INTELLECTUAL CAPITAL EFFICIENCY AS THE DETERMINANT OF SUSTAINING PROFITABILITY IN THE COVID-19 PANDEMIC CONDITIONS: DOES THE AGE OF THE ENTERPRISE MATTER IN THE HOTEL INDUSTRY?

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Abstract
The purpose of this paper is to provide the answer to the question - Can the efficiency of intellectual capital (ICE) be a factor in maintaining the profitability of young and mature hotel enterprises in the crisis caused by the Covid-19 pandemic? The key goal of the paper is to point out the importance

of[EG1] *intangible (intellectual) resources for improving business performance, and above all, profitability. To respond to the goals of the research, an analysis of the contribution of human capital efficiency (HCE) and structural capital efficiency (SCE) to the profitability of young and mature hotels in the year before the crisis and the year of crisis in the Republic of Serbia (RS), as an emerging country will be given. The study's findings suggest that the ICE components have a partial impact on the profitability of young hotels in the year before the crisis. In the year of crisis, the ICE components partially affect the realization of sustainable and profitable business among mature hotels.*

Key words: *intellectual capital, efficiency, profitability, hotel, Covid-19 pandemic*

JEL Classification: *O34, L25*

Introduction

(1) In the era of knowledge economy, with the dominance of knowledge resources and the dynamic development of information technology and the service sector, intellectual capital (IC) is becoming the primary factor of enterprise development and competitiveness [Radjenovic & Krstić, 2017]. The hotel industry is often called the "human industry" [Baum & Nickson, 1998]. Human resources are the drivers of the growth and development of hotel enterprises and are important for the efficiency improvement of all business processes and activities. MacGregor Pelikanova *et al.* [2021] point out the relevant role of employees in hotel organizations in emerging economies and their (un)readiness to cope with challenges and provide better labor efficiency. Therefore, it is necessary to have a constant focus of management on productivity [Veselinović *et al.,* 2021] and continuous growth of HC efficiency, measured by a set of different indicators applicable in hotel enterprises. With that in mind, this paper covers the issue of the importance of intellectual resources for hotel companies in order to improve their profitability.

(2) The importance of studied matter is based on the following: 1) Intellectual resources are a key factor of competitiveness in the knowledge economy, 2) This is the first study comparing the effect of the coefficients of the efficient use of human and structural capital on the profitability of hotel operations in the years before and after the crisis caused by the Covid-19 pandemic, 3) The special focus of the study

is on the operating period of the analyzed hotels and on investigating whether the efficiency of HC and SC equally or differently contributes to mature and young hotels in the years before and after the crisis.

(3) Authors intend to answer to this matter through the following research questions:

1. To make a comparison of the contribution of IC efficiency, profitability of hotel enterprises in the year of crisis caused by the Covid-19 pandemic and the year before the crisis in an emerging economy, such as RS. Effective IC management is expected to contribute to a higher profitability of hotel enterprises and overcoming the crisis.

2. To investigate whether enterprise age can be a significant factor in which the efficiency of IC contributes to the profitability of hotel enterprises. Mature hotel enterprises are assumed to have a higher value of IC, so the efficient use of components of the total IC (HC and SC) is expected to contribute to a higher profitability of hotel enterprises in an emerging economy.

Empirical research, presented in this paper, was conducted in RS. The hotel sector in the RS has achieved a significant growth in terms of the number of hotels and the number of hotel nights from 2010 to 2019 [Eurostat, 2021].

(4) There are relevant studies in the literature that have addressed the role of the age of the enterprise in IC management and development [El-Bannany, 2012; Goebel, 2015; Forte *et al.*, 2017], but none provided an answer to the question of whether there is a difference in the contribution of IC profitability between mature and young hotel enterprises, which reflects the special contribution of this paper to the specialized literature in this field.

Literature Review
Intellectual capital and profitability
By wisely investing in intellectual resources, enterprises can achieve higher productivity and increase efficiency in the use of resources. Service-based industries, which include the hotel industry, rely on IC, especially in the form of knowledge and creativity of employees to maximize the value of the business [El-Bannany, 2012; Radjenović & Krstić, 2017].

Business performance is a concept used by academics and professional managers in all areas of business research, especially within strategic and operational performance management [Campos *et al.,* 2021]. The key to business performance is profitability. It is an aggregate business performance because it

should measure the aggregate efficiency - efficiency in the use of all employed resources of an enterprise [Krstić & Sekulić, 2020]. Traditional accounting profitability measures, such as the return on assets (ROA) and the return on equity (ROE), show the success that an enterprise has achieved in carrying out its activities, describing the extent to which the enterprise can effectively (profitably) manage its assets and equity [Soewarno & Tjahjadi, 2020]. ROA and ROE indicators have their limitations as stated in Krstić [2014]. This author emphasizes that the denominator of ROA and ROE does not include the value of all intellectual resources because the value of these resources is not shown in the balance sheet, taking into account the requirements of International Accounting Standard 38. Also, the limitations of these ratios come from different accounting policies for estimating income and expenses that determine the amount of balanced earnings (profit) in the sense that it can be overestimated or underestimated [Krstić, 2014]. In the empirical research in this paper, the focus is on the profitability indicators of hotel enterprises.

Several research suggests a link between IC and business performance [Campos *et al.,* 2021; Torre *et al.,* 2021]. Also, the results of previous studies provide evidence of the relationship between IC and business performance of enterprises in emerging economies [Tiwari, 2021; Tran & Vo, 2021].

A number of researchers [Ghosh & Mondal, 2009] claim that enterprises with better IC performance are expected to have a higher profitability rate. The link between the intellectual capital efficiency (ICE) and profitability indicators has been pointed out by other authors in their research [Weqar *et al.*, 2020; Ramírez *et al.*, 2021; Tiwari, 2021; Maji & Hussain, 2021]. ICE positively contributes to ROA [Nimtrakoon, 2015]. D'Amato [2021] concludes that enterprises with higher IC value are more profitable compared to enterprises with lower IC value. He also found that enterprise profitability and risk mediate between IC and financial leverage. Bayraktaroglu *et al.* [2019] highlight that ICE has a moderating role in the relationship between efficiency of employed capital and profitability. Ghosh and Mondal [2009] believe that the performance of an enterprise's IC can explain profitability, but not productivity and market valuation in India. Bontis *et al.* [2015] conclude that, to some extent, the profitability of hotels is influenced by human and structural capital. Few studies [Firer & Williams, 2003; Chu *et al.*, 2011; Ognjanović, 2020] point out a significant negative relationship or no relationship between IC and enterprise profitability.

The age of the enterprise as a determinant of intellectual capital development and growth

The age of the enterprise is defined "as the length of time it has been in existence" [Nigam *et al.*, 2021]. The analysis of the age of enterprises confirms the fact that enterprises develop the value of IC in a cumulative way over time [Forte *et al.*, 2017]. Diverse studies [Hsu & Wang, 2010; Reed *et al.*, 2006] revealed that the increase of IC value is influenced by the age of the enterprise. Age provides evidence indicating that an enterprise has been, is, and will be sustainable [Bukh *et al.*, 2005]. Some authors [El-Bannany, 2012; Nigam *et al.*, 2021] consider years to be a proxy for the success of an enterprise. Another explanation may be that mature enterprises achieve better performance than young ones because market experience helps them gain a competitive advantage through better staff recruitment, production, and marketing strategies [El-Bannany, 2012]. Thus, the younger the enterprise, the greater the chances of failure [Nigam *et al.*, 2021]. Other authors [Bukh *et al.*, 2005; White *et al.*, 2007] believe that enterprise age is often a risk factor in the sense that mature enterprises are less risky.

The results of previous studies indicate that enterprise age is a significant business factor. Maji and Laha [2021] conclude that age is a significant determinant of business efficiency in Indian manufacturing enterprises during the period from 1999 to 2014. D'Amato [2021] proves that enterprise age affects the profitability of Italian enterprises. The results of the study of Shahzad *et al.* [2021] show that mature enterprises perform better and do better than young enterprises.

The relationship between the age of enterprise and intellectual capital has been analyzed in literature. El-Bannany [2012] concludes that experience is the main reason why the IC performance of mature banks is better than the IC performance of young banks. Hosono *et al.* [2021] highlight that for young Japanese enterprises, the accumulation of intangible capital is a key driver of overall economic growth. Organizational capital explains a large part of the sales growth of young enterprises. Certain studies [Forte *et al.*, 2017] conclude that age negatively affects IC value.

Efficiency of Human and Structural capital as elements of Intellectual capital according to VAIC model

In general, the value of IC is difficult to measure [Soewarno & Tjahjadi, 2020]. The same is the case with the efficiency of IC segments. It is difficult to measure the efficiency of the total IC, having in mind the intangible nature of individual

elements of IC, as well as the limitations of accounting standards - lack of accounting information in financial statements that would be used in quantitative models to calculate the aggregate indicator (which should express the efficiency of total intellectual capital) [Krstić & Bonić, 2016].

In the literature, the VAIC method has lately been widely used to measure the efficiency of human and structural capital as its key components. The VAIC model is based on measuring the efficiency of use of:

• Intellectual capital, consisting of two components:
   a) human capital (HC);
   b) structural capital (SC), and
• Other employed physical and financial capital (CE) in an enterprise.

The efficiency of the use of the total capital of the enterprise (intellectual - human and structural, physical, and financial) is marked as Value-Added Intellectual Coefficient (VAIC). Namely, it is considered that IC adds value to other engaged physical and financial resources.

Quantitatively, this coefficient represents the sum of two efficiency coefficients presented in the following relation: $VAIC = ICE + CEE$, where: ICE is an indicator of intellectual capital efficiency, while CEE is an indicator of the efficiency of other employed capital - physical and financial. The VAIC coefficient, therefore, allows the overall efficiency of enterprises to be quantified [Pulic, 2004].

Intellectual capital efficiency (ICE) is the sum of coefficients of the efficiency of human and structural capital [Pulic, 2004]: $ICE = HCE + SCE$. The analysis of the efficiency of the use of intellectual capital (human and structural) shows whether human intellectual resources and structural intellectual resources are managed in an efficient way.

In designing HC efficiency and SC efficiency indicators, Pulic [2004] uses the category of financial result called Value Added (VA) as the most appropriate indicator of business success, which is calculated as follows:

$VA = $ Operating earnings $+$ Employee costs $+$ Depreciation $+$ Amortization.

The efficiency of human capital, as an element of IC, is quantified using the indicator - HCE (Human Capital Efficiency), which represents the contribution of each unit of HC to the generation of value added [Tran & Vo, 2021]. Characteristic of the VAIC model is that all employee costs are included in the value of human capital (HC). The HCE indicator is calculated as follows [Pulic, 2004]: $HCE = VA / HC$, where HC indicates the total amount of salaries (wages) for all employees in the hotel, and VA denotes the value added.

The efficiency of structural capital, as an element of IC, is measured by a specific indicator - SCE (Structural Capital Efficiency). SCE is the contribution of SC in creating value added [Tran & Vo, 2021]. The value of structural capital (SC) is calculated as the difference between value added (VA) and human capital (HC), while the SCE indicator is calculated as follows [Pulic, 2004]: SCE = SC / VA.

Theoretical Background

The analysis of the relationship between ICE components and business performance, from the point of view of the hotel age, was conducted in the hotel industry in RS. The necessary data were collected from the financial reports of the hotels for 2019 and 2020. The hotel industry was chosen because: a) it is one of the largest and most dynamic industries in the world [Sardo *et al.*, 2018]; b) it is labor-intensive activity - it is necessary to determine what kind of support to human resources is provided by intellectual resources in the years of crisis; c) it is characterized by increased competition which requires decision-making based on sufficient performance information [Zigan & Zeglat, 2010].

In 2020, the year of the crisis caused by the Covid-19 pandemic, 421 accommodation facilities (hotels, garni hotels and motels) operated in the hotel industry in RS. Basic data on hotels are taken from the website of the Ministry of Trade, Tourism and Telecommunications of the Republic of Serbia. Data for calculating the value of ICE components and profitability indicators (ROA, ROE, RevPAR) are collected from the available financial statements of hotel enterprises. The sampling has been done considering the data availability, so a suitable sample was observed. Financial statements are available on the website of the Serbian Business Registers Agency (SBRA). The criterion for including a hotel in the sample is the registration of enterprises for hotel and other accommodation activities (5510, see RS Business Code).

The sample comprises hotel enterprises whose financial statements were available on the SBRA website. Data from the financial statements were collected for 164 hotels, which means that the sample makes up 38.95% of the total of 421 accommodation facilities which compose the accommodation sector in RS. Data for the remaining hotels were not collected and taken into account for the following reasons:

• Some hotels are registered under another name or as part of a larger company, which is not registered under activity code 5510- Hotels and similar accommodation.

• A few hotels are part of a national hotel chain. Consolidated financial report is presented for such hotels;

• Financial reports were not available for some hotels on the SBRA website;

• Hotels with a negative value added (VA) data from the VAIC methodology are excluded from the sample.

The criterion for defining young and mature hotels is based on the conclusion of Biggadika [1979] – young enterprises need 10 to 12 years to equate the ROI with the ROI of mature enterprises. Data from the Bureau of Labor Statistics shows that approximately 20% of new businesses failed during the first two years, 45% during the first five years, and 65% during the first 10 years. Only 25% of new businesses make it to 15 years or more [Deane, 2020]. It can be concluded that the first 10 years of business are risky for new, young hotels, based on which a cross-section of young hotels (operating for up to 10 years) and mature hotels (operating for 11 years or more) was made.

The structure of the sample was observed from four aspects: category, hotel size, hotel legal form and hotel type (see Table 1).

Table no. 1. Description of the sample structure

Criterion	Young hotels		Mature hotels		Total sample	
	Number of hotels	%	Number of hotels	%	Number of hotels	%
Category						
1-star	2	3	5	5	7	4
2-stars	8	12	19	20	27	17
3-stars	24	35	33	35	57	35
4-stars	33	47	33	35	66	40
5-stars	2	3	5	5	7	4
∑	**69**	**100**	**95**	**100**	**164**	**100**
Hotel size						
Micro	47	68	34	36	79	48
Small	15	22	45	47	60	37
Medium-sized	7	10	16	17	25	15
∑	**69**	**100**	**95**	**100**	**164**	**100**
Hotel legal form						
Entrepreneur	8	12	13	14	21	13
A limited liability company	61	88	74	78	135	82
Stock company	-	-	8	8	8	5

Criterion	Young hotels		Mature hotels		Total sample	
	Number of hotels	%	Number of hotels	%	Number of hotels	%
∑	**69**	**100**	**95**	**100**	**164**	**100**
Hotel type						
Garni hotel	25	36	23	24	48	29
Hotel	43	62	70	73	113	69
Motel	1	2	2	3	3	2
∑	**69**	**100**	**95**	**100**	**164**	**100**

Source: Authors

The VAIC method represents the foundation of the analysis of the human capital efficiency coefficient (HCE) and the structural capital efficiency coefficient (SCE). In setting research goals and formulating hypotheses, one starts from the elements of the efficiency of intellectual capital segments. Dependent variables in empirical research are the indicators of profitability - ROA and ROE. The ROA indicator is the ratio of operating earnings and total assets, and the ROE indicator is the ratio between net earnings and total equity [Tran & Vo, 2021]. Another indicator was added to profitability indicators, typical for hotel business - Revenue Per Available Room (RevPAR). This indicator measures the ability of hotels to earn income when renting rooms, as the ratio of total business revenue and the number of available rooms [Ognjanović, 2020].

Companies that adequately manage investments in HC can increase and improve their performance [Torre *et al.*, 2021] as evidenced by research [Maditinos *et al.*, 2011; Chatterjee *et al.*, 2021]. Studies [Asare *et al.*, 2017; Weqar *et al.*, 2020] indicate that HCE is a key component of a company's profit. Numerous analyzes also confirm the impact of HCE on ROA [Sardo & Serrasqueiro, 2017; Bayraktaroglu *et al.*, 2019] and ROE [Bayraktaroglu *et al.*, 2019]. Several studies do not prove the influence of HCE on business performance [Firer & Williams, 2003; Ognjanović, 2020; Dalwai & Salehi, 2021].

Hormiga *et al.* [2011] analyzed the importance of intangible assets among start-ups and concluded that HC has a very important role in the early stages of enterprise development. The importance of human capital in the initial stages of enterprise development is also discussed by Couto *et al.* [2021], emphasizing the importance of communication and interaction of employees within the teams. The literature [Peña, 2002; Hormiga *et al.*, 2011; Couto *et al.*, 2021] clearly highlights the importance of HC for young enterprises, which imposes the need to explore the

nature of the relationship between the HCE and the profitability of young hotels through the following hypotheses:

Hypothesis1: HCE has a positive impact on the profitability indicators of young hotels

Hypothesis1a: HCE has a positive impact on the profitability indicators of young hotels in the pre-crisis year

Hypothesis1b: HCE has a positive impact on the profitability indicators of young hotels in the year of the crisis

Cantrell *et al.* [2006] conclude that financial performance depends on the maturity of the human capital management process - enterprises with mature human capital management processes have better financial performance than those with young human capital management processes. In order to maintain a competitive advantage, mature enterprises can also strive to develop a value chain, forming networks (contacts) which increase the number of external relations and stimulate the development of human capital. Such activities may be the result of greater investment in human and relational capital [Couto *et al.*, 2021]. Goebel [2015] indicates that a company's focus on IC changes as the company matures, relying on "stocks" of knowledge, which is an important segment of overall IC. Based on the results of these studies it can be concluded that HC can positively contribute to the profitability of mature hotels. Hence, it is desirable to analyze the nature of the relationship between these two variables among mature hotels, as labor-intensive enterprises. Taking into account the above, the following hypotheses are defined:

Hypothesis2: HCE has a positive impact on the profitability indicators of mature hotels

Hypothesis2a: HCE has a positive impact on the profitability indicators of mature hotels in the pre-crisis year

Hypothesis2b: HCE has a positive impact on the profitability indicators of mature hotels in the year of the crisis

Several studies have indicated that higher levels of SC are associated with positive outcomes, such as productivity and efficiency gains [Ray *et al.*, 2012], enterprise value [Miles *et al.*, 2017] and business performance [Dalwai & Salehi, 2021]. SCE contributes to building high-quality services and enables the enterprise to build trust in relationships with customers and suppliers [Ramírez *et al.*, 2021]. SCE is positively associated with ROA [Dalwai & Salehi, 2021; Ramírez *et al.*, 2021] and ROE [Tran & Vo, 2021]. Other studies find that SCE negatively affects

ROA [Nimtrakoon, 2015]. This capital provides the enterprise with the flexibility to adapt to changes in the market, which is a determinant of business success [Peña, 2002]. The results of the studies [Chang & Hsieh, 2011; Couto *et al.*, 2021] indicate that enterprises in the early stage focus more on SC than on HC. Hence, based on these studies it is necessary to investigate whether investments in SC can contribute to the profitability of young hotels through the hypotheses:

Hypothesis3: SCE has a positive impact on the profitability indicators of young hotels

Hypothesis3a: SCE has a positive impact on the profitability indicators of young hotels in the pre-crisis year

Hypothesis3b: SCE has a positive impact on the profitability indicators of young hotels in the year of the crisis

It is assumed that mature enterprises have already developed SC, which is based on elaborated and connected processes, systems, databases with respect to the values of organizational culture. Accordingly, the following hypotheses are defined:

Hypothesis4: SCE has a positive impact on the profitability indicators of mature hotels

Hypothesis4a: SCE has a positive impact on the profitability indicators of mature hotels in the pre-crisis year

Hypothesis4b: SCE has a positive impact on the profitability indicators of mature hotels in the year of the crisis

Descriptive statistics results

Descriptive statistics are presented in Table 2 for all observed hotels, young and mature ones, in the pre-crisis year and the year of the crisis. In 2019, among young hotels, HCE is the dominant component of ICE (Mean = 2.09). The same conclusion can be drawn for mature hotels, as well (HCE Mean = 1.62). By observing the profitability indicators, the highest value is recorded for RevPAR among both young (Mean = 1840.47) and mature hotels (Mean = 1774.43) in 2019. The results of ROA and ROE are negative among young hotels in 2019.

By observing ICE components in 2020 (Table 2), the highest mean value is recorded for HCE for both young (Mean = 1.26) and mature hotels (Mean = 1.08). Among the profitability indicators, the highest value is recorded for the ROE of young hotels (Mean = 1164.74), while the highest mean value is documented for

the RevPAR of mature hotels (Mean = 1123.61). The results of descriptive statistics point to the negative value of ROA and ROE among mature hotels.

Table no. 2. Mean and Standard deviation for year before and during Covid-19 crisis

Variable	2019				2020			
	Young hotels		Mature hotels		Young hotels		Mature hotels	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
HCE	2.09	3.35	1.62	1.39	1.26	1.79	1.08	0.91
SCE	0.16	0.64	0.28	0.97	0.095	1.79	-0.42	6.61
ROE	-1161.33	9782	35.62	175.97	1164.74	8430.67	-32.40	204.20
ROA	-0.0008	0.28	0.05	0.18	-0.30	1.37	-0.08	0.32
RevPAR	1840.47	2474	1774.43	2421.41	1056.52	1795.9	1123.61	2778.80

Source: Authors

Investigating the relationship between the observed variables involves testing the normality of the sample distribution. The sample consists of 164 hotel companies – 69 young and 95 mature hotels. The observed sub-samples have more than 50 hotels, and hence the Kolmogorov-Smirnov test is used for testing the normality of the distribution. The results of the Kolmogorov-Smirnov test do not prove the normality of the sample distribution, as the value of statistical significance for all observed variables is $p = 0.000$.

The results of correlation analysis
Correlation analysis results for young and mature hotels are presented in Table 3 and 4, respectively. Due to the fact that normality of the sample distribution is not confirmed, correlation is observed by the Spearman's correlation coefficient.

The results of the correlation analysis between the ICE components and the profitability indicators of young hotels in 2019 revealed the strongest relationship between SCE and ROE ($\rho = 0.555$; $p = 0.000$), whereas the weakest relationship was present between HCE and RevPAR ($\rho = 0.249$; $p = 0.026$). The results of the correlation analysis between the ICE components and the profitability indicators of young hotels in 2020 determined the strongest relationship between ROE and HCE ($\rho = 0.612$; $p = 0.000$), while the weakest relationship was identified between SCE and ROE ($\rho = 0.271$; $p = 0.025$).

Table no. 3. Correlation results for young hotels

Variables	2019					2020				
	HCE	SCE	ROA	ROE	RevPAR	HCE	SCE	ROA	ROE	RevPAR
HCE	1					1				
SCE	0.984**	1				0.470**	1			
ROA	0.456**	0.463**	1			0.554**	0.359**	1		
ROE	0.546**	0.555**	0.713**	1		0.612**	0.271*	0.789**	1	
RevPAR	0.249*	0.199	0.345**	0.180	1	0.159	-0.147	0.145	0.154	1
Correlation is significant at: *0.05 and **0.01 levels *n = 69*										

Source: Authors calculations

The results of the correlation analysis between the ICE components and the profitability indicators of mature hotels in the pre-crisis year point to the strongest relationship between HCE and ROA ($\rho = 0.433$; $p = 0.000$), whereas the weakest relationship was present between SCE and ROE ($\rho = 0.276$; $p = 0.007$). Regarding the year of the crisis, the strongest relation was identified between HCE and ROA ($\rho = 0.573$; $p = 0.000$), while the weakest relationship was determined between SCE and ROA ($\rho = 0.483$; $p = 0.000$).

Table no. 4. Correlation results for mature hotels

Variables	2019					2020				
	HCE	SCE	ROA	ROE	RevPAR	HCE	SCE	ROA	ROE	RevPAR
HCE	1					1				
SCE	0.876**	1				0.745**	1			
ROA	0.433**	0.333**	1			0.573**	0.483**	1		
ROE	0.372**	0.276**	0.743**	1		0.561**	0.503**	0.920**	1	
RevPAR	0.133	0.021	0.070	0.146	1	0.095	-0.079	0.118	0.125	1
Correlation is significant at: *0.05 and **0.01 levels *n = 95*										

Source: Authors calculations

Results of Multigroup analysis

The overall structural model was determined by model fit indices: χ^2, χ^2/df; GFI; NFI; CFI, IFI and RMSEA. Hooperet *et al.* [2008] defined the acceptable threshold levels of these indices, determining the model goodness of fit

measurement. Chi-square (χ^2) evaluates the magnitude of discrepancy between the sample and fitted covariances matrices, where the values of p ≥ 0.05 point to the good fit of the model. In order to reduce the impact of sample size, apart from χ^2, the relative chi-square (χ^2/df) is used with the acceptable threshold of ≤ 3 [Kline, 2005]. According to Hooper *et al.* [2008], the following threshold levels are defined indicating acceptable fit of the model: GFI > 0.90; NFI > 0.80/0.90; CFI > 0.90; RMSEA < 0.08; IFI > 0.90. The results show that the observed measurement model is an acceptable fit of the model (Table 5).

We can identify a statistically significant impact when the critical ratio (CR) value is higher than 1.96 and p-value is lower than 0.05 (with an error rate of 5 percent) [Solimun, 2009]. For a more comprehensive insight into the importance of ICE components for the profitability of hotels, the necessary coefficients are calculated for the pre-crisis (2019) and the crisis year (2020).

Table no. 5. Standardized parameter estimates for year before Covid-19 crisis

Path	Young hotels			Path	Mature hotels		
	C.R.	**p**	**Support**		**C.R.**	**p**	**Support**
H_{1a} HCE → ROA	-1.066	0.286	No	H_{2a} HCE → ROA	1.226	0.220	No
H_{1c} HCE → ROE	**1.900**	**0.051**	**Yes**	H_{2c} HCE → ROE	1.781	0.075	No
H_{1e} → HCE RevPAR	-0.630	0.529	No	H_{2e} HCE → RevPAR	1.394	0.163	No
H_{3a} SCE → ROA	**4.995**	**0.000**	**Yes**	H_{4a} SCE → ROA	**2.060**	**0.039**	**Yes**
H_{3c} SCE → ROE	**6.606**	**0.000**	**Yes**	H_{4c} SCE → ROE	0.543	0.587	No
H_{3e} → SCE RevPAR	0.975	0.330	No	H_{4e} SCE → RevPAR	0.370	0.711	No

Note: Model fit: χ^2 = 7.812; d.f. = 6; χ^2/d.f. = 1.302; p = 0.252; IFI = 0.978; NFI = 0.911;
CFI = 0.969; RMSEA = 0.043
Young hotels: n = 69
Mature hotels: n = 95

Table 5 presents the results between ICE components and profitability indicators in 2019, pre-crisis year in the hotel business. It is evident that HCE and SCE of young hotels have a partially impact on some profitability indicators. Hypothesis1a is partially confirmed. Only HCE has a positive impact on the ROE of young hotels in the pre-crisis year (C.R. = 1.900; p = 0.051). Additionally, the

following Hypothesis3a is also partially confirmed. SCE has a positive impact on the ROA (C.R. = 4.995; p = 0.000) and the ROE (C.R. = 6.606; p = 0.000) of young hotels in the pre-crisis year.

In the case of mature hotels, SCE has a positive impact on ROA in the pre-crisis year (C.R. = 2.060; p = 0.039), thus Hypothesis4a is partially confirmed. Hypothesis2a is not confirmed by the research results. Therefore, it can be concluded that, in the pre-crisis year, the efficient usage of intellectual capital has a significant role in creating the profitable business of young hotels compared to mature ones.

Table no. 6. Standardized parameter estimates for year during Covid-19 crisis

Path	Young hotels			Path	Mature hotels		
	C.R.	**p**	**Support**		**C.R.**	**p**	**Support**
H$_{1b}$ HCE → ROA	0.296	0.767	No	H$_{2b}$ HCE → ROA	**2.853**	**0.004**	**Yes**
H$_{1d}$ HCE → ROE	0.217	0.828	No	H$_{2d}$ HCE → ROE	1.647	0.099	No
H$_{1f}$ HCE → RevPAR	0.645	0.519	No	H$_{2f}$ HCE → RevPAR	**2.660**	**0.006**	**Yes**
H$_{3b}$ SCE → ROA	**6.022**	**0.000**	**Yes**	H$_{4b}$ SCE → ROA	**1.977**	**0.044**	**Yes**
H$_{3d}$ SCE → ROE	0.223	0.823	No	H$_{4d}$ SCE → ROE	0.237	0.813	No
H$_{3f}$ SCE → RevPAR	-0.210	0.834	No	H$_{4f}$ SCE → RevPAR	0.093	0.926	No

Note: Model fit: χ^2 = 11.655; d.f. = 6; χ^2/d.f. = 1.942; p = 0.070; IFI = 0.902;
NFI = 0.836; CFI = 0.832; RMSEA = 0.076
Young hotels: n = 69
Mature hotels: n = 95

In Table 6, the results of the relationship between ICE components and profitability indicators in 2020, the crisis year in the hotel business, are presented. The results show that only SCE has a positive impact on the ROA of young hotels in the crisis year (C.R. = 6.022; p = 0.000), thus confirming hypothesis Hypothesis3b is partially confirmed. Hypothesis1b is not supported by the research results. Therefore, it can be concluded that, in the case of young hotels, ICE does not represent a significant factor which has successfully responded to the business crisis. Nonetheless, the conclusion of the positive impact can be drawn from the

results for 2019, where observed ICE components (HCE and SCE) made a significant impact of the profitability indicators.

By observing mature hotels, the dominant impact of human capital in the crisis year, as well as the impact of structural capital, can be determined. The research results partially confirm Hypothesis2b, i.e., HCE has a positive impact on the ROA of mature hotels in the year of crisis (C.R. = 2.853; p = 0.004) and HCE has a positive impact on the RevPAR of mature hotels in the year of crisis (C.R. = 2.660; p = 0.008). Finally, the impact of SCE on the ROA of mature hotels is determined (C.R. = 1.977; p = 0.044), thus partially confirming Hypothesis4b. By comparing these results with the results obtained for the mature hotels in 2019, it can be concluded that ICE has a significant role in the year of the crisis, with special emphasis on the importance of the efficient usage of human capital. For mature hotels, ICE has a more significant role in achieving profitable and stable business performances of hotel enterprises in a crisis period.

Conclusions

(1) The results of the study do not fully support the contribution of ICE and its components to the profitability of young and mature hotels. Firstly, the explanation for such results can be found in the VA and profitability concepts which encompass two different and completely unrelated dimensions of enterprise performance [Firer & Williams, 2003]. Profitability is understood as a financial-accounting indicator that is directed towards the shareholders' returns. VA represents an overall increase in the potential and wealth of different stakeholders, not just shareholders [Firer & Williams, 2003]. Thus, the conceptual disparity between IC and profitability can be explained by the lack of a significant association between profitability and VAIC components [Bayraktaroglu *et al.*, 2019].

Secondly, the calculation of ROA and ROE indicators may affect the correlation between VAIC and financial indicators, given that net earnings are highly influenced by financial leverage rates [Maditinos *et al.*, 2011].

A third possible explanation for the obtained results stems from differences in reporting and interpretation of IC in developed and developing countries as a result of social, economic and political factors [Dharni & Jameel, 2021]. In addition to these interpretations of the obtained results, other factors of the general environment that indirectly affect the observed variables should be taken into account. Tan *et al.* [2007] consider that the impact of IC on future performance

varies according to the type of industry. Most studies were conducted in the field of banking, financial services, pharmaceutical industry [Tiwari, 2021], i.e., extremely profitable industries. Besides, an imbalance among investors exists regarding their awareness of the importance of IC in value creation in companies operating in different geographical areas [Mehralian *et al.*, 2012]. These results are consistent with other research studies conducted in developing countries, which conclude that IC is not used enough in developing economies, hence it plays a minimal role in creating high financial performance [Firer & Williams, 2003; Dženopoljac *et al.*, 2017; Bayraktaroglu *et al.*, 2019]. It is assumed that developing countries still do not have sufficiently developed IC components at the national level, which may be one of the factors of such results.

Young hotels.

The results of the study are consistent with the conclusion of Hosono *et al.* [2021] that the sales growth rate and the growth rate of all business/production factors is higher in case of young companies. Before the crisis, SCE played a key role in the process of creating profitability (ROA, ROE) among young hotels. A similar conclusion can be drawn for the year of the crisis. Such results are in line with the results of Nassar [2018]; Hamdan [2018]; Chatterjee *et al.* [2021]. The results suggest that investors consider structural capital as a significant factor in investment decisions [Yu *et al.*, 2010], as companies with a high level of SCE are privileged for higher gains and steady revenue growth [Hamdan, 2018]. The study results are in line with the conclusion of Sumedre [2013] that in times of crisis the development of companies depends on structural capital because this capital makes a difference among companies in a turbulent business environment.

Mature hotels.

The results of the multigroup analysis indicate that mature hotels are less likely to fail than the young ones [Freeman *et al.*, 1983; Nigam *et al.*, 2021]. Such companies achieve better goals, meet deadlines, work more efficiently, and achieve cost savings [Vaz *et al.*, 2019]. The results show that, in a year of crisis, HCE plays an important role in achieving sustainable and profitable business among mature hotels. These results are in line with the conclusion of Nassar [2018] and Sumedrea [2013], according to which HCE has a key role in value creation after the 2008 financial crisis. Interestingly, HCE did not play a significant role in achieving hotel profitability in the year before the crisis, as evidenced by Nassar [2018]. These results indicate that investors continue to appreciate the role of human capital in value creation [Bayraktaroglu *et al.*, 2019] and use it as a significant tool for

overcoming the business crisis. Interpretations of the results are consistent with the conclusion [El-Bannany, 2012] that employee experience plays a key role in mature companies.

(2) The results clearly show that the efficient use of intellectual assets is not the only factor that would support the realization of a profitable hotel business in the Covid-crisis period. Hence, the following recommendations could be offered to managers:

•   Young hotels failed to make efficient use of intellectual resources during the crisis.

•   Managers are encouraged to further train their employees for the crisis business conditions and work on developing human resource management tools, such as the employer's brand. This is supported by the results of a study of mature hotels where, in the years of crisis, profitability can increase with a more efficient use of human capital.

•   Poorer performance indicators (ROA, ROE, RevPAR) in the year of crisis are a consequence of net losses and business losses produced by the hotel. It is recommended to the hotel management to look at fixed and variable costs, make a break-even analysis and manage the business so that, in times of crisis, it achieves the scope of activities that will enable a positive financial result and thus profitable business.

(3) The study has several limitations, which in fact points to directions for future research. The first limitation is related to the comprehensiveness of the sample. Empirical research was conducted only on hotels in the Republic of Serbia. A broader interpretation of the results would require expanding the sample with the several additional developing countries. Another limitation is related to a limited financial data set. Out of 421 possible hotels operating in Serbia, data were available for 173 hotels. For the rest of the hotels, financial reports were not available, or hotels were registered within some other companies, whose primary activity is not hotel services. By eliminating negative VA values, the sample was reduced to 164 hotels, representing 39% of the total number (421). The third limitation is related to the applied model of ICE calculation. The VAIC model is based on the calculation of variables on historical cost accounting and includes two components of ICE (HCE and SCE). This model does not include intellectual property and research and development (R&D) expenditure, which also affects hotel performance [Tran & Vo, 2021]. Notwithstanding these disadvantages, the model has certain advantages, which makes it very popular among researchers. The

VAIC model is a quantitative measurement approach based on the calculation of the efficiency of the use of appropriate components, based on information presented in publicly available financial statements and, as such, allows the comparison of ICE values among different industries.

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