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IMPACT OF HUMAN AND RELATIONAL CAPITAL ON THE PROFITABILITY OF COMMERCIAL BANKS IN SERBIA

Uticaj ljudskog i relacionog kapitala na profitabilnost poslovnih banaka u Srbiji

Abstract

Intellectual capital encompasses resources that have become increasingly important for business entities. Most of empirical research studies have found strong evidence that investments in intellectual capital components, such as human, relational and structural capital, have a positive impact on the overall performance of companies. This paper examines the impact of investments in specific components of intellectual capital, primarily related to human and relational capital, on the profitability of commercial banks that operate in Serbia. Empirical analysis covers the postcrisis period from 2010 to 2016. Our sample consists of 154 bank-year observations (22 commercial banks in a 7-year period). The results show that the banks that operate in Serbia are characterized by a low level of labor efficiency and that traditional ways of building and maintaining good customer relations negatively affect the core business and total profitability. Therefore, one of the ways to increase the efficiency of investments in human capital and to improve customer relations could be to digitalize the business of commercial banks. Our findings also show that the banks that have higher deposit growth rates have higher core business profitability, as well as that the banks with higher share of company loans in total loan portfolio have higher total profitability.

Keywords: *human capital, relational capital, profitability, commercial banks, panel data analysis.*

Sažetak

Intelektualni kapital predstavlja objedinjeni naziv za resurse čija je važnost za uspešno poslovanje kompanija sve veća. Brojna empirijska istraživanja su pokazala da ulaganja u komponente intelektualnog kapitala kao što su ljudski, relacioni i strukturni kapital imaju pozitivan uticaj na performanse kompanija. Ovaj rad ispituje uticaj ulaganja u specifične komponente intelektualnog kapitala, koje su primarno povezane sa ljudskim i relacionim kapitalom, na profitabilnost poslovnih banaka koje posluju u Srbiji. Empirijska analiza obuhvata postkrizni period od 2010. do 2016. godine. Naš uzorak se sastoji od 154 jedinice posmatranja (22 poslovne banke posmatrane tokom perioda od 7 godina). Rezultati istraživanja pokazuju da je efikasnost zaposlenih u bankama koje posluju u Srbiji na niskom nivou, kao i da se ulaganja u tradicionalne načine izgradnje I održavanje dobrih odnosa sa klijentima negativno odražavaju na profitabilnost banaka. Samim tim, jedan od mogućih načina da se poveća isplativost ulaganja u ljudski kapital kao i da se unaprede odnosi sa klijentima nalazi se u digitalizaciji poslovanja poslovnih banaka. Rezultati su takođe pokazali da banke koje imaju veću stopu rasta depozita beleže veću profitabilnost osnovne delatnosti, kao i da banke koje u strukturi plasmana imaju veće učešće plasmana privredi u odnosu na plasmane stanovništvu imaju bolju ukupnu profitabilnost.

Ključne reči: *ljudski kapital, relacioni kapital, profitabilnost, poslovne banke, analiza panel podataka.*

Introduction

Since the 1970s the leading world economies have seen deregulation of the key economic sectors, market globalization and surging development of the information and communication technologies. Such circumstances intensified competition, while innovation became a prerequisite for the survival of business entities. The sources of economic value and company value have ever since been shifting from the production of material goods toward the creation and use of information, ideas and knowledge. The use of the intellectual capital became crucial for the creation of competitive advantage and improvement of the market position. In the knowledge-based economy, intangible resources prevail over tangible and financial assets as they play the role of innovation and growth drivers. Given their characteristic, to business entities intangible resources have a higher strategic value than tangible resources. They are unique, difficult to imitate, their value is dependent on their usage context and there is usually no market for such assets. Moreover, another two significant features of strategic resources that intangible assets possess are durability and complementarity. Durability of a resource refers to its non-exposure to the danger of dramatic value deterioration, while complementarity represents the extent to which the given resource's value affects the values of other resources [8]. Therefore, although the sources of competitive advantage may lie in the domain of both tangible and intangible resources, it is the intangible resources that undoubtedly have greater potential and significance for acquiring sustainable competitive advantage.

Various approaches to classification of intellectual resources are presented in literature, among which the most commonly used is the classification proposed by the European Commission within the MERITUM Project [18]. According to it, intellectual capital is comprised of three components: human capital, structural capital and relational capital. Human capital is defined as the knowledge, skills and know-how that employees take with them when they leave the firm after working hours and bring back to work the following morning. These include creativity, innovation capacity, teamwork capacity, employee flexibility, motivation, satisfaction, learning capacity, loyalty, formal education, previous in-house trainings and the like. The main characteristics of this component of intellectual capital are the following: (1) it is the property of the individual, (2) the company does not own it and (3) it does not create value in itself. In order for this component to become a driver of value growth within the company, it is necessary to effectively use the knowledge of employees through numerous processes and relationships in the company [20]. Structural capital refers to the human knowledge integrated with company's processes and procedures; it stays in the firm when employees leave the firm at the end of the working day or to seek employment with another employer. This portion of intangible resources includes organizational routines, procedures, systems, databases, organizational culture and organizational flexibility, general use of information technologies, organizational learning capacity, etc. In addition to the aforesaid items, commonly referred to as the infrastructure assets, a portion of structural capital comprises intellectual property encompassing industrial property rights, copyright and similar rights. Relational capital is defined as all resources linked to the firm's external relationships with various entities in broader community. It consists of the portions of human and structural capital involved in building the firm's relations with numerous stakeholders (investors, creditors, customers, suppliers, competitors, media, research and development partners, universities, scientific institutes and other). Relational capital is the knowledge built into company's relationships with its customers, suppliers, shareholders and other important stakeholders [20]. Examples of relational capital resources are customer loyalty and satisfaction, relations with suppliers, strategic alliances with competitors, corporate reputation, image, brands, customer lists, negotiating capacity with creditors, etc.

Over the past few decades, the structure of resources of business entities has undergone drastic changes, resulting in increased intangible assets. However, the initial framework for financial reporting, created in the industrial economy era, did not manage to satisfy users' needs for information in the knowledge economy. The creators of international professional standards and regulations constantly put effort into improvement of the framework

for financial reporting, yet it has not resulted in a more substantial inclusion of intellectual resources in financial statements. Among both academics and professionals, there was a long-lasting debate on the treatment of intellectual resources, which intensified in the periods of increased efforts to transform the Conceptual Framework for Financial Reporting. The key issue hindering the reaching of a consensus was recognition of intangible resources as assets in the balance sheet. The reasons for which it was not possible to recognize most of these resources in financial statements are as follows:

- failure of the resource to fit the definition of an asset or satisfy the recognition criteria, which in particular may have meant non-identifiability of an asset, lack of control over the asset, impossibility of reliable measurement thereof or improbability of inflows of future economic benefits from the use of such an asset, as well as
- non-alignment with the qualitative characteristics of the accounting information required by the Conceptual Framework.

The 2010 Amendments to the Conceptual Framework for Financial Reporting [9] introduced significant changes in the required qualitative characteristics of accounting information, whereas the 2018 Amendments to the Conceptual Framework [10] introduced new definitions of assets and liabilities. This enabled a more comprehensive inclusion of intellectual resources in financial statements of business entities. However, intangible resources are still not presented in financial statements to a greater extent than they used to be before the aforesaid amendments and the question that naturally arises is why. Despite the altered definition of an asset (which no longer insists on the expected inflows of economic benefits) and redefined qualitative characteristics of accounting information (with a shift from reliability toward fair presentation), there still exists a lot of intangible resources which are not fully controllable (it is not possible to limit the use of economic benefits therefrom exclusively to their owner or user, which is particularly the case with human resources) or identifiable (they cannot be separated or do not arise from contractual or other legal rights). Finally, even when all of the aforesaid criteria are met, there often occurs a problem of determining the value of intangible resources (i.e., a problem of selecting the measurement approach, method and inputs used upon valuation, etc.) which prevents recognition thereof in financial statements.

Nevertheless, the foregoing should not lead to a conclusion that general-purpose financial statements are not useful for the presentation of assets and financial position of reporting entities. They certainly are useful since they present the profits and cash flows arising from deployment of the entire portfolio of assets (both recognized and not recognized) in implementation of the defined business strategy [21], encompassing the contribution of individual resources to value creation, as well as the created value resulting from the interaction of resources within a business process, thereby manifesting synergistic effects. Therefore, it is quite clear that the value arising from the use of total assets of a business entity may be arrived at by using the method of earnings/cash flow capitalization. The empirical research presented in this paper focuses on the impact of investment in human and relational capital components on the profitability of commercial banks in the Republic of Serbia.

Intellectual resources and the business model of modern banks

Modern banks are constantly adapting to radical changes occurring in the business environment over the past decades. Deregulation, globalization and development of information technologies have had a substantial influence on the way banks operate. It is hence quite justified to say that the banking industry is knowledge-intensive, sustainable competitive advantage being based on and developed from intellectual resources. In addition to preforming their traditional role of financial intermediaries, commercial banks are increasingly identified as entities that provide diverse services to their clients and whose business model is firmly based on various types of risk management activities.

The International Integrated Reporting Council (IIRC) defines a business model of an organization as a chosen "system of transforming inputs, through its business activities, into outputs and outcomes that aims

to fulfill the organization's strategic purposes and create value over the short, medium and long term" [11, p. 25]. As the business model is focused on establishing relations between inputs, business activities and outputs, it is clear that intellectual resources play a key role therein. In fact, they enable establishment of a number of interactions, both among various systems within an organization and among the organization and different segments of its external environment [4]. Actually, employees are the pillars in the process of establishing those relations, a portion of which will be formalized through various types of contracts, while the rest will mostly be informal in character. In addition, human capital has the predominant role in creation of both relational and structural capital. In the knowledge-based economy, motivated, well-trained and experienced employees, who support the business mission, may be the most significant source of competitive advantage.

There are numerous ways in which employees may contribute to the creation of value for the owners and achievement of better financial performance:

- employees are innovation and creativity drivers, which in a stimulative environment should lead to the creation of new products and services, and new ways to gain client affinity and loyalty,
- employees develop and maintain external stakeholder relations, i.e., generate relational capital;
- employees create structural capital, or the necessary capabilities and the capacity to implement strategies by transforming the knowledge at an individual level into measurable recurring processes, which are commonly automated.

A number of authors have tackled possible approaches to assessing the significance and value of the human capital [5], [29]. However, these can hardly be deemed complete. They all address human capacities of an organization, but not the ability of the organization to make use of them. As with non-current assets, which contribute to the creation of value through their use (as long as the going-concern principle is satisfied), the value of human resources is attained by considering the ways they interact with other resources in the process of value creation, i.e., in implementation of the defined business strategy.

Given that trust is vital in the process of building relations between banks and their external stakeholders, reputation, brand and customer relations will also have a significant role in the business model of banks. Furthermore, organizational culture and service quality are essential in banking practices. On the other hand, competitive advantage based on tangible resources is generally temporary and difficult to maintain since such resources can relatively quickly be imitated by competitors (may be obtained in the market or developed) [26].

Some authors highlighted certain intellectual resources as crucial for banks and depository financial institutions in general. One such more comprehensive classification lists the following intangible resources that are of utmost importance for those financial institutions [28]:

- core depositor relations,
- mortgage and other loan servicing relations,
- credit card customer relations,
- consumer/loan customer relations,
- software, both for banking operations and accounting records,
- trademark and trade name (including the brand value and customer loyalty), and
- well-trained and harmonized staff teams.

In addition to the brand and reputation as significant relational capital components in a number of industries, some specific customer-relation-based forms of intellectual resources may be identified exclusively in commercial banks. Such resources are [15]:

- mortgage servicing rights,
- credit card intangibles,
- core deposit intangibles, and
- trust operations intangibles.

Mortgage servicing rights are the result of financial innovation in the mortgage loan market and refer to contractual agreements where the rights to service existing mortgage loans are sold by an original lender to another party that specializes in various functions related to servicing mortgages. The securitization process has allowed the separation of proprietary rights from servicing rights over disbursed loans so that those rights represent independent asset portions. Several different valuation techniques can be applied with the aim of determining

the value of mortgage servicing rights since there are no market values for identical or similar rights. Most commonly used models are those based on the present value of the estimated future cash flows, where one needs to consider the present value of the expected future inflow of fees and commission for loan servicing (or opportunity costs where banks provide servicing of loans they realized themselves), as well as the risk of early loan repayment and relevant outflows expected to be incurred during the mortgage loan repayment period.

Credit card intangible also represents a significant intangible resource typical of commercial banking. Credit card portfolio is the driver of a bank's fee and commission income, yet it allows banks to place other products and services, both banking and non-banking, in the market. Sometimes business combinations are motivated by the acquisition of the client list as a valuable intangible resource (e.g., Citigroup Inc. was formed through merger of the banking giant Citicorp and the financial conglomerate Travelers Group in October 1998). Banks earn fee and commission income each time their clients use a credit card, but there are other types of income as well, such as commissions or annual membership fees for certain cards, penalties and default interest for exceeding the approved credit limit per card, etc. As regards determining the credit card intangible value, a problem arises in connection with the input information required for valuation, which is often inaccessible in publicly available sources (e.g., income from the credit card portfolio for a particular bank, amount of the related operating expenses or total expenses and their share in the income from card operations, the average period of client loyalty to a card type, i.e., the average customer lifetime or survival rate). It is therefore necessary to use assumptions that are arbitrary to a certain degree (e.g., fee and commission income rates based on surveys, relevant expenses determined based on a specific bank's total expense ratio, etc.) more frequently.

Core deposit intangible represents a summary monetary expression of the value stemming from the advantages of financing a commercial bank from its deposit base over financing from alternative sources (issuing certificates of deposit, using interbank loans or loans from a parent bank, issuing shares, etc.), since costs of obtaining deposits on an ongoing basis are, as a rule, lower. To determine the core deposit intangible, the expected cash flows are discounted by applying the estimated taxable profit rate for each core deposit type to the estimated outstanding balance of that deposit type at the end of each year during the observed period, while the weighted average cost of capital is used as a discount rate. Various core deposit types encompass demand deposits, term deposits and funds obtained in the money market through issues of securities, but only to the extent that they are available to a bank as long-term sources of financing.

Trust operations intangible is derived from the expected future net benefits from assets whose management is entrusted to a bank. Commercial banks compete in this activity with law offices, asset management funds and trust companies in order to earn fees and commission for management of third-party assets (which are off-balance sheet assets for the bank) and fees for advisory services in this area. Due to uncertainties as to the volume and success of future trust operations, current trust income earned by the bank most commonly proxies for expected future trust income in the period covered by the relevant valuation model. Moreover, it is generally assumed that asset management fee rates will be constant throughout the observed period (as a percentage of assets managed by the bank).

Given the foregoing, we could conclude that relational capital is a more significant source of value generation in commercial banks than human and/or structural capital. Nevertheless, it should not be forgotten that the interaction among all three pillars of intellectual capital, as well as the interaction between the intellectual capital and physical and financial capital, is a prerequisite for successful implementation of the business strategy. From such an interaction of resources arises a significant portion of the value created for business entities, which cannot be directly attributed to any one individual resource. The value created through effective interaction of diverse resources makes a company worth more as a going-concern entity than as a simple sum of elements it is comprised of [12], [30]. The difference between the going-concern value of a business (fundamental market value of a company) and the fair value of its net assets is known as internally

generated goodwill which is a unified name for all those intangible resources which enable the company to operate more efficiently as a whole than would be the case if its asset components were managed separately from each other [31].

Review of the previous relevant research

There are not many empirical research studies of the influence of intellectual capital and its components on the financial and market performance of banks [14], [22].

The author of one of the first relevant works is Mavridis [17]. He analyzes the performance of the Japanese banking sector using the modified Value-Added Intellectual Coefficient (VAIC) methodology [23], [24] on a sample of 141 Japanese banks, grouped into 5 categories according to the scope and specific nature of their banking business. Using the best practice index (BPI) as a performance indicator obtained by adjusting VAIC, the sampled Japanese banks are ranked and the impact of efficient utilization of intellectual capital on performance is found to be statistically significant.

Another similar study, where banks are ranked according to the indicators of efficient utilization of intellectual capital, was conducted within the banking sector of Malaysia from 2001 to 2003, on a sample comprised of 16 banks [7]. The research reveals that there is statistically significant impact of efficient utilization of intellectual capital on achieved performance and that investments in human capital play the key role in it. Further, the research demonstrates that some large banks, despite their high ranking in the industry as per traditional accounting indicators, do not use their intellectual resources efficiently enough.

The banking sector of Portugal was subject of a survey conducted using the method of semi-structured interviews with HR managers or deputy managers as interviewees [6]. The research results show that not much has been done in terms of knowledge and human capital management in major Portuguese banks (there is no position in the HR department fully dedicated to these activities, neither interim nor annual reports on such activities are prepared, management strategies are not defined, etc.). From the point of view of interviewees, about 55% of the bank value is generated through utilization of intellectual capital, whose key component is human capital, accounting for approximately half of the overall intellectual capital value.

A research study of the Italian banking sector analyzed data for 21 commercial banks listed on the Milan Stock Exchange from 2005 through 2007 [25]. The significance of this study lies in the fact that an econometric analysis of panel data is applied for the first time, as it was not used in the prior relevant works in this area. The ordinary least squares method is used to evaluate specifications with fixed and random individual effects, while time effects are entered into specifications as dummy variables. The research results do not confirm a significant impact of efficient utilization of intellectual capital components on the profitability and market performance (P/B ratio) of commercial banks.

Mondal and Ghosh [19] investigated the influence of intellectual capital on the financial performance of 65 largest commercial banks in India over the period from 1999 to 2008. The research uses a series of regressions estimated using the ordinary least squares method for each observed year individually, which is a limitation as it produces no single conclusion on the significance, direction and intensity of the impact of individual regressors on the profitability and productivity indicators as dependent variables. Nonetheless, in most of the observed years a significant positive impact of intellectual capital components is perceived, primarily on productivity, but on profitability of the analyzed banks as well, the efficiency of human capital playing a major role in generating net profits.

With regard to the analyses of data relating to commercial banks in the Republic of Serbia, we refer to the results of two studies relevant for the present paper in terms of the sample size and length of the period observed. The research study of Bontis et al. [2] relies on a multiple regression analysis where the regressors represent coefficients of efficient utilization of human, structural and the capital employed (the value of invested physical and financial capital), which are measured using the Value-Added Intellectual Coefficient (VAIC), while

different financial performance measures (operating profit rate, referred to as profitability by the authors, ROA, ROE, total assets and employee productivity) are used as dependent variables. The sample includes 33 banks operating in the banking sector of Serbia from 2008 to 2011. This study does not find a significant impact of efficient utilization of intellectual capital components on the financial performance indicators, except for the impact of efficient use of human capital on employee productivity and the impact of efficient use of structural capital on total assets and ROE as financial performance measures. Additionally, the two specifications applied confirm a significant impact of efficient utilization of the capital employed on financial performance.

The other research [27] uses an econometric analysis of panel data on a sample of 27 banks for the 2008-2016 period. Panel data models with fixed individual effects and time effects (depending on the effect significance) are defined, where dependent variables are: profitability (measured as ROA and ROE), employee productivity, business activity growth (measured with interest, fee and commission income growth rate and total income growth rate) and relative profitability (measured as the share of gross operating surplus in total revenues of a bank). The regressors in the defined panel data models are the coefficient of intellectual capital efficiency (ICE) and coefficient of capital employed efficiency (CEE) calculated using the Value-Added Intellectual Coefficient (VAIC). By redefining the starting models, the author subsequently examines the impact of the human capital and structural capital efficiency on the dependent variables. The research results suggest that the performance achieved is predominantly based on the efficient use of physical and financial capital. A significant impact of intellectual capital efficiency on profitability measured as ROA is partially confirmed (only for banks of certain size and indebtedness), while this impact on other financial performance measures is not significant. A conclusion similar to the aforesaid is reached about the significance of the impact of structural capital efficiency on financial performance, while the impact of efficient use of human capital on employee productivity is found to be significant.

Research design

Our empirical analysis covers the post-crisis period from 2010 to 2016. We chose 2010 as the first year in our sample in order to avoid effects of turmoil in the commercial bank sector caused by the financial crisis. The last year we included is 2016. We omitted the period after 2016 because it was the period of intense M&A activity in the domestic financial industry, which could affect our findings. Also, the new IFRS 9 accounting standard, which significantly changed the way of determining the impairment of financial assets, became effective for annual periods as of 1 January 2018, some of the banks in our sample taking advantage of the possibility for early adoption of the standard in 2017. The population of commercial banks in Serbia during the observed period consists of 31 banks. One of them was founded in 2015 and one in 2016, which is why they are not included in our sample, while seven others are not considered due to the problem of missing data. We ended up with a sample consisting of 22 commercial banks operating in the Republic of Serbia; actually, our final sample consisted of 154 bank-year observations (22 commercial banks in a 7-year period). Hence, we have had a balanced panel in our research. Data were collected from publicly available financial statements and management reports for the said commercial banks issued from 2010 to 2016, as well as from quarterly reports issued by the National Bank of Serbia.

As this paper examines the impact of investment in specific components of intellectual capital on profitability of commercial banks in Serbia, different measures of bank profitability are used as dependent variables. The first two models examine the impact of investment in human and relational capital on bank's total profitability measured by the most commonly used rates of return (ROA and ROE). In addition to performing the traditional role of a financial intermediary, banks are increasingly engaged in providing various types of services. Therefore, the main sources of net income are the net interest income and the net fee and commission income. In order to examine if there are any differences in findings when profitability measures are focused on a particular type of activities of commercial banks instead of encompassing total profitability, the third model employs a specific operating profitability measure

named IFCMARG (interest, fee and commission margin) which is calculated as follows:

$$IFCMARG = \frac{(Net\ Interest\ Income + Net\ Feee\ and\ Commission\ Income)}{Interest,fee\ and\ commission\ revenue}$$

Relying on Pulic's work about measuring the performance of intellectual potential [23], [24], we use salary per employee (SPE) as an aggregate measure of investment in the human capital component. When presenting VAIC (Value-Added Intellectual Coefficient) as an aggregate measure of intellectual potential, Pulic states that labor expenses should not be considered as expenses, but rather as an investment in human capital due to the active role employees have in the value creating process.

In contrast to the human capital component where we use one aggregate measure, we employ various indicators of investment in relational capital in order to address different types and reservoirs of this specific intellectual capital component. Chauvin and Hirschey show in their paper [3] that large firms with significant economic presence achieve better performance due to better customer relations and customer loyalty. In order to test the relationship between economic presence of commercial banks and their profitability, we use two variables that represent economic presence: (1) number of branches (NOB) and (2) lease expense per branch (LEASE). We assume that commercial banks with a larger number of branches are more accessible to their clients, which results in a stronger relationship between banks and their clients and is ultimately reflected in higher profitability of banks. Bearing in mind that commercial banks usually do not possess the properties they operate in, but instead lease them under operating lease contracts, they do not report them in the balance sheet in accordance with the accounting rules in effect in the sample period[1]. Hence, we use lease expense per branch as a proxy for economic presence and attractive location. We expect a positive relationship between those variables and profitability of commercial banks. One of the main reservoirs of relational capital are investments in advertising which are considered a prerequisite for the recognition of a company by customers and brand building. Therefore, we expect a statistically significant positive relationship between investments in advertising (ADV) and profitability of commercial banks.

Some research studies state that primary bank intangible assets arise from a single source – customer relations related to deposit and lending operations [15], [16]. We use the deposit growth rate (DGR) as a measure of quality of customer relations related to deposit operations. It is our assumption that better relations with clients allow the bank to predominantly rely on and constantly increase deposits as a primary source of finance whose borrowing costs are lower than those connected with debts, which ultimately positively affects commercial banks' profitability. As a measure of quality of customer relations related to lending operations and asset management, we use loan loss provision to gross loans ratio (LLP). This indicator serves as a proxy for quality and credit risk associated with the loan portfolio of a commercial bank. We also employ the share of subordinated debt in total liabilities (SUBORD) as a proxy for the intensity of the relationship between a commercial bank and its parent bank, if any.

Apart from the explanatory variables that serve as proxies for different types of human and relational capital components, we also use certain variables in order to control for the loan portfolio structure (LSTR) and structure of sources of finance (DE). Loan portfolio structure presents the ratio of bank loans to companies to bank loans to households. As the measure of financial structure, we use the debt-to-equity ratio (DE) which represents the indicator of bank's leverage. We control for bank size in such a way that time-invariant variables are grouped in four clusters, each of them representing a quartile to which a particular bank belongs based on its asset value.

Model specifications are as follows:

(FE model specification 1):

$$ROA_{it} = (\beta_1+\mu_i+\lambda_t) + \beta_2 SPE_{it} + \beta_3 LEASE_{it} + \beta_4 NOB_{it} + \beta_5 ADV_{it} + \beta_6 DGR_{it} + \beta_7 LLP_{it} + \beta_8 SUBORD_{it} + \beta_9 LSTR_{it} + \beta_{10} DE_{it} + u_{it}$$

(FE model specification 2):

$$ROE_{it} = (\beta_1+\mu_i+\lambda_t) + \beta_2 SPE_{it} + \beta_3 LEASE_{it} + \beta_4 NOB_{it} + \beta_5 ADV_{it} + \beta_6 DGR_{it} + \beta_7 LLP_{it} + \beta_8 SUBORD_{it} + \beta_9 LSTR_{it} + \beta_{10} DE_{it} + u_{it}$$

1 In our sample, we observe the period before IFRS 16 became effective.

(FE model specification 3):

$$IFCMARG_{it} = (\beta_1+\mu_i+\lambda_t) + \beta_2 SPE_{it} + \beta_3 LEASE_{it} + \beta_4 NOB_{it} + \beta_5 ADV_{it} + \beta_6 DGR_{it} + \beta_7 LLP_{it} + \beta_8 SUBORD_{it} + \beta_9 LSTR_{it} + \beta_{10} DE_{it} + u_{it}$$

Table 1: Model specification details

Dependent variables	Independent variables
ROA_{it} – return on assets (FE 1) ROE_{it} – return on equity (FE 2) $IFCMARG_{it}$ – interest, fee and commission margin (FE 3)	SPE_{it} – salary per employee (in 000 RSD) $LEASE_{it}$ – lease expense per branch (in 000 RSD) NOB_{it} – number of branches ADV_{it} – share of advertising costs in total revenue (in 000 RSD) DGR_{it} – deposit growth rate LLP_{it} – loan loss provision to gross loans ratio $SUBORD_{it}$ – share of subordinated debt in total liabilities $LSTR_{it}$ – loan portfolio structure (company loan-to-household loan ratio) DE_{it} – debt-to-equity ratio
$\beta_1, \beta_{2,\ldots}, \beta_{10}$ – intercept and regression parameters μ_i and λ_t – time invariant and time effects u_{it} – random error	

Source: Authors' presentation.

We employed a panel data analysis in our research. The range of econometric methods is narrowed to those used in panel data where number of individuals (commercial banks) is larger than the number of time periods (years) (N>T). We estimate model specifications with both time-invariant and time effects included – both FE (fixed-effects) and RE (random-effects) model specifications. According to the values of pairwise correlation coefficients and variance inflation factor (VIF), the correlation between regressors does not lead to harmful multicollinearity that could negatively affect the quality of the estimates obtained in the models (see Tables 2 and 3).

As the assumptions of homoskedasticity, cross-sectional independence and the absence of serial correlation are violated, when choosing between FE and RE models we have used the robust version of the Hausman test (the Sargan-Hansen statistics). The values of the Sargan-Hansen statistics suggest the use of the FE model in all three specifications we have designed. Given the violation of assumptions in the FE model, we have ended up with the Prais-Winsten regression with correlated panel-corrected standard errors (PCSEs) for the first (ROA) and the third (IFCMARG) model specifications, while for the second (ROE) model specification, where cross-sectional independence is fulfilled, we have employed the Prais-Winsten regression with heteroskedastic panel-corrected standard errors[2] (see Table 4).

Table 2: Pairwise correlation coefficients

Variable	ROA	ROE	IFCMARG	SPE	LEASE	NOB	LLP	LSTR	DGR	ADV	SUBORD	DE
ROA	1.0000											
ROE	0.9545*	1.0000										
IFCMARG	0.3371*	0.3614*	1.0000									
SPE	0.0033	0.0239	0.0306	1.0000								
LEASE	-0.0311	-0.0366	-0.1478	0.6054*	1.0000							
NOB	0.2648*	0.2303*	0.0027	-0.2165*	-0.2913*	1.0000						
LLP	-0.6030*	-0.6157*	-0.0527	-0.2266*	-0.2304*	-0.0905	1.0000					
LSTR	0.0487	0.0374	0.1568	0.1408	0.0876	-0.1048	-0.1861*	1.0000				
DGR	0.1191	0.1040	0.0955	-0.1209	0.0412	-0.1178	-0.2563*	-0.1209	1.0000			
ADV	-0.0503	-0.0077	0.1740*	0.2487*	0.1066	0.0426	-0.0325	0.2827*	-0.1206	1.0000		
SUBORD	-0.2216*	-0.1657*	-0.3279*	0.0193	0.1208	-0.2183*	0.0313	0.1580	-0.0572	0.0344	1.0000	
DE	-0.1146	-0.2279*	-0.2278*	0.1328	0.0043	0.0747	-0.0606	0.2026*	-0.0639	0.0057	0.0584	1.0000

* denotes statistical significance at the level of 5% or higher.
Source: Authors' presentation based on the Stata output.

Table 3: Calculated values of VIF

Regressor	SPE	LEASE	NOB	LLP	LSTR	DGR	ADV	SUBORD	DE
VIF	1.9	1.81	1.31	1.30	1.26	1.22	1.18	1.11	1.09

Source: Authors' presentation based on the Stata output.

2 More about panel data analysis in [1], [13].

Table 4: Calculated values of the relevant test statistics

Dependent variable	Heteroskedasticity (the modified Wald test)	Cross-sectional dependence (the Frees test)	Serial correlation (the Wooldridge test)	the Sargan-Hansen statistics
ROA	2865.87***	0.603**	6.741**	26.459***
ROE	4394.24***	0.180	31.041***	15.988**
IFCMARG	250.22***	1.025***	141.578***	74.924***

***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.
Source: Authors' presentation based on the Stata output.

Research findings

Initially, we observed how investments in human and relational capital affect the overall profitability of commercial banks that operate in Serbia measured by ROA and ROE. The results show that there is a statistically significant and negative relationship between salaries per employee and both ROA and ROE, which means that, on average, salaries are viewed rather as expense than contribution to total profitability of a bank. When it comes to the number of branches variable that we use in our model as a proxy for economic presence, there is, contrary to expectations, a statistically significant and negative relationship between NOB and ROA, while the one between NOB and ROE is not statistically significant. Investments in attractive location and advertising are not statistically significant in models where ROA and ROE represent dependent variables. The deposit growth rate, as a measure of quality of customer relations, and the subordinated debt level, as a proxy for intensity of the relationship between commercial bank and its parent bank, are not significant in the first two model specifications.

The results of our research show that the higher the loan write-offs, the lower the total profitability of commercial banks. Therefore, high interest rates that many banks charge risky borrowers fail to make up for losses due to loan write-offs. When we separate the impact of loan write-offs related to company loans from the impact of loan write-offs related to household loans, the results (untabulated) show that a statistically significant impact on bank's total profitability exists only in the case of company loans. This could imply that higher credit risk exposure connected with company loans does not pay off and that, unlike the quality of household loan portfolios, the quality of company loan portfolios significantly affects the overall profitability of banks.

In addition to the quality and credit risk associated with the loan portfolio, the overall profitability of commercial banks is affected by the portfolio structure, which depicts the business model and strategy of commercial banks. Regarding first two models, the variable that measures the loan portfolio structure is statistically significant, which means that the loan portfolio structure is an important determinant of total profitability of commercial banks that operate in Serbia. Hence, the higher the share of company loans in total loan portfolio, the higher the total profitability of banks. Financial leverage measured by the debt-to-equity ratio has a statistically significant effect on ROE, as opposed to its effect on ROA. The higher the leverage, the lower the total profitability measured by ROE. Of course, it should be taken into account here that when calculating accounting profitability indicators such as ROE, opportunity costs related to equity are not taken into account.

After analyzing the impact of investment in human and relational capital components on the overall profitability of commercial banks, the focus of the research has been placed on the impact of the same components on operating profitability measured by the operating margin (interest, fees and commission income margin). A noticeably larger number of variables that serve as proxies for investment in human and relational capital components show statistical significance compared to the models in which the impact on total profitability is observed. Investments in human capital, investments in a good relationship with customers through the building of an extensive branch network and investments in attractive location show a statistically significant and negative impact on interest, fees and commission margin. As similar findings are presented in the models in which the impact of intellectual capital on overall profitability is observed, the general conclusion could be that banks which operate in Serbia

are characterized by a low level of labor efficiency and that traditional ways of building and maintaining good customer relations negatively affect the profitability. Therefore, one of the ways to increase the efficiency of human capital and improve customer relations could be to digitalize the business of commercial banks that operate in Serbia. Building good customer relationships is important, which is reflected in our findings showing that banks that have higher deposit growth rates have higher interest, fees and commission margin (the measure of core business profitability). Hence, when it comes to commercial banks, building good customer relationships refers to the ability to find a cheaper source of finance and create opportunities for cross-selling activities.

The level of subordinated debt that commercial banks use as a source of finance has a statistically significant and negative impact on operating profitability. Its level shows the intensity of the relationship that commercial banks have with their bank holding company in terms of borrowing. The results show that it is better for commercial banks to have a higher level of deposits than to rely on borrowings from parent banks. In other words, commercial banks that are not capable of building a good relationship with depositors are forced to rely on a more expensive source of finance, which negatively affects operating profitability. Finally, the results show that investment in advertising does not significantly contribute to profitability of commercial banks in Serbia irrespective of the way we measure the dependent variable.

Apart from total profitability, the quality and credit risk associated with the loan portfolio also affect the operating profitability of commercial banks. The results show that the higher the loan write-offs, the lower the interest, fees and commission margin. These findings could imply that the commercial banks that have higher levels of loan write-offs rely heavily on more expensive sources of finance and that with an increase in the level of write-offs, the basis for calculating interest decreases, which further reduces operating profitability.

Concluding remarks

In the last few decades, intellectual resources have become an increasingly important part of total assets of business entities. Most of empirical research studies find strong evidence that well-trained work force, good customer relations, unique market position, reputation, brand name and other intangibles prohibited from capitalization have a positive impact on firm performance. The current accounting standards make a visible and unduly distinction

Table 5: Results of estimation in final specifications

	ROA[1]	ROE[2]	IFCMARG[3]
Regressor			
SPE	-0.0000268**	-0.0001284**	-0.0000332**
LEASE	-0.00000027	-0.00000324	-0.00000493***
NOB	-0.0001784**	-0.0005045	-0.0005704**
ADV	-0.4063107	-1.39811	0.2483938
DGR	-0.0051277	-0.0457581	0.050804***
LSTR	0.0166989**	0.1062919***	0.0118385
LLP	-0.2854492***	-1.739844***	-0.1858175***
SUBORD	-0.0673656	-0.1637854	-0.3587019***
DE	-0.0009773	-0.0339222***	-0.0130003***
Intercept	0.140591***	0.8066632***	0.9874635***
Fixed effects	**Test of significance** (p-value)		
time-invariant (individual)	24.44 (0.0000)	18.84 (0.0003)	17.53 (0.0006)
time	129.33 (0.0000)	27.01 (0.0001)	747.78 (0.0000)
Model specification quality			
R^2	0.5822	0.6148	0.9068
Model significance (Wald χ^2)	558.02 (p=0.0000)	209.18 (p=0.0000)	2133.95 (p=0.0000)

[1]The Prais-Winsten regression, correlated panel-corrected standard errors (PCSEs)
[2] The Prais-Winsten regression, heteroskedastic panel-corrected standard errors
[3] The Prais-Winsten regression, correlated panel-corrected standard errors (PCSEs)
Source: Authors' presentation based on the Stata output.

between different forms of intangible resources in terms of their capitalization possibilities. The main reasons various components of intellectual capital are not capitalized are: impediments in the process of identification, problems related to reliably determining their value and the risk of distorting the faithful presentation of accounting information.

This paper examines the impact of specific components of intellectual capital, primarily related to human and relational capital, on the profitability of commercial banks that operate in Serbia, analyzing overall profitability and operating profitability separately. We have concluded that investments in human capital significantly reduce the profitability of commercial banks, even when profitability is measured as interest, fee and commission margin and salaries do not appear as expenses. This could mean that on average the employees in commercial banks operating in Serbia are not sufficiently efficient and/or that the human capital component of intellectual capital is not effectively integrated with other intellectual capital components. Besides, investments in traditional reservoirs of good customer relations, such as branch networks and attractive locations, appear to significantly reduce the profitability of commercial banks in Serbia. The findings of the research by Chauvin and Hirschey suggesting that large firms with a significant economic presence achieve better performance due to better customer relations and customer loyalty are not confirmed in our research. Therefore, one of the ways to use human capital more efficiently and to build and maintain good relations with clients in order to increase the profitability of commercial banks in Serbia could be to digitalize their business.

Building good customer relations further expands the deposit base and creates opportunities for cross-selling activities which ultimately increases bank's profitability. Customer relations related to lending operations of commercial banks appear to be significant, as our results show that higher credit risk exposure connected with loans does not pay off, especially when it comes to loans that banks lend to companies. This means that, unlike the quality of the household loan portfolio, the quality of the company loan portfolio significantly affects the overall and core business profitability of banks.

The loan portfolio structure which depicts the business model and business strategy of commercial banks is a significant determinant of total profitability of commercial banks that operate in Serbia. Hence, irrespective of the level of investments in human and relational capital, total profitability of commercial banks is predetermined by the loan portfolio structure.

There are several limitations to our research. We could outline the sample size as a major limitation. Although the sample represents more than 80% of the banking sector in Serbia, there is a relatively small number of observations for the implementation of the panel data analysis compared with other relevant research studies that cover similar topics. Also, the study was conducted on the basis of the data originating from one industry (banking) and one country (Serbia), which restrains the generalization of the presented results. However, this could also be considered an advantage of this research, as the observation units were exposed to the same macroeconomic environment. In addition, it allows for the use of certain ratios which are characteristic for banking (e.g., interest margin, the share of revenues from fees and commissions in operating revenue). Data availability can also be noted as a significant limitation of this research. Banks operating in Serbia have just recently started to post the notes to their financial statements for the past 10 years on their websites. However, some banks are not disclosing many important details in those notes. Furthermore, the form of financial statements has not been consistent, which is why the data cannot be compared.

Potential directions for improvement of this research could be to expand the sample so as to include more industries and/or more countries and to test the robustness of the used econometric models by changing the sample size and using alternative methods of estimation of regression parameters.

References

1. Baltagi, B. (2008). *Econometric analysis of panel data*. Chichester, England: John Wiley & Sons.
2. Bontis, N., Janošević, S., & Dženopoljac, V. (2013). Intellectual capital and corporate performance of Serbian banks. *Актуальні проблеми економіки*, *4*, 287-299.

3. Chauvin, K. W., & Hirschey, M. (1994). Goodwill, profitability, and the market value of the firm. *Journal of Accounting and Public Policy, 13*(2), 159-180.
4. Chen, L., Danbolt, J., & Holland, J. (2014). Rethinking bank business models: The role of intangibles. *Accounting, Auditing & Accountability Journal*, *27*(3), 563-589.
5. Creelman, D., & Bassi, L. (2013). *Reporting on human capital: The drama, the guidelines and the future.* KY, USA: Creelman Research Inc. Lexington.
6. Curado, C. (2008). Perceptions of knowledge management and intellectual capital in the banking industry. *Journal of Knowledge Management*, *12*(3), 141-155.
7. Goh, P. C. (2005). Intellectual capital performance of commercial banks in Malaysia. *Journal of intellectual capital*, *6*(3), 385-396.
8. Harasim, J. (2008). The role of intangible assets in bank's competitiveness and effectiveness. *Journal of Economics and Management*, *4*, 42-57.
9. IASB. (2010). *Conceptual Framework for Financial Reporting*. London, UK: IFRS Foundation.
10. IASB. (2018). *Conceptual Framework for Financial Reporting*. London, UK: IFRS Foundation.
11. International Integrated Reporting Committee. (2013). *The International Integrated Reporting Framework*. Retrieved from https://integratedreporting.org/.
12. Johnson, L. T., & Petrone, K. R. (1998). Commentary: Is goodwill an asset?. *Accounting Horizons*, *12*(3).
13. Jovičić, M., & Mitrović, R. D. (2011). *Ekonometrijski metodi i modeli*. Beograd: Univerzitet u Beogradu, Ekonomski fakultet.
14. Kaufmann, L., & Schneider, Y. (2004). Intangibles: A synthesis of current research. *Journal of Intellectual Capital*, *5*(3), 366-388.
15. Kohlbeck, M. (2004). Investor valuations and measuring bank intangible assets. *Journal of Accounting, Auditing & Finance*, *19*(1), 29-60.
16. Kohlbeck, M., & Warfield, T. D. (2007). Unrecorded intangible assets: Abnormal earnings and valuation. *Accounting Horizons*, *21*(1), 23-41.
17. Mavridis, D. G. (2004). The intellectual capital performance of the Japanese banking sector. *Journal of Intellectual capital*, *5*(1), 92-115.
18. MERITUM Project. (2002). *Guidelines for Managing and Reporting on Intangibles, Intellectual Capital Report*. Madrid: Fundación Airtel Móvil.
19. Mondal, A., & Ghosh, S. K. (2012). Intellectual capital and financial performance of Indian banks. *Journal of Intellectual Capital*, *13*(4), 515-530.
20. Pantelić, M. (2020). Izazovi vremenskog povezivanja prihoda i rashoda na području intelektualnog kapitala. *Zbornik radova EKONBIZ*, (19), 368-378.
21. Penman, S. H. (2009). Accounting for intangible assets: There is also an income statement. *Abacus*, *45*(3), 358-371.
22. Petty, R., & Guthrie, J. (2000). Intellectual capital literature review. *Journal of Intellectual Capital*, *1*(2), 155-176.
23. Pulic, A. (1998). Measuring the performance of intellectual potential in knowledge economy. *2nd McMaster Word Congress on Measuring and Managing Intellectual Capital by the Austrian Team for Intellectual Potential*, 1-20.
24. Pulic, A. (2004). Intellectual capital – Does it create or destroy value?. *Measuring Business Excellence*, *8*(1), 62-68.
25. Puntillo, P. (2009). Intellectual capital and business performance. Evidence from Italian banking industry. *Electronic Journal of Corporate Finance*, *4*(12), 97-115.
26. Radić, S. (2019). Izveštavanje o intelektualnom kapitalu u poslovnim bankama u Srbiji – aktuelno stanje i budući pravci. *Tematski zbornik radova „Ekonomska politika i razvoj"*, 65-87.
27. Radić, S. Č. (2019). *Teorijski i metodološki aspekti uticaja intelektualnog kapitala na finansijske performanse* [Doctoral dissertation, Univerzitet u Beogradu, Ekonomski fakultet].
28. Reilly, R. F. (2010). Intangible asset identification and valuation in the bank and thrift industries. *Intangible Asset Valuation Insights*. Retrieved from http://www.willamette.com /insights_ journal/10/winter_2010_10.pdf.
29. Reilly, R. F., & Schweihs, R. P. (2016). *Guide to intangible asset valuation*. John Wiley & Sons, New York.
30. Zhang, M. (2013). The impact of internally generated goodwill on financial performance of firms. *Journal of Applied Business Research (JABR)*, *29*(6), 1809-1814.
31. Živanović, M. (2017). Razlike u računovodstvenom tretmanu interno generisanog I stečenog gudvila – uzroci, posledice i doslednost. *Ekonomske ideje i praksa*, *25*, 69-87.

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