within African community-based enterprises (Sebele-Mpofu, 2020, Mahosi, 2026).

In response, the study develops the COMPASS framework, an empirically grounded leadership and decision-making model designed to guide community-based enterprises in selecting appropriate leadership approaches based on decision type, stakeholder involvement, and contextual readiness. By foregrounding leadership as a core management function rather than a peripheral social process, this study contributes to management and business scholarship on community-based enterprises, collaborative governance, and sustainable tourism, while offering practical insights for policymakers and practitioners operating in complex, multi-stakeholder environments.

Research Methodology and Design

This study adopted a qualitative, exploratory case study design to examine leadership styles and decision-making processes within community-based tourism (CBT) enterprises in the Ngamiland District of Botswana. A qualitative approach was deemed appropriate given the study's aim to generate in-depth, contextualised insights into leadership practices, governance dynamics, and stakeholder interactions within community-based organisations (CBOs) operating in complex, resource-constrained environments (Yin, 2018; Nunkoo & Ramkissoon, 2012). The exploratory design enabled the study to capture lived experiences, perceptions, and decision-making rationales that are often difficult to observe through quantitative methods alone, particularly in rural governance contexts.

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Ngamiland District was selected as a single-case study due to its prominence within Botswana's tourism economy, its long-standing implementation of community-based tourism and Community-Based Natural Resource Management (CBNRM) initiatives, and the presence of diverse stakeholder arrangements involving traditional authorities, government agencies, NGOs, and private tourism operators. This context provided a suitable setting for examining leadership and governance challenges that are theoretically relevant and empirically rich.

Data Collection Methods

Primary data were collected between July and August 2024 using semi-structured interviews and focus group discussions. Semi-structured interviews were conducted with 16 purposively selected participants representing key stakeholder groups involved in CBT governance, including community trust leaders, CBO managers, traditional leaders (Dikgosi), tourism operators, and technical advisory board members. This sampling strategy was designed to ensure representation of actors occupying different leadership and decision-making positions within the CBT ecosystem.

In addition, two focus group discussions were conducted,comprising 18 participants drawn from village development committees, community members involved in tourism activities, and local stakeholders with experience in CBT initiatives. Focus groups were used to capture collective perspectives, surface shared governance challenges, and explore areas of convergence and divergence in leadership experiences. The combination of individual interviews and focus group discussions enhanced data triangulation and strengthened the credibility of the findings (Hesse-Biber, 2017; Phasumane et al., 2023).

Interview and focus group guides were informed by the study's research objectives and existing literature on leadership, collaborative governance, and community-based tourism. Topics included leadership styles, decision-making processes, stakeholder collaboration, capacity constraints, and sustainability practices. All interviews and discussions were conducted in either English or Setswana, depending on participant preference, and were audio-recorded with consent.

Data Analysis

All audio recordings were transcribed verbatim and, where necessary, translated into English to ensure analytical consistency. Data was analysed thematically using NVivo software (version 14). The analysis followed the six-phase thematic

analysis process outlined by Braun and Clarke (2006): familiarisation with the data, initial coding, theme development, theme review, theme definition and naming, and final interpretation.

An inductive-deductive approach was employed. Initial codes were generated inductively from the data, while subsequent theme refinement was guided by the study's conceptual focus on leadership styles, decision-making processes, and governance effectiveness. To enhance analytical rigour, coding decisions were reviewed iteratively, and emerging themes were continuously compared across participant groups. Verbatim quotations were retained to preserve participants' voices and to support analytic claims.

Ethical Considerations

Ethical clearance for the study was granted by the University of Derby's College of Business, Law and Social Sciences Research Ethics Committee under reference number CBLSS-REC-2023-045. All participants were provided with detailed information regarding the study's purpose, procedures, and voluntary nature prior to participation. Informed consent was obtained either in writing or verbally, depending on participants' literacy preferences and contextual suitability.

To ensure confidentiality and protect participant identities, pseudonyms were used in all transcripts and in the reporting of findings. All data were stored securely on password-protected university servers in compliance with the General Data Protection Regulation (GDPR). Access to raw data was restricted to the researcher only.

The researcher is a Botswana national with prior engagement in community development and tourism-related initiatives within rural settings. This positionality facilitated access and trust-building with participants but also required active management of reflexivity to minimise bias. Reflexive practices included maintaining a fieldwork journal, writing analytic memos throughout the coding process, and critically reflecting on how insider status and prior assumptions could influence data interpretation. These measures were employed to enhance the credibility, transparency, and trustworthiness of the findings.

Results

This section presents the empirical findings from the qualitative analysis of interviews and focus group discussions conducted with community-based organisation leaders, traditional authorities, tourism operators, and advisory stakeholders in Ngamiland District. Data were analysed thematically, following Braun and Clarke's six-phase approach, resulting in a set of interrelated themes

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that explain how leadership styles, decision-making processes, and stakeholder collaboration shape the performance and sustainability of community-based tourism enterprises.

Rather than presenting themes in isolation, the findings are synthesised to show how different leadership approaches are combined, contested, and adapted in practice. Table 1 summarises the emergent themes, their empirical grounding, and their implications for the COMPASS leadership framework.

Table 1: Emergent Themes on Leadership and Collaboration for Sustainable CBT in Ngamiland

Main Theme	Sub-theme	Description	Illustrative Quote (Participant Code)	Implication for COMPASS
Leadership Styles	Transformational leadership	Vision-oriented leadership mobilised community support and sustained long-term commitment	"Our role is to guide and motivate, not dictate. When people understand the vision, they support it." (P4, CBO Leader)	Anchors the transformational leadership layer for vision-setting and crisis contexts
Leadership Styles	Participatory leadership	Inclusive decision-making enhanced legitimacy but frequently slowed implementation	"Involving the community builds trust, but it can delay urgent decisions." (P6, FGD Member)	Requires structured and time-bound participation mechanisms
Leadership Styles	Transactional leadership	Directive decision-making improved efficiency for routine tasks but risked exclusion	"Sometimes decisions must be made quickly to meet deadlines." (P9, Tourism Operator)	Validates transactional tools for operational decisions
Decision-Making Processes	Decision delays	Prolonged consultation resulted in missed opportunities and stalled projects	"We discuss and discuss until opportunities pass us by." (P5, VDC Representative)	Justifies decision-tiering within COMPASS

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Main Theme	Sub-theme	Description	Illustrative Quote (Participant Code)	Implication for COMPASS
Decision-Making Processes	Transparency	Limited information-sharing generated mistrust and resistance	"Conflicts start when decisions are made behind closed doors." (FGD2, Community Member)	Positions transparency as a cross-cutting governance principle
Skills and Capacity	Leadership skills gaps	Leaders relied largely on experiential learning with limited formal training	"We were never trained; we just learned as we went." (P15, CBO Leader)	Supports capacity-building pillar of COMPASS
Skills and Capacity	Contextual training mismatch	Generic training often failed to reflect local realities	"Some training does not fit our situation on the ground." (P14, Technical Advisor)	Reinforces need for locally adapted training
Stakeholder Collaboration	Power asymmetries	External actors frequently dominated decision-making processes	"Tourism operators and officials control most decisions." (FGD3, CBO Member)	Emphasises community primacy and safeguards
Stakeholder Collaboration	Bureaucratic delays	Government approval processes slowed implementation	"Approvals take months; projects stall." (P5, CBO Leader)	Necessitates operational efficiency mechanisms
Sustainability Practices	Community-led sustainability	Locally initiated projects demonstrated stronger continuity	"When projects are ours, we protect them." (P3, Traditional Leader)	Grounds COMPASS in community ownership
Sustainability Practices	Cultural commodification risks	Commercial pressures threatened cultural integrity	"Tourism can change culture if not controlled." (P12, FGD Member)	Supports values-based governance

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Descriptive Results

Table 1 above summarises the main themes and sub-themes emerging from the analysis, together with illustrative quotations and their implications for the COMPASS framework. The sections that follow synthesise these findings in narrative form.

Leadership Styles and Decision-Making Processes

Leadership style emerged as a central determinant of decision quality, implementation speed, and community engagement within CBT initiatives. Participants consistently described the coexistence of transformational, participatory, and transactional leadership approaches, each producing distinct governance outcomes.

Transformational leadership was associated with higher levels of motivation and project completion. Project records from 2018 to 2023 indicate that initiatives led by leaders who articulated clear visions and fostered trust achieved approximately 68% higher completion rates than projects characterised by short-term or directive leadership. Participants attributed this to leaders' ability to align tourism activities with shared community values, particularly conservation and cultural stewardship.

Participatory leadership enhanced legitimacy and community ownership but introduced operational tensions. While exclusion from decision-making reduced commitment, extended consensus-seeking processes frequently delayed implementation. Document analysis showed that 47% of major project delays were linked to prolonged consultations, particularly where multiple stakeholder interests intersected.

Transactional leadership was primarily employed for routine operational decisions, especially where external deadlines applied. Although this approach improved efficiency, participants noted that it sometimes reduced transparency and increased perceptions of exclusion. Across leadership styles, transparency moderated outcomes, with clearly communicated decisions generating higher acceptance and trust.

Skills and Knowledge of CBO Leaders

Leadership effectiveness within community-based tourism enterprises was closely linked to leaders' skills and knowledge, particularly in tourism management, regulatory compliance, and community engagement. Most CBO

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leaders reported relying primarily on experiential learning, with limited access to formal leadership or tourism-specific training.

Participants who had received targeted training described improvements in governance practices and operational efficiency. Approximately 89% of trained leaders reported enhanced compliance with environmental and tourism regulations, particularly in relation to permit management, reporting requirements, and stakeholder coordination. One CBO leader noted, "Our training sessions highlighted environmental laws, making compliance easier without fear of penalties" (P11, CBO Leader).

Despite these gains, challenges in contextual adaptation persisted. Approximately 34% of participants reported difficulties translating standardised training content into locally appropriate practices, particularly where financial and infrastructural constraints limited implementation. A technical advisor observed, "Some training does not fit our situation on the ground" (P14, Technical Advisor), reflecting concerns that externally designed programmes often overlooked community-specific realities.

Practical application of leadership skills was most evident where tourism revenues were linked to visible community benefits, including water infrastructure, education support, and local enterprise development. Participants reported that such tangible outcomes strengthened community support for conservation and tourism initiatives, reinforcing the relationship between leadership competence and the long-term viability of CBT enterprises.

Stakeholder Collaboration

Collaboration with government agencies, non-governmental organisations, and private tourism operators was widely viewed as essential for accessing resources, markets, and technical expertise. Participants reported that partnerships enhanced project visibility and expanded opportunities for funding and capacity development.

At the same time, collaboration introduced governance challenges. Bureaucratic approval processes were frequently cited as sources of delay, with several participants noting that project implementation was slowed by prolonged permit and licensing procedures. As one CBO leader stated, "We sometimes wait months for government approvals, which slows progress" (P5, CBO Leader).

Power asymmetries were also evident in partnerships with external stakeholders. Participants described situations in which tourism operators or government officials exerted disproportionate influence over decision-making, limiting community control over project direction. These dynamics were reflected

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in stalled initiatives and unresolved conflicts between community priorities and external stakeholder interests.

Where communities retained clearer decision authority and defined collaboration terms through formal agreements, CBT initiatives demonstrated greater continuity and stability. Participants emphasised the importance of role clarity, equitable benefit-sharing arrangements, and structured participation mechanisms in managing multi-stakeholder relationships.

Leadership Practices and Sustainability

Sustainability outcomes were strongest in cases where leadership practices integrated socio-economic development, cultural preservation, and environmental conservation. Community-led initiatives, including cultural villages and conservation-linked enterprises, were consistently identified as more resilient and socially accepted.

Participants reported that reinvestment of tourism revenues into community infrastructure, such as water systems, schools, and local services, enhanced support for CBT initiatives. Cultural preservation efforts, when locally governed, were viewed as strengthening community identity and reinforcing stewardship of heritage resources.

However, participants also highlighted vulnerabilities associated with weak institutional support and inconsistent policy backing. In the absence of formalised governance mechanisms, sustainability initiatives were more susceptible to external pressures and the commodification of cultural practices. As one focus group participant noted, “Tourism can change culture if not controlled” (P12, FGD Member).

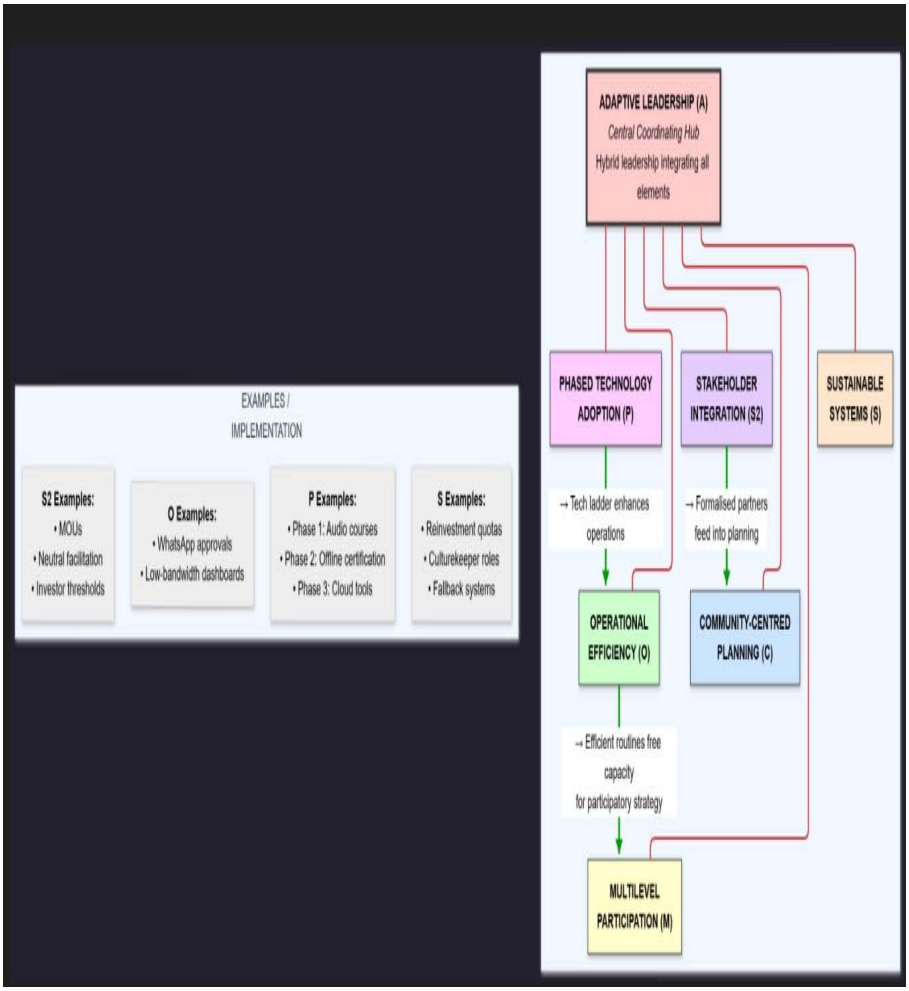
Across cases, these patterns indicate that sustainability in CBT is closely tied to leadership practices that balance economic objectives with cultural and environmental priorities. The empirical relationships observed across leadership, collaboration, and sustainability informed the design of the COMPASS framework, particularly its emphasis on adaptive leadership, structured participation, and safeguards for community agency.

Figure 1. The COMPASS Framework

The COMPASS Framework below illustrates how Community-centered Planning feeds into Operational Efficiency, Multilevel Participation, Phased Technology Adoption, Adaptive Leadership, Sustainable Systems and Stakeholder

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Integration. These seven components form a cycle that guides leadership decisions in CBT environments.



Discussion

This study set out to examine how leadership styles, decision-making processes, and stakeholder collaboration shape the governance and sustainability of community-based tourism (CBT) enterprises in Ngamiland District, Botswana. The

findings provide empirical confirmation that CBT performance is less constrained by the availability of tourism assets than by the quality of leadership and governance arrangements through which those assets are managed. In this section, the results are interpreted in relation to existing scholarship, followed by an articulation of the study's theoretical contribution and its practical implications for CBT governance.

Leadership styles and hybrid governance in CBT

The findings demonstrate that leadership in CBT enterprises operates as a situational and adaptive practice, rather than a fixed or normative model. Participants consistently described the coexistence of transformational, participatory, and transactional leadership approaches, each deployed in response to different decision contexts. This supports emerging evidence from African CBT contexts that hybrid leadership arrangements are more effective than reliance on a single governance style (Mofokeng & Mathe, 2020; Ncube & Dube, 2021; Cloete & Van Vuuren, 2020: Jones 2008).

The strong association between transformational leadership and project completion aligns with prior studies emphasising the role of vision, trust, and motivation in mobilising community support for tourism initiatives (Dangi & Jamal, 2016; Van Zyl & Mathur-Helm, 2018; Keogh, 1990). In Ngamiland, transformational leaders were particularly effective during project initiation and periods of uncertainty, where shared vision helped align tourism objectives with environmental stewardship and cultural values. However, unlike some normative CBT models that privilege transformational leadership as a universal solution, this study shows that its effectiveness diminishes in routine operational contexts where speed and compliance are required.

Participatory leadership enhanced legitimacy and community ownership, corroborating Reed's (2008) and Nyaupane and Poudel's (2017) arguments that inclusion strengthens sustainability outcomes. At the same time, the Ngamiland case illustrates a critical limitation of unstructured participation. Extended consultations frequently resulted in decision fatigue, conflict, and stalled implementation, echoing Moscardo's (2019) caution that participation without procedural clarity can undermine governance effectiveness. This contrasts with Sebele-Mpofu's (2020) findings in South African CBTs, where participatory approaches were less contested, suggesting that leadership effectiveness is highly context-dependent and shaped by institutional capacity, stakeholder complexity, and cultural expectations.

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Transactional leadership, while often viewed critically in community contexts, emerged as an essential governance tool for time-sensitive and operational decisions. Similar patterns have been observed in East African community enterprises, where directive leadership is selectively used to maintain efficiency without displacing participatory legitimacy (Mmeko et al., 2023). In Ngamiland, the challenge was not the presence of transactional leadership per se, but the absence of clear rules governing when it was appropriate to use it.

Taken together, these findings reinforce the argument that effective CBT governance requires structured hybridity, rather than ideological commitment to participation alone.

Decision-making tensions and the limits of participation

A central contribution of this study is its empirical demonstration of the tension between inclusivity and efficiency in CBT decision-making. While participation was universally valued by participants, the data reveal that participation alone does not guarantee effective governance. Nearly half of major project delays were linked to unresolved governance disagreements, confirming earlier critiques that participatory processes can become paralysing in complex, multi-stakeholder environments (Ansell & Gash, 2008; Jamali & Keshishian, 2009; Khunou, 2016).

Transparency emerged as a critical moderating factor in this tension. When decision rationales, timelines, and constraints were clearly communicated, communities were more willing to accept outcomes, even when consensus was not fully achieved. This finding supports collaborative governance theory, which emphasises transparency and procedural clarity as prerequisites for legitimacy (Ansell & Gash, 2008; Jelev, 2016) and extends it by showing how transparency operates at the micro-level of community enterprises.

These findings challenge idealised representations of CBT governance that equate inclusivity with effectiveness. Instead, they suggest that participation must be procedurally bounded, with differentiated decision pathways that reflect the urgency, impact, and stakeholder scope of each decision. This insight directly informed the architecture of the COMPASS framework.

Capacity constraints and stakeholder power dynamics

Consistent with previous research in southern Africa (Mbaiwa & Kolawole, 2022; Masunga & Thebe, 2021), leadership effectiveness in Ngamiland was constrained by limited access to formal training in tourism management, negotiation, and conflict resolution. While experiential learning enabled leaders to

manage local operations, it proved insufficient for engaging confidently with government agencies, NGOs, and private-sector partners.

Power asymmetries were particularly pronounced in external partnerships, where bureaucratic procedures, regulatory authority, and capital control frequently shifted decision-making away from communities. These findings align with concerns raised by Naidoo and Pillay (2020) and Kemp et al. (2024) regarding elite capture and external dominance in CBT arrangements. Importantly, the study shows that such asymmetries are not inevitable. Where communities retained control over decision rules and partnership terms, sustainability outcomes were stronger and conflicts more manageable.

This reinforces the view that leadership capacity and governance design are mutually reinforcing. Without structured decision architectures and negotiation skills, community participation risks becoming symbolic rather than substantive.

Theoretical contribution: extending adaptive leadership through COMPASS

The primary theoretical contribution of this study lies in the development of the COMPASS framework. While adaptive leadership theory emphasises flexibility and responsiveness (Heifetz et al., 2009; Nunkoo & Ramkissoon, 2011: Jelev, 2016), it offers limited guidance on how leaders should operationalise adaptability in participatory, resource-constrained contexts such as CBT enterprises.

COMPASS extends adaptive leadership theory by introducing a decision-contingent governance architecture that explicitly links leadership style to decision type, stakeholder configuration, and contextual readiness. Rather than treating participation, transformation, and transaction as competing paradigms, the framework integrates them into a structured cycle that preserves legitimacy while enabling efficiency.

In doing so, COMPASS advances CBT scholarship by shifting leadership from a normative ideal to a practical management function, grounded in empirical evidence from community enterprises. This addresses a persistent gap in CBT literature, where leadership is often acknowledged but rarely operationalised.

Practical implications for CBT governance

For CBT practitioners and policymakers, the findings offer several actionable insights. First, leadership systems should explicitly differentiate between strategic, operational, and crisis decisions, aligning each with appropriate leadership approaches. For example, strategic decisions should employ structured

participatory processes, while routine operations can be delegated through transactional mechanisms without undermining legitimacy.

Second, CBT enterprises should begin collaborative projects with formal context-mapping exercises to surface power relations, stakeholder expectations, and decision rights. This aligns with the COMPASS framework's emphasis on contextual readiness and can prevent later conflict.

Third, targeted capacity-building in negotiation, conflict management, and tourism governance is essential. Training programmes should be co-designed with communities to ensure contextual relevance and integration of indigenous knowledge.

Finally, policymakers supporting CBT should prioritise governance support alongside financial investment. Clear guidelines on transparency, partnership agreements, and decision thresholds can significantly enhance the sustainability of community enterprises.

Conclusion

This study set out to examine how leadership styles, decision-making processes, and stakeholder collaboration shape the governance and sustainability of community-based tourism (CBT) enterprises in Ngamiland District, Botswana. The findings demonstrate that the effectiveness of CBT initiatives is less dependent on the availability of tourism assets than on the quality of leadership and governance systems through which those assets are managed.

The study shows that no single leadership style is sufficient for effective CBT governance. Transformational leadership plays a critical role in mobilising community support and aligning tourism initiatives with shared socio-cultural and environmental values. Participatory leadership enhances legitimacy and ownership, while transactional leadership enables operational efficiency in time-sensitive contexts. However, when these approaches are applied without clear decision rules, CBT enterprises experience delays, conflict, and uneven performance.

In response to these challenges, the study developed the COMPASS framework, an empirically grounded leadership and decision-making model that integrates adaptive leadership, structured participation, and contextual readiness. By linking leadership approaches to decision type and stakeholder configuration, COMPASS provides a practical mechanism for balancing inclusivity with efficiency in complex, multi-stakeholder environments.

By foregrounding leadership as a core management function rather than a peripheral social process, this study contributes to management and business

scholarship on community-based enterprises, collaborative governance, and sustainable tourism. More broadly, the findings align with global development priorities, particularly Sustainable Development Goal 8 (Decent Work and Economic Growth) and Sustainable Development Goal 11 (Sustainable Communities), offering pathways to strengthen local governance and equitable benefit-sharing in rural tourism economies.

Study Limitations

Several limitations should be considered when interpreting the findings. First, the study employed a qualitative, exploratory case study design focused on a single district. While this approach enabled rich, contextualised insights into leadership practices, it limits the generalisability of findings beyond similar CBT settings.

Second, the sample size, though appropriate for qualitative inquiry, restricts the ability to draw statistically representative conclusions. The perspectives captured reflect those of key stakeholders but may not encompass all community viewpoints, particularly marginalised or less vocal groups.

Third, some elements of the COMPASS framework, particularly those involving phased technological adoption and digital decision-support tools, remain conceptual at this stage. While grounded in empirical needs identified by participants, their effectiveness will depend on infrastructural reliability, funding continuity, and user acceptance, which may vary across contexts.

These limitations do not undermine the study's contributions but rather define the boundaries within which its findings should be interpreted.

Future Research

Future research should build on this study in several ways. First, mixed-methods studies could quantitatively assess the impact of COMPASS-guided leadership decisions on CBT performance indicators such as project completion rates, revenue retention, and community participation levels across multiple sites.

Second, longitudinal research is needed to examine how leadership styles and decision architectures evolve over time, particularly as CBT enterprises mature and stakeholder configurations change. Such studies would be valuable in assessing the long-term sustainability of structured hybrid governance models.

Third, comparative studies across different national and institutional contexts in Africa could test the adaptability of the COMPASS framework and identify context-specific modifications. Finally, further research should explore the role of

youth and gender dynamics in CBT leadership, an area that emerged indirectly in this study but warrants focused investigation.

In conclusion, this study demonstrates that sustainable community-based tourism requires adaptive leadership, structured decision-making, and equitable collaboration. The COMPASS framework offers a viable and context-sensitive pathway for translating leadership theory into practical governance solutions for CBT enterprises in Botswana and similar rural tourism contexts across the Global South.

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MARKET SEGMENTATION BASIS AND PERFORMANCE OF HOTELS IN IMO STATE

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Abstract

The study examined effect of market segmentation basis on performance of hotels in Imo state. The study aim to examine the relationship between market segmentation bases and performance of hotels in Imo state. The work used survey research design, with four research questions and three formulated hypotheses. The study population involved all the supervisors, and managers of the selected hotel in Owerri, Imo State ten (10) personnel from each hotel

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making it one hundred and fifty (150) from the fifteen selected hotels study adopts complete enumeration-based method, random sampling was used to obtain 100 personnel from the 10 randomly selected hotels. Questionnaire is used to collect data for analysis. The analysis was done using descriptive analysis by tabulation, measure of central tendency and charts. Tabulation was used to arrange the data in a table format. Measure of central tendency was employed to see the minimum and maximum values, the mean and the standard deviation for the sake of explaining level of market segmentation. Moreover, charts like bar charts, pie charts and histograms were used to describe the demographic characteristics of the respondents. Statistical package for the social sciences (SPSS) version 20 statistical program is used for the analysis of hypotheses. The study found among others that the sample hotels mostly used demographic and geographic segmentation bases for segmenting their markets. It is recommended that market segmentation as a marketing strategy should be taken seriously by players in the hotel industry since it helps to promote quality service delivery and competition among hotels.

Keywords: *hotels, market segmentation bases, performance*

JEL Classification: M31, L83, C83

INTRODUCTION

Background of the Study

Today, where the world is being recognized as global village marketing has become vital ingredient for every business success. It is almost become difficult for every competitor to survive in market for a prolonged period because competition is cut to throat. Change order is the core faith of marketing, that is why development of right marketing strategy over time is required. Right marketing Strategy is something that helps companies achieves marketing objectives. Marketing objectives help achieve corporate objectives and corporate objectives aim to achieve a competitive advantage over rival organizations. Effective marketing strategies or marketing campaigns often consist of a combination of several marketing tactics that work together in a synergistic way to establish your brand, reduce sales resistance, and create interest and desire for your product or service. Today marketing is everywhere, formally or informally, people and organization engage in vast number of activity that we call as marketing (Ahmadi, 2010).

But still there is one constraint before all companies that they cannot connect to all customers in large, broad or diverse market. Every company wants to focus on

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customers within their capacity and with customers intimacy. For this, market is divided into groups of consumers or segments with distinct needs and wants. This strategy of dividing the market in homogenous group is known as segmentation. Even companies, who have mass marketing phenomena, are now adopting this new world's strategy i.e. segmentation. The purpose of segmentation is the concentration of marketing energy and force on subdividing to gain a competitive advantage within the segment. It's analogous to the military principle of concentration of force to overwhelm energy. Concentration of marketing energy is the essence of all marketing strategies and market segmentation is the conceptual tool to help in achieving this focus.

Market segmentation involves the identification of the most profitable market segments. Therefore, businesses may decide to focus on just one or a few of these segments. They may develop products or services to satisfy each selected segment. Such a market segmentation strategy differs from mass marketing (where a company may decide to produce and distribute one product to all consumers) or from product differentiation (where a company offers a variety of products to a large market). Marketers have been moving away from mass marketing endeavours, as they are increasingly targeting smaller segments with customised marketing programmes. In this light, this chapter sheds light on the effect of market segmentation on performance of hotels in Imo state. It clarifies how hotels could select the most profitable segments as they employ market coverage and positioning strategies to attract them (Park, 2011).

A hotel is a managed building or establishment that provides guests with a place to stay overnight – on a short-term basis – in exchange for money. The precise features and services provided to guests can vary quite drastically from one hotel to another. The hotel industry is the section of the service industry that deals with guest accommodation or lodgings. By most definitions, the hotel industry refers to hotels and many other forms of overnight accommodation, including hostels, motels, inns, and guest houses (Nduoko & Essien, 2014). Furthermore the hotel industry is defined as a business sector that revolves around providing accommodation to guests. The hotel industry consists of subdivisions such as lodging service, food & beverage service, tourism, transportation, and events.

1.2 Statement of the Problem

Management decision quality depends on the ability to understand the functioning of the market served, with the strongly interrelated strategic marketing issues of competition and market segmentation representing crucial issues of market knowledge. However, in a competitive marketplace, market segmentation is

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the key to success. The concept of market segmentation can be implemented best when there is a sound basis of knowledge about the target group. Basic to this knowledge depends on statistical information of consumers in terms of (a) demographics (b) psychographics (c) geographic and (d) behaviourial variables.

In an era of increasing sophistication of customers' demand, when hotel facilities such as room, restaurant, bar, nightclub or health club are no longer considered a luxury, hoteliers go to great lengths to provide unique benefits to customers and turn to different strategies, amongst which market segmentation forms one of the most important marketing strategies in hotel management. In this context, there have been very few studies on the factors that influence market segmentation and performance in hotels in Imo state. This study is motivated by the observed gap in the methodology, findings and locations on the sub variables of interest necessitating an enquiry.

1.3 Objectives of the Study

The general objective of the study is to examine the relationship between market segmentation bases and performance of hotels in Imo state. The specific objectives are to:

1. examine the effect of demographic bases of market segmentation on repeat patronage of hotels in Imo State
2. evaluate the nexus between demographic bases of market segmentation and customer satisfaction of hotels in Imo state
3. assess the nexus between geographic bases of market segmentation and repeat patronage of hotels in Imo State
4. evaluate the effect of geographic bases of market segmentation on customer satisfaction of hotels in Imo state

1.4 Research Questions

1. What is the effect of demographic bases of market segmentation on repeat patronage of hotels in Imo State?
2. What is the nexus between demographic bases of market segmentation and customer satisfaction of hotels in Imo state?
3. What is the nexus between geographic bases of market segmentation and repeat patronage of hotels in Imo State?
4. What is the effect of geographic bases of market segmentation on customer satisfaction of hotels in Imo state?

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1.5 Research Hypotheses

The following hypotheses were formulated based on the research objectives

H_{01}: There is no significant relationship between demographic/geographic bases of market segmentation and repeat patronage of hotels in Imo State

H_{02}: There is no significant relationship between demographic/geographic bases of market segmentation and customer satisfaction of hotels in Imo state

H_{03}: There is no significant relationship between market segmentation and repeat patronage/satisfaction of hotels in Imo State

Significance of the Study

The study is beneficial to this set of people; businesses, hotels and companies in the sense that companies must work harder to ensure that their marketing has the greatest impact possible. Increasing competition makes it difficult for a mass marketing strategy to succeed. As Customers are becoming more diversified and firms are constantly differentiating their products relative to competitors. When the focus is on segmented markets, the company's marketing can better match the needs of that group. Market segmentation allows firms to focus their resources more effectively, and with a greater chance of success. Marketing, product and brand managers are continuously being asked to increase their return on investment. They are constantly searching for new information about their markets, and new ways to approach them. This is where the study comes in to serve as an eye opener to these sectors.

To future researchers in the field marketing, it will serve as a reference paper for further studies

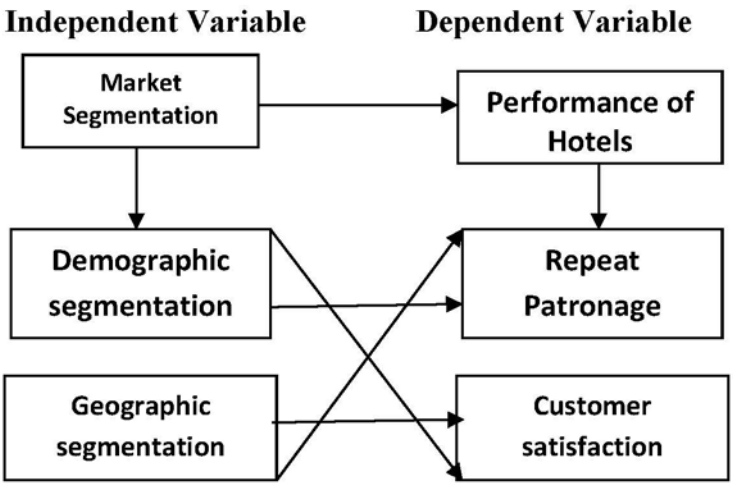
The scope of the study is focused on effect of market segmentation on the performance of Hotels in Imo State. The unit scope is made up of hotels, and managers and directors of hotels in Imo state.

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REVIEW OF RELATED LITERATURE

2.1 Conceptual Review



Market Segmentation
bases of market segment

A market segment is a group of individuals, groups or organizations who may share the same interests, traits and characteristics. The consumer segments may have similar needs, wants and expectations.

Market segmentation is the actual process of identifying segments of the market and the process of dividing a broad customer base into sub-groups of consumers consisting of existing and prospective customers. Market segmentation is a consumer-oriented process and can be applied to almost any type of market. In dividing or segmenting markets, researchers typically look for shared characteristics such as common needs, common interests, similar lifestyles or even similar demographic profiles (Daudi, 2019). So, market segmentation assumes that different segments require different marketing programmes, as diverse customers are usually targeted through different offers, prices, promotions, distributions or some combination of marketing variables.

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Benefits of Segmentation

By dividing the market into segments, marketing managers can acquire a better understanding of the needs and wants of customers. This enables them to customise or to 'tailor' the company's marketing activities more accurately and responsibly to the individual customers' likings. Segmentation marketing supports businesses in meeting and exceeding their customers' requirements. It may also allow them to evaluate the competitors' strengths and weaknesses. This way, they could discover business opportunities in markets which were not served well. Customer segmentation enables marketers to adopt a more systematic approach when planning ahead for the future. This leads to better exploitation of marketing resources, resulting in the development of a more finely-tuned marketing programme.

Bases /Segmentation Variables

One of the most important factors to segment market appropriately and comprehensively is to choose appropriate factors for segmentation . An appropriate segmentation makes it possible to achieve strategic advantages. However, inappropriate variables cause segmentation processes to distort, organizational sources to waste and performances to deviate from defined objectives (Liu & Ong, 2008)as cited by (Amadi, 2010). There are a wide and disparate set of segmentation methods to choose among. The traditional variables that may be used for market segmentation can be grouped into five main categories: (i) Demographic; (ii) Geographic (iii) Psychographic; (iv) Behavioural and / or (v) Product-Related Factors but for the sake of this study, the bases of market segmentation will be limited to two, demographic and geographic market segmentation.

Performance

Performance is stated to be the realization of organizational goals and objectives with minimum resources while performance measurement could be described as the assessment of the level of achievement of organizational goals and objectives with minimum resources(Bayer, 2020). According to Adiele and Grend (2015) patronage can be described as the support and encouragement given by a patron. Customer patronage is deeply held commitment to repurchase a firm's products at the expense of a competitors' offering is known as customer patronage. Repeat patronage is the act of having multiple patronage from the same brand. It is generally seen as an indication of customer satisfaction and growing customer

loyalty, as they have chosen to return to a business and buy their product again. The repeat purchase rate may also be called a "reorder rate," a "repeat-customer rate," or a "customer- to cause the switching behaviour (Clarke, 2021).

Empirical Review

Weinstein (2020) advocates that service providers attempt to know who the better customers are through the use of demographic, geographic, psychographic and behavioral research. In doing so a profile of the "typical user" is determined. With the use of descriptive survey and sample size of 308 customers from three randomly selected hotels in Australia. Such information then becomes very useful in the subsequent marketing effort. To retain customers and to gain a larger share of their business, service providers need to develop better understanding of the customers' purchasing pattern.

A study by Bayer (2020) examined impacts of customer segmentation on the telecommunications industry in Bostwana. The study employed four segmentation schemes, namely: customer value segmentation, customer behaviour segmentation, customer life cycle segmentation and customer migration segmentation. Findings of the study reveal that advanced use of segmentation strategy allows each customer to be part of a micro-segment which allows for precise targeting, with knowledge of what the retention and value drives are for each customer. The end result was higher retention and growth, with the parallel benefit of enhanced business planning and retention targets may be assigned to each segment (Bayer 2020).

In the same vein, a study conducted by Aheleroff (2018) examined customer segmentation for a mobile telecommunications company based on service usage behavior in Dubai. The study discusses how to cluster mobile customers by billing systems and call details records, and analyse their customer behaviours. The study used simple linear regression in analysis of data, it reveals that customer life cycle segmentation effectively captured the subscribers into four loyal groups (Aheleroff 2018).

Similarly, a study by Daudi (2019) on the marketing strategy based on customer behaviour and marketing segmentation on telecoms in Tanzania examined marketing segmentation in telecommunications companies such as VODACOM, AIRTEL, TIGO, TTC and ZANTEL. Findings from the cross-sectional study revealed the possibility of explaining customers' buying behaviour and satisfaction through the market segment, attitudes towards telecoms companies and services provided by the companies (Daudi 2019).

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On his part, Kasadha (2018)in his study titled "Market segmentation and customer service at orange telecom-Uganda employed the cross-sectional research design was employed to collect primary data using self-administered questionnaires. Drawing on four main dimensions of market segmentation; namely: geographic, demographic, psychographic and behavioural segmentations, findings from the study revealed that Orange telecom has segmented its market according to population, age groups, gender, time, level of use, attitude though some respondents disagreed with the assertion that orange telecom segments its customers according to their level income and earnings (Kasadha 2018).

Ndu, Oko & Essien (2014) examined the Prospects and Challenges of Market Segmentation Practice in the Equipment Leasing Industry of Nigeria. Six research questions guided the study the study used survey method and questionnaire for data collection, with the population of 180 respondents. The data collected was analyzed using frequency table and simple percentage. The lessors' and lessees' assessment of the operational efficiency of the equipment lease market operation and associated drive for market segmentation is low because the volume and value of transactions in the industry is small and lessors have poor knowledge of the needs and operational environments of the lessees

Park , Lim, Bhardwaj & Kim (2011) examined the benefit segmentation of TV home shoppers. The study identified four benefit segments of TV home shoppers: and they exhibited significant differences in demographic characteristics (i.e. gender, age, education level), consumer characteristics (i.e. time-consciousness, price- consciousness), and attitudinal outcomes (i.e. satisfaction with TV shopping, repurchase intention).

Montinaro & Sciascia (2011) investigate market segmentation models to obtain different kinds of customer loyalty. The study found that the market segmentation models commonly used in literature do generate different types of loyalty. It further recommend that customer loyalty can be considered and calculated as a function of market segmentation and customer patronage and satisfaction.

Vinerean (2014) investigate market Segmentation in the Decision Making Process in Tourism Exhibited three distinct segments of consumers who purchase tourism services based on specific dimensions of behavior.

Mor & Sulekha (2014) A Study of Psychographic variables proposed for Segmentation for Personal Care Products through Factor Analysis. Personal values, work values, social interests, general attitude for life, prudent and brand conspicuous were found to be the different psychographic factors that can be used to group personal care products consumers.

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Ateboh-Briggs (2014) examined Market Segmentation and Customer Loyalty in Deposit Banks in Port Harcourt, Nigeria. The study was guided by two objectives and two research question with one hypothesis. The study employed survey method to ascertain from Deposit Bank Port Harcourt the impact of market segmentation on customer loyalty. The study found that the application of marketing segmentation strategies is associated with the loyalty displayed by customers

Theoretical Review

The study reviewed dynamic capabilities theory, resource based theory, performance theory, and learning curve theory. But, the work is anchored on dynamic capabilities theory.

Dynamic Capabilities Theory (DCT)

This study adopts the Dynamic Capabilities Theory (DCT) to establish the interface between the variables in the study. Dynamic Capabilities Theory (DCT) is defined as the firm's ability to integrate, build and reconfigure internal and external competencies to address rapidly changing environments (Teece, Pisano & Shuen, 1997). Dynamic capabilities thus reflect an organisation's ability to achieve new and innovative forms of competitive advantage given path dependencies and market positions. The concept of dynamic capabilities as the ultimate source of competitive advantage is at the forefront of strategy research (Hou & Chien, 2010).

Applying the Oliver (1977) Dynamic Capabilities Theory (DCT) to this research on market segmentation and performance of hotels shows that hotels network introduced the market strategy of classifying the company’s customers into four broad segments on the basis of geography, and demography respectively, so as to capture their specific needs in a fast changing market environment. This is widely believed to be done with the aim of improving targeted service delivery to meet specific demands with the ultimate goal of yielding maximum profit and capture the competitive market.

Resource-Based Theory

According to Resource –based theory, in his article titled "Firm Resources and Sustained Competitive Advantage," in Texas university. Barney (1991) asserts that “Resources are of great importance to an organization because they aid companies to gain and maintain competitive advantage within their industry or market. In every organization, there are four types of resources namely; physical (plant; technology and equipment; geographical location (segmentation), human (employees’ experience and knowledge), financial, and information resources. This theory is appropriate for this study because its emphasis the relevance of marketing

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resources as one of the main sources of competitive advantage by many organizations in today's economy.

Performance Theory

The performance theory suggests that employees are an asset to the organization, and they should be managed in a way that maximizes their potential. This theory posits that if employees are managed effectively, they will be more productive, and their performance will lead to increased profits for the organization. It explore the way performances are created, received and interpreted and how they shape and reflect cultural and social norms, values and identities.

In practice, organizations often balance these two theories by emphasizing both efficiency and effectiveness. They aim to minimize costs associated with employees while also maximizing their potential and performance. This approach requires effective human resource management practices, including hiring, training, and utilizing effective marketing strategies to aid boast productivity.

Learning Curve Theory

The Learning Curve Performance management theory states that employees learn in a predictable , measurable way overtime. It's specifically based on the idea that employees perform better as they gain experience in their jobs. It's generally applicable to any type of job or situation where a manager expects an employee to perform a new task or complete a new project. It's important to note that the learning curve performance management theory doesn't apply to jobs that don't have a learning curve

Research Gap in Literature

The gap in knowledge in this study is that there is no specific empirical work on market segmentation and performance of hotels in Imo state this is true because we have main related studies, but no one specifically covers the independent variable (market segmentation) and dependent variable (performance) the past works did not utilize the effect of geographic, and demographic bases of market segmentation on performance.

RESEARCH METHODS

The research design for this study is descriptive research design. According to Anyanwu(2000) survey is research design that enables a researcher to take information from primary sources (questionnaires, interview and observation)

The study population involved all the 180 registered hotels in Imo state with different star ratings of 7 five star, 15 four star, 28 three star, 45 two-stars and 85

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one-star(Source: Imo State Government e-Procurement Platform, 2024) , the entire hotels in Owerri metropolis will be difficult to study due to cost implication involved in moving from one location to the other, however, the researcher randomly pick two(2) hotels each from each rating, thereby making the study population to be ten(10) registered hotels in Imo state.

Since the population of the study is not too large, the study adopts complete enumeration-based method. Most populations about which inferences must be made are usually quite large. Given the above reasons, the sample size cannot be statistically determined using Taro Yamene formula. Out of the ten(10) hotels chosen, ten (10) staff were randomly selected making it a sample size of One hundred(100) personnel from the 10 randomly selected hotels.

The sampling technique used in this study was simple random sampling. Simple random technique was adopted in distributing the questionnaire to the target audience using the selected hotels. A simple random sampling technique allows each unit in the population an equal chance of being selected and represented in the survey and it is free from sampling bias

The data collection instrument used for this study was a structured rating scale designed in the form of questionnaire developed by the researcher. A self-administered questionnaire was used to obtain demographic information of respondents relevant to the study. Participants were asked to furnish information with regard to their age, gender, educational level and their job position in the present institution. Market segmentation questionnaire was also developed to assess the segmentation bases used in the sample hotels and the effectiveness of market segments in the sampled hotels. Each of the questions consists of five response choices weighted in the following manner.

Response choices Scoring weight

Very low----------1
Low----------2
Medium---------- 3
High---------- 4
Very high----------5

A percentile score of 75 or higher indicate a high degree of using the mentioned market segmentation practice; a percentile score of 25 or lower would indicate a low level; and, the scores in the middle range that is from 26 to 74 of percentiles indicate average usage.

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Content and face validity methods were used as the instruments were presented to the supervisor, the corrections and directives from the supervisor were fully adhered to in the final draft of the instrument before distribution.

The researcher used test retest reliability method for the study. A pilot test was first conducted with a separate group who is not but possess similar characteristics with the respondents. The Cronbach alpha was used. A comparison of the result generated from the pilot test with the main study shows that the instrument of the study is reliable, since the values of r is 0.89 as against 0.7 which is the benchmark for acceptance according to (Nnenefe, 2008)

Data collected were analyzed using both descriptive and inferential statistics to further transform the processed data to patterns between and/or among data groups.

Descriptive analysis was used to summarize the data by tabulation, measure of central tendency and charts. Tabulation was used to arrange the data in a table format. Measure of central tendency was employed to see the minimum and maximum values, the mean and the standard deviation for the sake of explaining level of market segmentation. Moreover, charts like bar charts, pie charts and histograms were used. Statistical package for the social sciences (SPSS) version 20 statistical program with Pearson Product moment Correlation Coefficient is used for the analysis of hypotheses.

DATA PRESENTATION, ANALYSIS AND INTERPRETATION

100 questionnaires were distributed to the respondents and out of the 100 questionnaires 51 of them were collected. Among the 51 collected questionnaires 3 of them were incomplete which does not provide relevant data for the study. Accordingly the analysis of this study was done based on the number of questionnaires collected. Total questionnaire was 100 (100%) and total completely retrieved was 48 (40%)

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Gender distribution of respondents

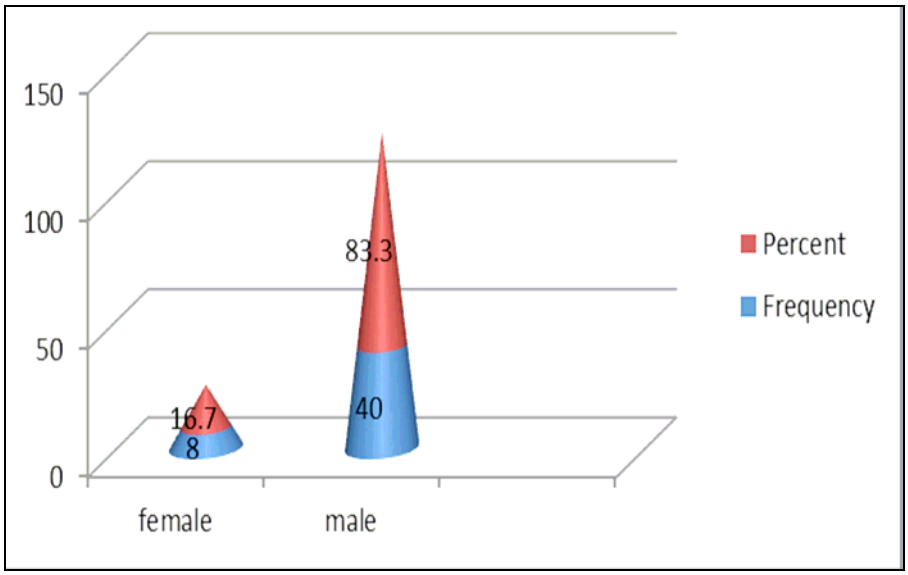


Figure 1: Gender distribution of respondents

Fig 1 above presents a graphical representation of the gender distribution of the selected sample. There are a large number of male respondents (n=40), which is 83.3% of the sample. The female respondents (n=8) comprise 26.5% of the target sample respondents.

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Age distribution of respondents

The age distribution of the sample respondents is depicted in the following graph.

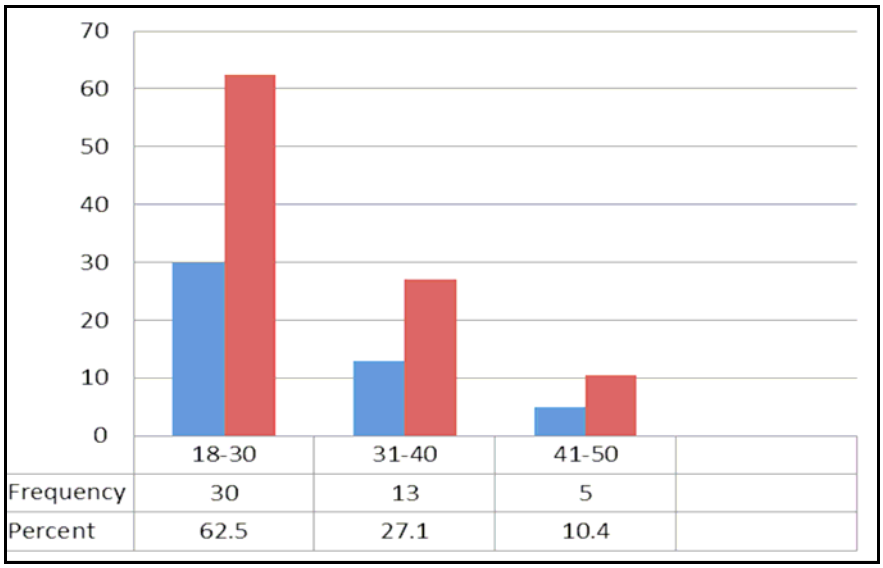


Fig. 2 above describes how the age of sample respondents were distributed among three age categories. The majority of the respondents (62.5% or n=30) were between 18 and 30 years old. n=13 or 27.1% of the respondents were between the age of 31 and 40 years old. The remaining respondents i.e. n=5 or 10.4% lies between 41 and 50 years of age.

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Educational level of respondents

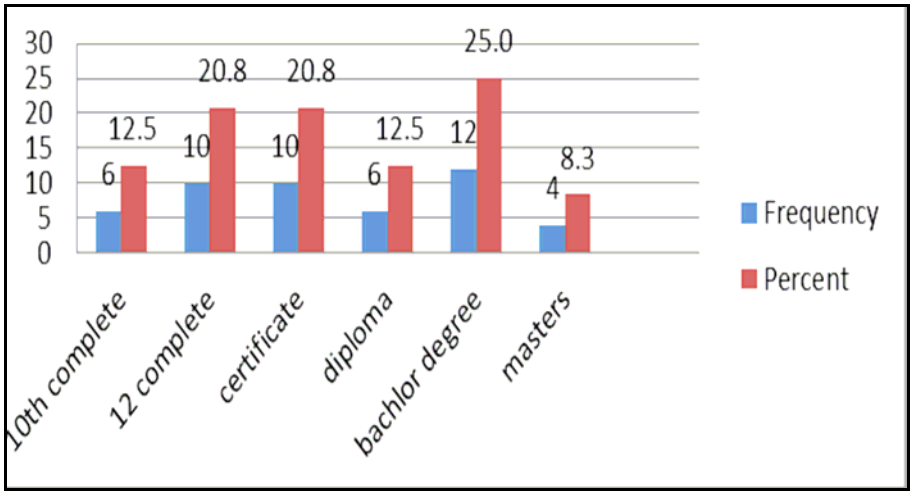
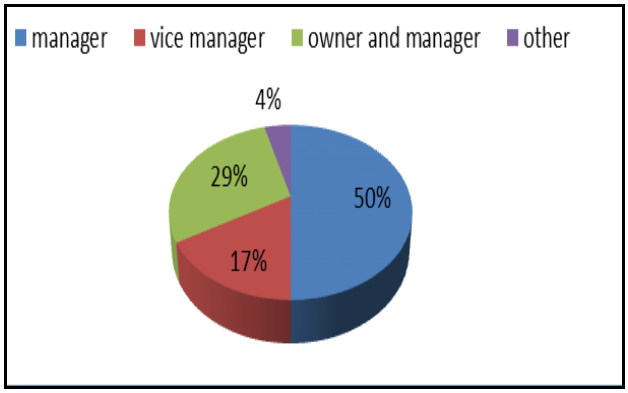


Figure 3 above shows that the educational level of the majority of respondents (25% or n=12) are first degree holders followed by 12 complete and certificate graduates each comprising n=10 or 20% of the sample respondents. Diploma holders and 10th complete respondents constitute n=6 or 12.5% of the respondents each. The remaining n=4 or 8.3% are second-degree graduates.

Figure 4: Current job position of respondents



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Figure 4 above shows the current job position of respondents indicating that most of the respondents are managers and owner and managers of the hotels comprising 50% or n=24 and 29% or n=14 respectively. 17% or n=8 of the respondents are vice managers and the remaining 4% or n=2 respondents are engaged in other activities of the hotels.

Research Question One & Two: To what extent does demographic and Geographic base of market segmentation effect on repeat patronage of hotels in Imo State?

Table 1 Results on the extent of effect of demographic and geographic bases of market segmentation with repeat patronage of hotels in Imo state

	Demographic Segmentation with Repeat patronage	Geographic Segmentation with Repeat patronage	Behaviourial Segmentation with Repeat patronage	Psychographic Segmentation with Repeat patronage
Mean	1.6458	4.1667	1.8125	1.6458
Std. Deviation	.72902	.75324	.93754	.72902
Minimum	1.00	2.00	1.00	1.00
Maximum	4.00	5.00	4.00	4.00

Performance of the hotels within the bases of market segmentation used was assessed by performance questionnaire; table 4.1 above indicates the calculated arithmetic means and standard deviations for the performance (customer repeat patronage) of the hotels under demographic and geographic segmentation. Therefore, it is possible to say that most of the hotels are profitable under demographic and geographic bases of market segmentation with a mean and standard deviation of 4.1667 and 0.75324 respectively. Table 4.1 also shows that beaviourial bases of market segmentation is the less profitable segmentation level for the sample Hotels with a mean of 1.8125. The least performance of the hotels on repeat patronage was found under psychographic bases of market segmentation with a mean of 1.6458 each.

Research Question Three & Four: To what extent does demographic and geographic bases of market segmentation effect on customer satisfaction of hotels in Imo state?

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Table 2 Results of the performance of market segmentation bases used in the sample hotels as obtained from the respondents

	Demographic Segmentation with Customer satisfaction	Geographic Segmentation with Customer satisfaction	Behaviourial Segmentation with Customer satisfaction	Psychographic Segmentation with Customer satisfaction
Mean	4.3125	3.7708	1.5417	1.3750
Std. Deviation	.87898	1.03635	.77070	.56962
Minimum	1.00	2.00	1.00	1.00
Maximum	5.00	5.00	4.00	3.00

The performance of the segmentation bases used in the Hotels as indicated on table 4.2 above, shows that demographic and geographic segmentation bases are the most profitable bases for the sample Hotels with arithmetic mean of 4.3125 and 3.7708 respectively. The behaviourial and psychographic segmentation bases are found less profitable in the sample Hotels with a mean score of 1.6667 and 1.6383 respectively, thus increases the customer satisfaction of the sampled hotels.

4.3 Testing of Research Hypotheses

To test the hypothesis above, data from table 4.1 were used

Segmentation Bases used in the sample hotels		Level performance
Psychographic on repeat patronage	Pearson Correlation	.189
	Sig. (2-tailed)	.197
Segmentation Levels used in the sample hotels		Level performance
Demographic/Geographic on repeat patronage	Pearson Correlation	.689**
	Sig. (2-tailed)	.000
Demographic /Geographic on customer satisfaction	Pearson Correlation Sig. (2-tailed)	.338* .019
Behaviourial on customer satisfaction	Pearson Correlation	.189
	Sig. (2-tailed)	.197
	*. Correlation is significant at the 0.05 level (2-tailed).	
**. Correlation is significant at the 0.01 level (2-tailed).		

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Table 4.3 above, indicates that there is a very low positive, but not statistically significant relationship between psychographic segmentation bases and performance (r=0.189, p>0.05) and behaviourial segmentation and performance (r=0.189, p>0.05).

Table 4: The relationship between market segmentation and performance

Effectiveness of segments in the sample hotels	Performance
Segments Effectiveness Pearson Correlation Sig. (2-tailed)	.240** .000
** correlation is significant at 0.01(2- tailed)	

As it is clearly depicted on table 4.4, the correlation coefficient results for the relationship between segment effectiveness and performance, there is low positive relationship between segment effectiveness and performance (r= 0.240, p<0.01) at 99% level of confidence

Concise table for hypotheses testing

S/N	Hypotheses		Results
Ha_1	There is a significant relationship between the bases of market segmentation and repeat patronage / customer satisfaction of hotels in Imo State	Pearson Correlation = .189 .689 .338 .189 Sig = 0.05 N = 48	 Valid Valid
Ha_2	There is a significant relationship between market segmentation and performance of hotels in Imo state	Pearson Correlation = . 240 Sig = 0.01 N = 48	Valid

The results of the first hypothesis showed that most of the hotels are operating under demographic and geographic bases of market segmentation which indicates valid with Pearson value .689. and .338 respectively. In contrast behaviourial and psychographic bases of market segmentation are used and implemented by few of the sample hotels this indicates invalid with Pearson value .189 respectively.

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The findings of the study also revealed that demographic and geographic segmentation used in the sample hotels results high mean score and substantial relationship with performance. Regarding with other bases of market segments with moderate relationship.

Moreover, the third hypothesis showed that the hotels have lower level of segment effectiveness when they are evaluated in terms of the criteria of measurability, accessibility, substantiality, differentiability and actionability. In relation with segment effectiveness, the study further showed that the lower level of the hotels' segments effectiveness has resulted in low performance of the hotels. Thus, segments effectiveness can explain performance.

SUMMARY, CONCLUSION AND RECOMMENDATION

Summary

It was discovered that:

1. The sample hotels mostly used demographic and geographic segmentation bases for segmenting their markets.
2. Demographic and geographic segmentation bases are the best segmentation bases contributing substantial and moderate profits to the SMEs respectively. While psychographic and behaviourial segmentation base results in low performance. Therefore, market segmentation bases can also significantly explain the variation in performance.
3. The combined effect of overall market segmentation practices i.e. (bases of market segmentation) on profitability was found positive and substantial.

Conclusion

This work focused on effect of market segmentation on performance of hotels in Imo state. The implementation of market segmentation practices in hotels has a significant positive result on their performance. The result ranges from low to substantial in its contribution to the performance of the sample hotels. This work concludes that market segmentation is substantial when the appropriate segmentation bases are chosen based on their respective situations and capabilities for better enjoyment of performance in market segmentation.

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Recommendations

Based on the results and findings of the study, the researcher made the following recommendations to the owners and managers of hotels in Imo state;

1. It is recommended that market segmentation as a marketing strategy should be taken seriously by players in the hotel industry since it helps to promote quality service delivery and competition among hotels.
2. Age and location are an important variables for market segmentation criterion design and that most hotel clients are youthful. On the basis of this, the study recommends that the hotel industry should encourage its members to provide enough recreational facilities to meet the needs of their clients

Contribution to Knowledge

The work contributed to knowledge because it focused on effect of market segmentation on performance of hotels in Imo state which has not been covered before by past researchers. The work contributed to knowledge by using level of market segmentation, bases of market segmentation and effectiveness of market segment on performance, the heuristic model was therefore presented in the figure below.

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