

Marko Milašinović

University of Kragujevac
Faculty of Hotel Management and
Tourism in Vrnjačka Banja

Jasmina Ognjanović

University of Kragujevac
Faculty of Hotel Management and
Tourism in Vrnjačka Banja

Aleksandra Mitrović

University of Kragujevac
Faculty of Hotel Management and
Tourism in Vrnjačka Banja

BANK PROFITABILITY BEFORE AND DURING THE COVID-19 CRISIS: THE ROLE OF INTELLECTUAL CAPITAL

Profitabilnost banaka pre i tokom COVID-19 krize
– uloga intelektualnog kapitala

Abstract

The banking sector, recognized as a knowledge-intensive sector, largely relies on the use of intellectual capital as a key factor for sustainable and profitable growth. The aim of the paper is to determine the contribution of intellectual capital and its components to the profitability of banks in stable and crisis situations, influenced by the COVID-19 pandemic crisis. The sample includes 21 banks that operated in Serbia in the period before the pandemic crisis (2017-2019) and during the crisis (2020-2022). The MVAIC method was applied in the paper to measure the value of intellectual capital and its components. The results of the regression analysis indicate that intellectual capital contributes to profitability both in the period before the crisis and in the period of the crisis. Structural capital had a dominant influence on profitability before the pandemic crisis, while during the crisis period, capital employed efficiency had a decisive influence.

Keywords: *intellectual capital, bank profitability, COVID-19 crisis*

Sažetak

Bankarski sektor, prepoznat kao sektor zasnovan na znanju, dobrim delom se oslanja na upotrebu intelektualnog kapitala kao ključnog faktora održivog i profitabilnog rasta. Cilj rada jeste da utvrdi koliki je doprinos intelektualnog kapitala i njegovih komponenti profitabilnosti banaka u stabilnim i kriznim situacijama, uslovljenih pandemijskom krizom COVID-19. Uzorak obuhvata 21 banku koje su poslovale u Srbiji u periodu pre pandemijske krize (2017-2019) i periodu tokom krize (2020-2022). U radu je primenjen MVAIC metod za merenje vrednosti intelektualnog kapitala i njegovih komponenti. Rezultati regresione analize ukazuju da intelektualni kapital doprinosi profitabilnosti u periodu pre krize, kao i u periodu krize. Dominantan uticaj na profitabilnost pre pandemijske krize ima strukturni kapital, dok u periodu krize efikasnost angažovanog kapitala ima presudan uticaj.

Ključne reči: *intelektualni kapital, profitabilnost banke, COVID-19 kriza*

Introduction

With rapid technological change and the continued growth of digital transformation initiatives around the world, the banking industry has become more exposed to change than ever before [1]. For emerging countries, the banking sector is particularly important for the smooth functioning of the economy, since it plays a key role in providing finance, ensuring the safety of savings, and stimulating the economy [11]. Such is the situation in Serbia, where the financial market is primarily bank-centric [16], [19]. With the debt moratorium and the redirection of consumer needs towards the purchase of basic products during the COVID-19 pandemic, there was a significant drop in the turnover and total income of the banks, which required the restructuring of the banks to cope with the financial consequences of the crisis [16]. According to data from the National Bank of Serbia, 21 banks were operating in 2022, while 26 banks were operating in 2019, the year before the outbreak of the crisis [14]. In percentage term, the number of banks decreased by 23% in this period. The decrease in the number of banks occurred as a result of reduced demand for banking products, which resulted in mergers and acquisitions of banks.

Intellectual capital (IC) is part of the intangible assets of banks, which plays a key role in business crisis situations. The literature confirms the contribution of IC to the growth of profitability and its positive impact on the growth and sustainability of banks [15]. Weqar et al. [27] consider that analyzing and monitoring the effectiveness of IC use by different types of banks is an essential area of research as academics, policymakers, and researchers wish to investigate the importance of IC in improving the efficiency of the banking sector [27]. El-Bannany [5] agrees with this, stating that the banking sector is an ideal area for IC research since the business nature of the banking sector is intellectually intensive [5]. Banks' focus on IC will increase their ability to innovate and learn through the transformation of knowledge and ideas into new products and services that will improve the banks' business performance and create satisfied stakeholders [1].

Several research gaps have been observed in the literature. The pandemic crisis left a negative impact on

the banking sector of Serbia, which indicates the need to analyze the profitability of this sector and the contribution of material and intellectual resources to this result. Previous studies have analyzed the impact of IC on bank profitability before and during the COVID-19 crisis [6], but the focus of their research was a narrower time period (2019 and 2020). The study seeks to overcome this gap by including a wider time period in the analysis (2017-2022). Second, most research on IC uses the VAIC model [4] which is based on the analysis of the efficiency of the use of two components of IC (human and structural capital). As the VAIC model has been criticized for missing the value of relational capital [26], [21], the study seeks to overcome this shortcoming by analyzing the IC of banks by applying the MVAIC method and observing IC through the components – human, structural, and relational capital. Thirdly, the literature points out that there is a positive relationship between the better performance of the banking sector and the economic development of the country [10], so it is necessary to investigate the results of bank operations in emerging countries. Majumder et al. [11] also believe that it is necessary to analyze the banking sector of emerging economies since research related to international industry and bank performance is scarce. Also, different banking practices in different countries lead to different research findings due to economic, political, and national cultural differences [11]. Therefore, consideration of the importance and role of IC in the banking sector implies consideration of the wider context of the environment in which business is carried out.

The study aims to answer the following research questions:

- Does IC affect the profitability of the Serbian banking sector before the pandemic crisis of COVID-19?
- Does IC affect the profitability of the Serbian banking sector during the COVID-19 pandemic crisis?
- What is the contribution of IC components to banks' profitability before and during the crisis?

The contribution of the study is reflected in determining the importance and role of IC profitability in the banking sector in an emerging country such as Serbia. Secondly, the paper investigates whether IC will be a key factor of sustainability and profitability in stable business conditions

as well as in crisis conditions. Third, in the paper, IC is observed in a more comprehensive way, compared to previous studies, because the analysis includes, in addition to human and structural capital, the value of relational capital.

Literature review

Intellectual capital in the banking sector

Banks are the lifeblood of an economy [27] that provide financial services to stimulate economic growth [13]. Majumder et al. [11] state that banks dominate financial markets and are considered the nerve of the financial system, especially in emerging countries [11]. Financial institutions, especially those in the banking industry, have experienced a dynamic and competitive environment [13] which has forced banks to adjust their competitive position by achieving sustainable financial performance [13]. The pandemic has led to increased business uncertainty and numerous pressures, as a result of which crisis management has been introduced in most organizations [7]. It is assumed that the key resources for the survival of companies in crisis conditions will be IC, which leads to the need to analyze the contribution of IC to banks' operations before and during the crisis.

In industries such as banking, IC is much more important than physical capital in the wealth creation process [5] since banking is recognized as a knowledge-intensive sector [13]. As the economic growth of a country is affected by the performance of banks and the business results of other organizations of the economy dependent on the services provided by the banking sector, it is important to examine the extent to which banks are able to use intellectual property [13]. IC enhances and maintains rare and imitative comparative advantages of banks, builds organizational competencies, and encourages the creation of added value [15] thus contributing to strengthening its competitive position [12].

IC is a part of intangible assets that includes knowledge and experience that skilled personnel use to gain a competitive advantage by applying some creative strategies [5]. IC constitutes all factors of production that

are invisible in the traditional balance sheet, but decisive for the long-term profitability of banks [13]. According to the resource-based view, firm performance is driven by unique resources such as IC [22]. Consequently, IC becomes a key resource that contributes to banks' sustainable competitive advantage.

IC includes human capital, structural capital, and relational capital. Human capital includes the knowledge, skills, experience, and abilities of employees [8], [9]. It has a key role in reducing the bank's costs and differentiating banking products, which should attract more customers and ensure greater market share [5]. Structural capital includes non-physical assets created by employees and owned by the bank. It represents the organizational infrastructure necessary for the smooth functioning of human capital, such as processes, databases, and organizational culture [27]. Relational capital represents knowledge or value created in interaction with external parties of the company [22] such as suppliers, customers, creditors, trade associations and government bodies [21].

Profitability of the banking sector

Profitability is the most commonly used measure of financial performance [22]. It shows the value of the profit that the bank makes in performing its activities, describing the degree to which the bank can manage its operations [22]. The two most common measures of bank profitability are Return on asset (ROA) and Return on equity (ROE) [27]. ROA measures the company's ability to gain profit on assets over a certain period while ROE represents a return to a common shareholder [22, p.1089]. ROA is the ratio of net income divided by total assets [27]. ROE is the ratio of net income divided by stockholder's equity [28].

The literature recognizes IC as a key capital that drives bank performance [4]. Duho [4] views IC as a strategic tool for bank management with the potential to increase shareholder value and even boost banks' competitive advantage. The ability of bank managers to understand the impact of IC performance on business results is useful in making strategic decisions aimed at improving performance [4]. Therefore, with greater investment of banks in IC components, profitability

increases, and such banks have better financial performance [13].

Regarding the empirical results of the impact of IC and its components on bank performance, a mostly positive relationship is established, but the results differ depending on the context, the data set used, or the component of IC considered [4]. Previous studies confirm the impact of IC on bank profitability before the pandemic crisis [11], [13]. The influence of IC on the profitability of banks in emerging countries was also confirmed [22], [27]. Considering that the literature confirms that the efficient use of IC can improve the performance of banks [17] and considering that the banking structure of Serbia was significantly changed during the pandemic crisis, it is necessary to investigate the impact of this capital on the profitability of banks before the pandemic crisis. Accordingly, the following hypothesis is defined:

H_1 : IC contributes to the profitability of banks before the pandemic crisis

As IC constitutes a significant part of the value of the total assets of banks, it is necessary to examine what contribution to the profitability of the IC component was made before the pandemic crisis. The value of human, structural, and relational capital will be monitored through the efficiency coefficient of their use: human capital efficiency (HCE), structural capital efficiency (SCE), relation capital efficiency (RCE), and capital employed efficiency (CEE). Accordingly, the following research hypotheses are defined:

H_{1a} : HCE contributes to the profitability of banks before the pandemic crisis

H_{1b} : SCE contributes to the profitability of banks before the pandemic crisis

H_{1c} : RCE contributes to the profitability of banks before the pandemic crisis

H_{1d} : CEE contributes to the profitability of banks before the pandemic crisis

Previous studies show that IC contributes positively to bank performance even during the pandemic crisis [1], [7]. Banna & Alam (2021) conclude that the acceleration of digital financing in ASEAN countries is a key factor in maintaining the stability of the banking system leading to economic and financial resilience in crisis situations

[2]. The results of the study by Ilić & Lepojević showed that the relationship between bank performance and the compensation of top managers (base salary, bonus, and total compensation) was positive even during the COVID-19 pandemic [7]. Crisis situations, such as the COVID-19 pandemic, require appropriate strategies that will ensure the viability of banks. It is also necessary to determine which business resource becomes crucial in crisis situations and how much it contributes to the sustainability and stability of banks' operations. Accordingly, the following research hypothesis is defined:

H_2 : IC contributes positively to the profitability of banks during the pandemic crisis

According to the position of IC in the structure of banks' balance sheets, it is necessary to investigate how each of the components of IC contributes to the banks' profitability during the pandemic crisis. Accordingly, the following hypotheses are defined:

H_{2a} : HCE contributes to the profitability of banks during the pandemic crisis

H_{2b} : SCE contributes to the profitability of banks during the pandemic crisis

H_{2c} : RCE contributes to the profitability of banks during the pandemic crisis

H_{2d} : CEE contributes to the profitability of banks during the pandemic crisis

Methodology and measurement

Data collection and sample characteristics

The research in the paper was conducted on a sample of 21 banks that operated at the end of 2022 in the Republic of Serbia, and their operations in the period from 2017 to 2022 were covered. According to data from the National Bank of Serbia, at the end of 2022 there were 17 banks majority owned by foreign shareholders, 2 banks with majority private domestic capital, and 2 banks majority owned by the Republic of Serbia. At the end of 2022, the balance sheet of the banking sector increased by 407.5 billion dinars compared to 2021, while the balance sheet capital increased by 0.5 billion dinars [14, p. 43]. Bank operations in the period from 2017 to 2019 are considered

in the paper as operations before the onset of the COVID-19 pandemic. Business in the period from 2020 to 2022 is viewed as business during the COVID-19 pandemic. Individual financial reports of banks, which are publicly available at the Serbian Business Registers Agency, were used as a data source for research purposes.

Methodology

VAIC is one of the most commonly used quantitative models for measuring the effectiveness of IC use [4] which is based on value-added, as the most appropriate measure of business success [18]. VAIC measures the value creation efficiency from both intangible and tangible assets of the firms [18], [21]. In order to eliminate the shortcomings of the VAIC model, researchers use MVAIC as a model that includes relational capital and to measure value-added efficiency in a more comprehensive way [21]. Thus, VAIC is an aggregation of human capital, structural capital, and capital employed, while MVAIC is an aggregation of human capital, structural capital, relational capital, and capital employed [23].

In order to calculate MAVIC, it is necessary to first calculate value added (VA) [18]:

$$VA = OP + EC + D + A$$

OP – operating; EC – Employee costs; D – Depreciation; A – Amortization.

Then it is necessary to calculate the efficiency of use of all IC components. Human capital efficiency (HCE) is calculated as follows [18]:

$$HCE = VA/HC$$

HC (Human capital) – total salaries and wages for the company.

The second component of IC, structural capital (SC) is calculated as the difference between value-added and the value of human capital [18]:

$$SC = VA - HC$$

Structural capital efficiency (SCE) is calculated as the ratio of the value of structural capital (SC) and value-added (VA) [18]:

$$SCE = SC/VA$$

Relational capital is important for creating and maintaining relationships with external parties. The costs of maintaining such a relationship include the costs

of marketing, sales and advertising, which represent the proxy of relationship capital (RC) [21]. Relation capital efficiency (RCE) is calculated as [21]:

$$RCE = RC/VA$$

RC - marketing, selling, and advertising costs.

Based on the above, intellectual capital efficiency (ICE) is calculated as the sum of indicators of the efficiency of the use of three IC components [21], [23]:

$$ICE = HCE + SCE + RCE$$

Efficiency of value-creating resources also requires the calculation of the efficiency of the use of physical and financial capital, since IC cannot independently create value. it is necessary to determine capital employed efficiency (CEE) as the ratio of value-added (VA) and book value of the net assets of the bank (CE) [18]:

$$CEE = VA/CE$$

Accordingly, MVAIC represents the sum of all the coefficients of resource use efficiency calculated above [21], [23]:

$$MVAIC = HCE + SCE + RCE + CEE$$

For the purposes of statistical data processing, the statistical package for social sciences IBM SPSS Statistics, version 23, and EViews, version 12 were used. Descriptive statistics, correlation analyses and multiple regression panel analysis were used for data analysis. Accordingly, general regression panel models were formed:

$$\text{Model 1: } PROF_{it} = \beta_0 + \beta_1 HCE_{it} + \beta_2 SCE_{it} + \beta_3 RCE_{it} + \beta_4 CEE_{it}$$

$$\text{Model 2: } PROF_{it} = \beta_0 + \beta_1 MVAIC_{it}$$

where PROF represents ROA and ROE.

Results

The results of the descriptive analysis, before and during the COVID-19 pandemic, are shown in Table 1. Based on the results, it can be concluded that the dominant role in the IC structure is human capital. There was a drop in the mean of all IC components during the crisis compared to the period before the crisis. Just as there was a decrease in the average value of individual MVAIC components during the pandemic, there was also a decrease in the average value of MVAIC during the observed period. It is interesting that the mean ROE increased during the crisis period.

Table 1: Descriptive statistics

	Mean	Std. Deviation	Minimum	Maximum
Before COVID-19 crisis				
HCE	4.7974	2.0816	1.9698	15.5499
SCE	0.7624	0.0828	0.4923	0.9357
RCE	0.0166	0.0226	0.0008	0.1552
CEE	0.4064	0.2148	0.1434	1.0625
MVAIC	5.9827	2.1228	2.7591	16.8151
ROA	0.0081	0.0283	-0.0806	0.1205
ROE	0.0425	0.1453	-0.6363	0.4766
During COVID-19 crisis				
HCE	4.6032	1.7008	1.9424	12.0785
SCE	0.7546	0.0895	0.4852	0.9172
RCE	0.0082	0.0061	0.0002	0.0249
CEE	0.4048	0.1843	0.1643	0.9560
MVAIC	5.7771	1.7387	2.7061	13.3051
ROA	0.0071	0.0151	-0.0345	0.0634
ROE	0.0538	0.0840	-0.1412	0.3382

Source: Authors

The direction and strength of the relationship between the observed variables will be examined using correlation analysis. Before the onset of the COVID-19 pandemic, it was identified the existence of a strong, positive, and statistically significant correlation between the components of HCE and SCE and indicators of bank profitability, while RCE achieves a strong and statistically significant but negative correlation with these indicators. In the same period, no statistically significant correlation was identified between CEE and both indicators of bank profitability, as well as between CEE and components of intellectual capital. In the period during the COVID-19 pandemic, HCE and SCE have a strong, positive, and statistically significant correlation with bank profitability indicators, while RCE and CEE have no significant correlation with these indicators.

Before and during the COVID-19 pandemic, MVAIC achieves a strong, positive and statistically significant correlation with the coefficients of HCE and SCE. RCE and CEE coefficients do not have a statistically significant correlation with MVAIC, neither before nor during the pandemic.

As can be seen from Table 2, the Random Effect model is more suitable compared to the Fixed Effect model when examining the impact of IC on bank profitability before the COVID-19 pandemic. On the other hand, the Fixed Effect model is more suitable compared to the Random Effect

model when examining the impact of IC components on bank profitability before the COVID-19 pandemic.

During the COVID-19 pandemic, the Random Effect model is more suitable compared to the Fixed Effect model when investigating the influence of IC on bank profitability, as well as when examining the impact of MVAIC components on bank profitability measured by ROE (Table 3). The Fixed Effect model is more suitable compared to the Random Effect model when examining the impact of IC components on bank profitability measured by ROA.

The Augmented Dickey-Fuller (ADF) test determined that all variables the period before and during the COVID-19 crisis are stationary.

Table 2: Hausman test results the period before the COVID-19 crisis

	Model 1 (ROA)	Model 2 (ROA)	Model 1 (ROE)	Model 2 (ROE)
Chi-sq. statistic	2.198	14.867	0.906	14.475
Chi-sq. d.f.	1	4	1	4
p-value	0.138	0.005	0.341	0.006
Effect	Random	Fixed	Random	Fixed

Source: Authors

Table 3: Hausman test results for the period during the COVID-19 crisis

	Model 1 (ROA)	Model 2 (ROA)	Model 1 (ROE)	Model 2 (ROE)
Chi-sq. statistic	2.560	9.622	0.073	7.577
Chi-sq. d.f.	1	4	1	4
p-value	0.11	0.047	0.785	0.108
Effect	Random	Fixed	Random	Random

Source: Authors

Based on the results shown in Table 4 for the period before the pandemic crisis, it can be concluded that MVAIC has a statistically significant effect on both indicators of profitability, and hypothesis H_1 is accepted. In the same period, only SCE has a positive influence on the value of both bank profitability indicators, so hypothesis H_{1b} is accepted. HCE does not significantly contribute to bank profitability indicators, so hypothesis H_{1a} is rejected. RCE had a negative impact on ROE value before the pandemic while CEE had a positive impact only on ROA value. Thus, the hypotheses H_{1c} and H_{1d} are partially accepted.

The results of the research for the period during the pandemic crisis are shown in Table 5. The impact of MVAIC on the profitability of Serbian banks was also proven during the pandemic period, thus hypothesis H_2 is *accepted*. The impact of the HCE, RCE, and CEE components on the banks' ROE was realized, while the impact of these components on the ROA was rejected. Thus, hypotheses H_{2a} , H_{2c} , H_{2d} are *partially accepted*. SCE has a positive impact on the value of ROA during the pandemic, so hypothesis H_{2b} is *partially accepted*. The influence of the other three components of MVAIC on the value of the ROA indicator is not statistically significant.

Discussion

The research results provided answers to the research questions. Since the hypotheses H_1 and H_2 are accepted, it can be concluded that IC becomes a key factor in the sustainable and profitable operation of banks in both stable

and crisis conditions. The same results were obtained by the authors Weqar et al. [27].

Before the COVID-19 pandemic. The results show that human capital does not contribute enough to the profitability of banks, which the authors Tran & Vo also noted in their study [24]. Such results are worrying since banking is recognized as a knowledge-intensive activity [13], where human capital should be the key driver of profitability and competitiveness. The absence of an impact of HCE on the profitability of banks can be explained by the "delayed effect" of human capital investment on the profitability of banks because research shows that investment in human capital in the present brings future benefits [24]. Soewarno & Tjahjadi explain these results by the fact that shareholders do not have enough guarantees from the human capital that they will receive an appropriate return on their investments [22]. The results of this study show that SCE affects the profitability of banks, which has been proven in studies [22], [27]. As an important

Table 4: Regression analysis results for the period before the COVID-19 crisis

Variables	Model 1 ROA	Model 2 ROA	Model 1 ROE	Model 2 ROE
C	-0.053 (-5.594)***	-0.219 (-4.810)***	-0.202 (-3.677)***	-0.979 (-3.627)***
MVAIC	0.010 (7.168)***		0.041 (4.950)***	
HCE		0.004 (1.683)		0.016 (1.236)
SCE		0.257 (3.769)***		1.265 (3.129)***
RCE		-0.154 (-1.676)		-1.307 (-2.396)**
CEE		0.038 (2.697)***		-0.002 (-0.001)
Adj. R ²	0.443	0.862	0.275	0.814
F-Value	(50.385)***	(17.103)***	(24.544)***	(12.343)***

***-shows significance at 1% level

**--shows significance at 5% level

*--shows significance at 10% level

Source: Authors

Table 5: Results of the regression analysis for the period during the COVID-19 crisis

Variables	Model 1 ROA	Model 2 ROA	Model 1 ROE	Model 2 ROE
C	-0.022 (-4.022)***	-0.044 (-1.197)*	-0.100 (-3.141)***	-0.194 (-1.835)*
MVAIC	0.005 (5.549)***		0.027 (5.043)***	
HCE		-0.004 (-1.092)		0.023 (2.211)**
SCE		0.097 (1.521)*		0.157 (0.805)
RCE		-0.723 (-1.231)		-2.905 (-2.072)**
CEE		0.006 (0.272)		0.117 (2.410)**
Adj. R ²	0.329	0.343	0.286	0.354
F-Value	(31.462)***	(2.350)***	(25.825)***	(9.507)***

***-shows significance at 1% level

**--shows significance at 5% level

*--shows significance at 10% level

Source: Authors

infrastructural asset that enables employees to work [27], the development of structural capital supports employees to improve productivity and profitability [3], [22]. The results also indicate that RCE contributes negatively to ROE, both before and during the COVID crisis. Previous studies [25] also prove the influence of RCE on ROE, but in a positive direction, explaining this relationship by the fact that the growth of bank profitability requires building a good relationship with external stakeholders. The obtained results actually indicate that with higher investment growth in RC, the profitability of banks decreases. The study partially proves the impact of CEE on the profitability of Serbian banks. The impact of CEE on ROA is also proven by [22] stating that such results are due to good capital management. Better use of capital employed creates higher profits, which is in accordance with financial theory [22].

During the COVID-19 pandemic. The results show that HCE, RCE and CEE contribute statistically significantly to ROE, while the impact of these components on ROA was absent. This result is a consequence of the increase in the value of ROE during the pandemic period, while the value of ROA decreased in the same period. The impact of HCE on the ROE of banks was also proven in the study of Mondal & Ghosh [13]. The absence of HCE's impact on ROA can be justified by the fact that in the previous period the merger and takeover of banks was carried out, on the basis of which the costs of employees increased due to the payment of severance pay and other benefits [24]. If banks plan to maintain or increase their profitability in crisis periods, more attention should be paid to human capital [25]. During the crisis period, the influence of SCE on the profitability of banks was partially proven. This may be the result of reduced investment in organizational infrastructure during periods of crisis. As the COVID-19 crisis caused certain changes in the banking sector, primarily the orientation towards electronic banking and business without branches [20], effective the use of structural assets will be the main priority of banking operations in the future. The results indicate that CEE contributes positively to banks' ROE in crisis periods, and according to the value of the β coefficient, this IC component contributes the most to profitability compared

to others. Uslu [25] came to similar results, stating that if banks want to increase profitability, they must concentrate on the growth of CEE rather than HCE and SCE [25].

Practical implications

The research results show that structural capital plays a dominant role in stable business conditions. However, in crisis conditions, the impact of this IC component has only been partially proven. On the other hand, in times of crisis, CEE and HCE have a dominant influence on bank profitability. This means that bank management can insist on the development of structural and relational capital in stable business conditions in order to increase profitability. In crisis periods, banks can only rely on the knowledge, experience, and competence of their employees, who will ensure the sustainable operation of banks with appropriate strategies, plans and actions. Stocks of physical and financial capital appear as support for the operation of human capital, the rational and efficient use of which can ensure the implementation of the stability strategy. The recommendation to bank managers is to improve the synergistic effects between IC components since MVAIC has been found to have a positive effect on bank profitability.

Limitations and future research directions

First, the financial reports of the banks did not show the costs of research and development, so it was not possible to examine the impact of innovation capital on the profitability of the banks. Therefore, the influence of this component of IC should be considered in future research. Second, historical data on bank profitability indicators were used for research purposes. Therefore, the results of the banks' operations in the previous period, were used. That is why, in the next research studies, the influence of IC components on current business indicators, such as net present value, economic value added, cash flow return on investment, should be considered.

Acknowledgment

This research is supported by the Ministry of Science, Technological Development and Innovation of the Republic of Serbia by the Decision on the scientific research funding

for teaching staff at the accredited higher education institutions in 2024 (No. 451-03-65/2024-03/200375 of February 5, 2024).

References

1. AL-Khatib, A. W. (2022). Intellectual capital and innovation performance: the moderating role of big data analytics: evidence from the banking sector in Jordan. *EuroMed Journal of Business*, 17(3), 391-423. <https://doi.org/10.1108/EMJB-10-2021-0154>
2. Banna, H., & Alam, M. R. (2021). Impact of digital financial inclusion on ASEAN banking stability: implications for the post-Covid-19 era. *Studies in Economics and Finance*, 38(2), 504-523. <https://doi.org/10.1108/SEF-09-2020-0388>
3. Bontis, N., Chua Chong Keow, W., & Richardson, S. (2000). Intellectual capital and business performance in Malaysian industries. *Journal of Intellectual Capital*, 1(1), 85-100.
4. Duho, K. C. T. (2020). Intellectual capital and technical efficiency of banks in an emerging market: a slack-based measure. *Journal of Economic Studies*, 47(7), 1711-1732. <https://doi.org/10.1108/JES-06-2019-0295>
5. El-Bannany, M. (2008). A study of determinants of intellectual capital performance in banks: the UK case. *Journal of Intellectual Capital*, 9(3), 487-498. <https://doi.org/10.1108/14691930810892045>
6. El-Chaarani, H., Ismail, T. H., El-Abiad, Z., & El-Deeb, M. S. (2022). The impact of COVID-19 on financial structure and performance of Islamic banks: a comparative study with conventional banks in the GCC countries. *Journal of Economic and Administrative Sciences*, Vol. ahead-of-print No. ahead-of-print. <https://doi.org/10.1108/JEAS-07-2021-0138>
7. Ilić, M. & Lepojević, V. (2022). Rewarding top managers in the banking sector during the Covid-19 pandemic. *The European Journal of applied Economics*, 19(2), 15-27.
8. Janošević, S., & Dženopoljac, V. (2014). The relevance of intellectual capital in Serbian ICT industry. *Ekonomika preduzeća*, 62(7-8), 348-366. <https://doi.org/10.5937/ekopre1408348J>
9. Janošević, S., & Dženopoljac, V. (2015). The impact of intellectual capital on companies' market value and financial performance. *Ekonomika preduzeća*, 63(7-8), 354-371. <https://doi.org/10.5937/ekopre1508354J>
10. Maji, S. G., & Hussain, F. (2021). Technical efficiency, intellectual capital efficiency and bank performance in emerging markets: the case of India. *Journal of Advances in Management Research*, 18(5), 708-737. <https://doi.org/10.1108/JAMR-09-2020-0218>
11. Majumder, M. T. H., Ruma, I. J., & Akter, A. (2023). Does intellectual capital affect bank performance? Evidence from Bangladesh. *LBS Journal of Management & Research*, Vol. ahead-of-print No. ahead-of-print. <https://doi.org/10.1108/LBSJMR-05-2022-0016>
12. Melović, B., Vukčević, M., & Dabić, M. (2021). The Midas touch of branding: banks' brand value, intellectual capital and the optimization of the Interbrand methodology. *Journal of Intellectual Capital*, 22(7), 92-120. <https://doi.org/10.1108/JIC-08-2020-0272>
13. Mondal, A., & Ghosh, S. K. (2012). Intellectual capital and financial performance of Indian banks. *Journal of Intellectual Capital*, 13(4), 515-530. <https://doi.org/10.1108/14691931211276115>
14. Narodna Banka Srbije. (2023). *Godišnji izveštaj o poslovanju i rezultatima rada*. Beograd.
15. Olohunlana, A. O., Odeleye, A. T., & Isola, W. A. (2023). Determinants of the intellectual capital efficiency of listed banks in Nigeria: a DEA approach. *Journal of Business and Socio-economic Development*, 3(1), 86-96. <https://doi.org/10.1108/JBSED-07-2021-0100>
16. Pavlović, G. (2023). The COVID-19 pandemic and its effect on human capital and financial performance: evidence from Serbian banks. *The Annals of the Faculty of Economics in Subotica*, <https://doi.org/10.5937/AnEkSub2300022P>
17. Prasojo, P., Yadiati, W., Fitrianti, T., & Sueb, M. (2023). Exploring the relationship between intellectual capital and maqasid sharia-based performance: the moderating role of sharia governance. *Journal of Islamic Marketing*, 14(8), 2130-2146. <https://doi.org/10.1108/JIMA-07-2021-0226>
18. Pulić, A. (2004). Intellectual capital – does it create or destroy value? *Measuring Business Excellence*, 8(1), 62-68. <https://doi.org/10.1108/13683040410524757>
19. Ristanović, V., & Mirković, S. (2023). Ocena profitabilnosti bankarskog sektora u Srbiji. *Revizor*, 26(102-103), 71-82.
20. Shahabi, V., Azar, A., Faezy Razi, F., & Fallah Shams, M. F. (2021). Simulation of the effect of COVID-19 outbreak on the development of branchless banking in Iran: case study of Resalat Qard-al-Hasan Bank. *Review of Behavioral Finance*, 13(1), 85-108. <https://doi.org/10.1108/RBF-06-2020-0123>
21. Soetanto, T., & Liem, P.F. (2019). Intellectual capital in Indonesia: dynamic panel approach. *Journal of Asia Business Studies*, 13(2), 240-262. <https://doi.org/10.1108/JABS-02-2018-0059>
22. Soewarno, N., & Tjahjadi, B. (2020). Measures that matter: an empirical investigation of intellectual capital and financial performance of banking firms in Indonesia. *Journal of Intellectual Capital*, 21(6), 1085-1106. <https://doi.org/10.1108/JIC-09-2019-0225>
23. Tiwari, R. (2022). Nexus between intellectual capital and profitability with interaction effects: panel data evidence from the Indian healthcare industry. *Journal of Intellectual Capital*, 23(3), 588-616. <https://doi.org/10.1108/JIC-05-2020-0137>
24. Tran, D. B., & Vo, D. H. (2018). Should bankers be concerned with Intellectual capital? A study of the Thai banking sector. *Journal of Intellectual Capital*, 19(5), 897-914. <https://doi.org/10.1108/JIC-12-2017-0185>
25. Uslu, H. (2022). The role of intellectual capital in financial development: evidence from the banking sector of Turkey. *Competitiveness Review*, 32(2), 230-249. <https://doi.org/10.1108/CR-06-2020-0084>
26. Vishnu, S., & Gupta, V.K. (2014). Intellectual capital and performance of pharmaceutical firms in India. *Journal of Intellectual Capital*, 15(1), 83-99.
27. Weqar, F., Khan, A. M., & Haque, S. M. I. (2020). Exploring the effect of intellectual capital on financial performance: a study of Indian banks. *Measuring Business Excellence*, 24(4), 511-529. <https://doi.org/10.1108/MBE-12-2019-0118>
28. Yalama, A., & Coskun, M. (2007). Intellectual capital performance of quoted banks on the Istanbul stock exchange market. *Journal of Intellectual Capital*, 8(2), 256-271. <https://doi.org/10.1108/14691930710742835>

**Marko Milašinović**

is a teaching assistant at the University of Kragujevac, Faculty of Hotel Management and Tourism in Vrnjačka Banja. His main areas of scientific interest are management accounting and enterprise performance management.

**Jasmina Ognjanović**

is an assistant professor at the Faculty of Hotel Management and Tourism in Vrnjačka Banja, University of Kragujevac. She completed her Ph.D. studies in the field of business management in 2020 at the Faculty of Economics, University of Kragujevac. She completed her bachelor's and master's studies at the same Faculty. Her research interests include strategic management, intellectual capital management, business performance management, employer brand, and entrepreneurship. She is a member of the Serbian Marketing Association, and the Society of Economists "Ekonomika", Niš.

**Aleksandra Mitrović**

works as an associate professor at the Faculty of Hotel Management and Tourism in Vrnjačka Banja, University of Kragujevac. Her scientific and professional interests are centered around accounting and finance.