

Ekonomika preduzeća



**Serbian Association of Economists
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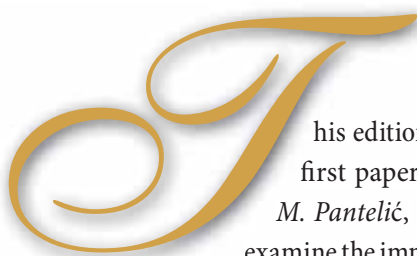
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This edition starts with the *Finance* section and the first paper in it offers the research conducted by *M. Pantelić, S. Radić* and *M. Živanović*. The authors examine the impact of investments in specific components of intellectual capital, primarily related to human and relational capital, on profitability of commercial banks that operate in Serbia. In the following section, *Accounting and Auditing*, *T. Janačković* and *S. Milanović* perform an aggregate analysis of software solutions used in the practice of domestic companies, and present the comparison of the characteristics of these solutions with the characteristics of the best online accounting software solutions applied in the world. In the second paper in this section, *S. Vržina, V. Obradović* and *J. Bogičević* examine the quality of financial reporting on income tax in Serbia and Croatia in order to determine the extent to which disclosed information on income tax in these countries is useful for economic decision making. In the following paper, *S. Milutinović* and *O. Grljević* perform an evaluation of legal and international accounting regulations in terms of major deficiencies from the perspective of their users. The last paper in this section, authored by *M. Vasilić*, offers an analysis of compliance with global professional regulations on a sample of Serbian joint stock parent companies, focusing on selected disclosures in their consolidated financial statements.

In the *Corporate Governance* section, *D. Dimitrijević, N. Karapavlović* and *S. Milutinović* examine the influence of enterprise characteristics on the degree of implementation of fraud prevention measures.

In the *Economics of Organizations and Industries* section, *G. Nikolić* and *I. Nikolić* discuss the structural changes in exports and imports during the transition process in Serbia. In the *Information Technology* section, *B. Ubiparipović, P. Matković, M. Marić* and *P. Tumbas* provide a literature overview with the aim to identify and systemize critical success factors of attaining purposeful digital transformation.

In the first paper in the *Logistics* section, *S. Popović-Pantić, D. Semenčenko* and *N. Vasilić* explore the ways in which the perception of the importance of different barriers affects inclusion in the supply chains, as well as whether the different-sized companies perceive differently the importance of individual barriers to inclusion in the supply chains. In the second paper in this section, *V. M. Mijušković* and *A. Todorović Spasenić* analyze whether organizational structure elements act as a predictor of developing an efficient supply chain management.

Finally, in the *Tourism* section, *G. Perić* and *M. Mandarić* explore in their paper how the tourists perceive Prolom Banja and identify the key elements that could influence the branding of Prolom Banja as a destination specializing in health tourism.

Prof. Dragan Đuričin, Editor in Chief

The background of the central section is a black and white photograph of a vast mountain range. The mountains are rugged and layered, with some peaks covered in sparse vegetation. A winding road or path is visible in the lower part of the image, leading through a valley. The sky is filled with soft, white clouds.

**ADJUSTING
TO POST-COVID WORLD:
NEW SOURCES OF GROWTH
UNDER GREAT ECONOMIC RESET**

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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 uspješno 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 performing 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:

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

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 period¹. 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):

$$\begin{aligned} \text{IFCMARG}_{it} = & (\beta_1 + \mu_i + \lambda_t) + \beta_2 \text{SPE}_{it} + \beta_3 \text{LEASE}_{it} + \beta_4 \text{NOB}_{it} \\ & + \beta_5 \text{ADV}_{it} + \beta_6 \text{DGR}_{it} + \beta_7 \text{LLP}_{it} + \beta_8 \text{SUBORD}_{it} + \beta_9 \text{LSTR}_{it} \\ & + \beta_{10} \text{DE}_{it} + u_{it} \end{aligned}$$

Table 1: Model specification details

Dependent variables	Independent variables
ROA _{it} – return on assets (FE 1)	SPE _{it} – salary per employee (in 000 RSD)
ROE _{it} – return on equity (FE 2)	LEASE _{it} – lease expense per branch (in 000 RSD)
IFCMARG _{it} – interest, fee and commission margin (FE 3)	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
$\beta_1, \beta_2, \dots, \beta_{10}$ – 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 errors² (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)

¹The Prais-Winsten regression, correlated panel-corrected standard errors (PCSEs)

²The Prais-Winsten regression, heteroskedastic panel-corrected standard errors

³The 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.

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SOFTWARE SUPPORT FOR FINANCIAL REPORTING ON THE INTERNET IN THE PRACTICE OF COMPANIES IN THE REPUBLIC OF SERBIA

Softverska podrška finansijskom izveštavanju na internetu u praksi preduzeća u Republici Srbiji

Abstract

Modern business conditions and the development of information technologies impose the need for introducing software solutions which will, if necessary, enable access to financial data via the internet. A significant segment of business activities of a modern company is to ensure the availability and processing of financial information at any time and place. A great challenge encountered by companies today is the need to improve their operational efficiency in the creation and distribution of financial statements in accordance with legal regulations. Accordingly, the most advanced software solutions for financial reporting have been developed around the world. Thanks to the application of online accounting software, it is possible to access financial and business reports using a regular web browser, at any time and location if internet access is provided. This paper includes empirical research of the features, advantages, functionalities, and modules of software solutions for web financial reporting in the practice of companies in the Republic of Serbia. The aim of the paper is to perform an aggregate and quantitative analysis of software solutions that are most used in the practice of domestic companies, as well as to compare their characteristics with the characteristics of the best online accounting software solutions used worldwide, in order to point out their level of quality and functionality in modern business conditions.

Keywords: *financial reporting, internet, web technology, software.*

Sažetak

Savremeni uslovi poslovanja i razvoj informacionih tehnologija, nameću potrebu za uvođenjem softverskih rešenja, koja će po potrebi omogućiti pristup finansijskim podacima preko interneta. Značajan segment poslovanja savremenog preduzeća jeste da se obezbedi dostupnost i obrada finansijskih informacija u svakom trenutku i na svakom mestu. Veliki izazov sa kojim se susreću preduzeća danas jeste potreba za unapređenjem njihovih operativnih efikasnosti u kreiranju i distribuciji finansijskih izveštaja, a u skladu sa zakonskim propisima. U skladu sa tim, razvijena su najsavremenija softverska rešenja za finansijsko izveštavanje širom sveta. Zahvaljujući primeni onlajn računovodstvenog softvera, moguće je pristupiti finansijskim izveštajima i izveštajima o poslovanju, upotrebom običnog veb pregledača, u svakom trenutku i na bilo kojoj lokaciji, ukoliko je obezbeđen pristup internetu. Rad obuhvata empirijsko istraživanje karakteristika, prednosti, funkcionalnosti i modula softverskih rešenja za veb finansijsko izveštavanje u praksi preduzeća u Republici Srbiji. Cilj rada je da se agregatnom i kvantitativnom analizom softverskih rešenja koja se najviše koriste u praksi domaćih preduzeća, kao i komparacijom karakteristika ovih rešenja sa karakteristikama najboljih onlajn računovodstvenih softverskih rešenja koja se koriste u svetu, ukaže na njihov nivo kvaliteta i funkcionalnosti u savremenim uslovima poslovanja.

Ključne reči: *finansijsko izveštavanje, internet, veb tehnologija, softver.*

Introduction

An increasing number of companies, especially in developed economies, recognize the benefits of using modern technologies to support the accounting and financial reporting process. The effects of the development of information technologies on accounting applications are numerous and reflected in the following sources [16, p. 12], [5], [14], [17], [19]. Implementation of various technological tools in the accounting profession (e.g., the internet, computer-aided production, communication technologies) ensures detailed and accurate information. Information technology (IT) also affects the structure, functions, and management of organizations, thus changing the structure of accounting activities and the competitive environment of the accounting profession members. In addition, it reduces the burden imposed on the accounting sector in terms of recording, classifying, and reporting data. In view of this, the role of the accounting profession changed in terms of designing a management system and applying, analyzing and interpreting data. In addition to the design, development, management, control, and evaluation, IT creates new business opportunities for the accounting profession (e.g., finding new clients and opening up to new geographic areas). Owing to the availability of publications on the internet, it enhances the availability of information and the competitiveness of the accounting profession. The change in the financial reporting process in terms of form and content, along with the changes in reporting requirements, has increased the application of IT in financial reporting. Modern business conditions impose the need for periodic reporting intensively followed by continuous financial reporting and the presentation of financial statements via electronic media. Applications resulting from IT development (e.g., e-tax return, e-report) contribute to time and money savings, providing accountants with accurate and efficient information.

Cloud computing, as one of the technologies that affect all aspects of business operations, contributes to better efficiency of the business processes, in which it finds significant application, including the field of accounting. Taking into account the benefits of using this technology, an increasing number of successful companies in developed

countries use it to support the process of web financial reporting. Cloud computing includes software that is delivered on the internet as a service, as well as hardware and system software in data centers¹ which provide these services [1]. “Modern accounting systems are closely linked to the new cloud computing technologies, while web-based accounting software is based on internet technologies, where information is stored on servers or in the cloud” [15, p. 720]. Cloud computing, by definition of the National Institute of Standards and Technology (NIST), is a “model that enables reliable and demand-driven access to a network of a common group of adjustable (configurable) computer resources (e.g., network, servers, warehouses, applications, and services) that can quickly cater to users with a minimum effort put into management or interaction with the provider” [12], [15].

The present empirical research included applications that are most used by our companies. The investigated applications include cloud solutions and traditional software solutions to support financial reporting on the internet. The first part of the paper presents an aggregate and quantitative analysis of their characteristics and functionalities, which are significant for the process of web financial reporting. The second part includes a comparative analysis of Serbian and the best foreign software packages to support web financial reporting for the purpose of assessing the level of quality and functionality of Serbian solutions in modern business conditions.

Analysis of the characteristics and functionality of software solutions to support web financial reporting in the practice of companies in the Republic of Serbia

The survey of software support to web financial reporting in the practice of domestic enterprises has included 9 applications that are most used by our companies. The results of the research are part of a doctoral dissertation [11]. The researched applications are BIS-ERP-WEB, Minimax, e-računi, Billans, asw:dominus, AB Soft, Infosys, FIS, PANTHEON and include 1) cloud solutions,

¹ The place where computer systems, data storage systems, and telecommunication equipment are located.

2) traditional software solutions, 3) business and 4) online accounting software solutions to support web financial reporting. Cloud solutions are BIS-ERP-WEB, Minimax, e-računi, Billans, asw:dominus, while AB Soft, Infosys, FIS, PANTHEON belong to the group of traditional software solutions. Business solutions include AB Soft, Infosys, BIS-ERP-WEB, PANTHEON, FIS, asw:dominus, while online accounting software solutions are Minimax, e-računi and Billans. Business solutions account for 67%, while accounting solutions comprise 33% of the researched applications. Certain solutions are designed for small companies and specific activities, while others can be used in different sectors and activities, regardless of the company size. The specific needs of each company determine the choice of appropriate software to support web financial reporting in terms of features and functions to support. The division of software solutions in the sample was carried out according to the size of company and types of activities. Based on these classification criteria, the solutions in the sample are grouped according to their characteristics and functionalities to those that match: a) companies from different sectors and with different

activities, as well as companies of different sizes, b) small and medium-sized companies, c) primarily medium-sized and large companies from all spheres, and d) companies with their own accounting department, external accounting, or accounting agencies.

As previously pointed out, the research encompassed the characteristics, advantages, functions, and modules of the aforementioned software solutions. Below is a review of those modules and functionalities of importance for the process of financial reporting on the internet (Table 1).

In addition, there is also an overview of the characteristics of software solutions that are relevant to the process of web financial reporting, as well as their representation in a given sample of applications. Apart from that, in order to assess the level of quality and functionality of applications in relation to the requirements of modern business, the characteristics that are common to all applications from the sample are considered. A review of software characteristics significant for web financial reporting is given in Table 2. There are 11 features² which

² Characteristics can be changed and improved by upgrading the existing solutions, given the flexibility of the software solutions.

Table 1: Modules and functionality of the software for support to the financial reporting process

Software	Modules and functionalities of the software for support to financial reporting
AB Soft	Financial accounting (FIPO) – creation and printing of trial balances, logs, various reports from the general ledger for arbitrary periods, balance sheets, and income statements. The data recorded in this application is used by the FINALIS (financial analysis) program for creating additional reports. AB Soft reporting system – web reports – in addition to standard reports (spreadsheets), there is also a possibility of sending messages with the data obtained from reports (messages).
asw:dominus	The financial and bookkeeping module – purchase and sales invoices, cash book, financial statements, general ledger, buyer's and supplier's accounting, statement of accounts.
Infosys	The financial accounting module; Web program: WebInfo, WEBFIN module (access to bookkeeping information on the internet and review of financial statements).
BIS-ERP-WEB	Finance – inputting general ledger orders and various analytics, generating financial reports in PDF and MS Excel format, browsing the web in search of them, and exporting reports in XML.
PANTHEON Accounting	Basic functionalities: general and subsidiary ledgers; automatic posting of documents; checking postings with the possibility to filter them; open items, debts, and receivables; journal voucher and year-end closing; e-business with clients and state institutions. Advanced functionalities: balance sheets, business analytics, and creation and submission of business reports.
FIS	Financial accounting through the Reviews and Reports submodules allows viewing and printing of various reports. Users have a complex open-format report generator available, and there is a possibility of generating reviews and report summaries with a cut-off on a specific day, for a selected period, per organizational unit, as well as legal reports that include a balance sheet, income statement, trial balance, and open item statement forms.
Minimax	Bookkeeping – double-entry bookkeeping, calculations of VAT, interest, fixed assets (add up the value of fixed assets), interim returns, annual returns.
e-računi	Tax settlements and balances – enables automatic creation of basic financial statements (balance sheet and income statement) and other reports, based on the general ledger and the trial balance.
Billans	Financial accounting – double-entry bookkeeping, simple bookkeeping, cash book, interest calculation, VAT calculation, posting statements, annual settlements, annual balance sheet.

Source: [11, p. 218].

include 1) automatic posting in accounting; 2) efficient and controlled access to information; 3) providing accurate and timely information at any time; 4) ease of use; 5) flexibility; 6) generating reports in a variety of formats – PDF, HTML; 7) updating legal changes and standards – legal compliance; 8) integration with e-banking and e-commerce systems; 9) a common database; 10) data security; and 11) a business analytics system³.

Based on the aggregate and quantitative analysis of the characteristics and functionalities of the tested solutions, the level of their quality and functionality in modern business conditions is determined. It is noted that out of the total number of examined applications, nine out of nine 1) support the process of automatic document processing, that is, enable automatic posting in accounting and automatic creation of financial statements; 2) provide efficient and controlled access to accounting and financial information; 3) provide accurate and timely information for accounting, management, and other users at any time, and 4) are characterized by the ease of use of the system.

Exceptional flexibility of the system is characteristic of six examined applications. The solutions are flexible, i.e., they are adaptable to user requirements, as well as the needs of modern management. The solutions are mostly modular. For example, the web version of AB Soft Reporting is flexible, i.e., it can be customized in

3 Business analytics (BA) is the combination of competencies, practices, and technologies that enable continuous iterative research and exploration of the past performance of a business in order to acquire insights into and facilitate business planning. Business analytics focuses on attaining new insights into and comprehension of business performance by using data and statistics.

accordance with the requirements of the user, whereby once created, reports can be used in all reporting variants. The flexibility of this system is at a high level, and it is possible to adapt it to the requirements of management at various levels of corporate governance hierarchy. Modularity or flexibility is also a feature of the asw:dominus system. In addition, this system is not only configurable (it can be used by clients from different industries and sectors of the economy), but also scalable (user organizations can adapt it to large and distributed systems without conditional constraints). Flexibility is also a feature of BIS-ERP-WEB. It is reflected in the fact that this system can be applied in all companies, regardless of their size and activity, while certain companies require setting parameters in accordance with their business activities. The Infosys solution is also flexible, i.e., users can simply upgrade the system in accordance with their specific needs. This solution also enables the creation of a variety of reports within each program segment. PANTHEON is also a solution that can be adapted to any form of business and new market demands, as well as the FIS system, which involves creating a package of solutions with appropriate modules in accordance with the specific needs of the company.

Six out of nine examined applications support the process of generating financial reports in a variety of formats. Ab Soft applications support the generation of hundreds of different reports, as well as the option of printing each report in MS Excel or some other format. In addition, reports can also be submitted in HTML or other formats

Table 2: Overview of features of the software for web financial reporting support

Characteristics of software solutions	Software								
	AB Soft	asw: dominus	Infosys	BIS-ERP-WEB	PANTHEON	FIS	mini max	e- računi	Billans
Automatic posting in accounting	x	x	x	x	x	x	x	x	x
Efficient and controlled access to information	x	x	x	x	x	x	x	x	x
Accurate and timely information at any time	x	x	x	x	x	x	x	x	x
Ease of use	x	x	x	x	x	x	x	x	x
Flexibility of the system	x	x	x	x	x	x			
Generating reports in a variety of formats	x			x	x		x	x	x
Updating legal changes and standards				x	x	x	x	x	x
Integration with e-banking and e-commerce			x	x	x		x	x	x
Shared database		x		x	x		x	x	x
Data backup				x	x		x	x	x
Business analytics system	x	x	x	x	x				

Source: [11, p. 219].

suitable for sending via email. The Ab Soft web reporting system supports the option of SMS reporting while also allowing for the graphical presentation of results, based on various types of graphics. Generating reports in PDF and MS Excel formats and exporting them to XML is provided by the BIS-ERP-WEB software solution. In its framework of advanced functionality, PANTHEON allows export of business and financial reports in various formats (PDF, MS Excel) and via email. In addition, it enables online transfer of balance sheets to the Business Registers Agency (BRA). Through the Minimax application, it is possible to generate reports in PDF and MS Excel formats and create XML files of statistical reports (balance sheet and income statement). The e-računi application supports direct processing of statements in XML format and allows the import and export of the accounting scheme into and from MS Excel. It is also possible to use prepared flexible templates to directly transfer data from the gross balance sheet to the annual financial statement forms. The Billans accounting software solution allows sending reports directly from the program via email, as well as automatically saving all output docs when issuing them in PDF format.

Providing up-to-date billing data is a feature of six examined applications. Such data is provided based on automatic updates of legal changes and standards in the program. For example, the PANTHEON solution is characterized by legal compliance, stability, and reliability. In case the legislation changes (changes in VAT calculation, introduction of fiscalization), the program will automatically be updated the moment the law changes. In addition, the Minimax, e-računi, and Billans software solutions also provide up-to-date billing data and are based on automatic upgrades and rapid implementation of legal changes in order to align with them. The modern BIS-ERP-WEB solution is also in line with the current legal norms and is characterized by flexibility, i.e., ability to comply with changing regulations and standards in a short period of time. In addition, the FIS system provides support and compliance with the International Financial Reporting Standards and the Law on VAT.

The same number of surveyed applications, six out of nine, support integration with e-banking and

e-commerce systems, i.e., enable a connection with these systems. The connection with the e-banking program is enabled within the 'Finansijsko knjigovodstvo' (Financial accounting) segment of the Infosys program. Such connection involves automatic tracking or transferring of payment orders, as well as downloading the statements from the program and automatically posting them in it. The BIS-ERP-WEB software solution allows loading statements, creating giro transfer orders for earnings, and uploading them into the e-banking software. The integration with online banks and stores is also enabled through PANTHEON. The Minimax bookkeeping software provides an e-commerce connection, through which it can automatically communicate and exchange information about the stock status, stock distribution, orders received, as well as the exchange of information on VAT data, payment orders, and clients. Using this software, it is possible to import bank statements from and export payment orders into the e-banking system. The Billans software also enables integration with the electronic banking systems (Halcom, Fx Client, OfficeBanking, Raiffaisen Online, etc.). Owing to its integration with an e-banking program, the e-računi solution exchanges payment orders and bank statements with it, while simultaneously enabling posting and automatic data transfer to the general ledger. It is also possible to link the program to other programs/sites using web services which enable automatic synchronization of item data between the third-party business application and the e-računi software. In addition, it has built-in support for connection to standard platform web stores (Magento, Prestashop, WooCommerce, OpenCart, Shopify).

Simplified exchange of financial data between clients and accounting offices characterizes six out of total of surveyed applications. For example, PANTHEON allows simultaneous access of both the accounting office and the client to the same database. In addition, it is possible to send all important forms to government institutions electronically, alongside rapid exchange of scanned documents with the clients of the accounting office. The asw:dominus system also allows for simplified information exchange between clients and accounting offices. The BIS-ERP-WEB software is based on a database common for clients and bookkeeping agencies, thus establishing a link

between them. It also allows for reviewing and revising the account balance at any time. The e-računi software can be adapted to the needs of the accounting office by allowing clients online access to the data within the program. This way, they are able to use the selected program modules. The Minimax software allows simultaneous use of the same data and documents by both the company and accounting, with data entered once and processed simultaneously in different locations. In a similar way, Billans provides the opportunity to run a business, simultaneously linking it with a bookkeeping agency, i.e., enables simultaneous use of the same data between the company and the accounting agency. Concurrent work can be done by all users within the same database, at any time and at any location. In addition, Billans has a built-in communication center through which it is possible to send and receive SMS, email, fax, and make phone calls.

Out of the total of surveyed applications, five out of nine provide a high level of data security. This includes automatic backups to protect user data, securing data protection through a digital certificate and the use of modern SSL technologies⁴, as well as data security on Telekom's servers. Data security in Minimax is accomplished by protecting data using a digital certificate and modern SSL technologies. Automatic backups for data protection are provided within the e-računi software, while Billans can be accessed only by using a personal password. It also enables a system of access through digital certificates applied for internet banking. Within this software, data are archived once a day. Daily automatic backup of each client's database is done in BIS-ERP-WEB, storing the backups in a secure location. Regular data archiving is a feature of PANTHEON hosting, backups of databases being created at least once a day. The security of the data centers in which data are stored is ensured through a firewall and data encryption.

The same number of examined applications, five out of nine, support the financial reporting process through a powerful system of business and financial analytics. Thus, business analytics is embedded in advanced

versions of PANTHEON which enables reviewing business activities at all company levels, while the accountant has a comprehensive overview of the client's business. Exporting information and analyzing them is simply done via email or MS Excel. Within the framework of AB Soft's program FINALIS (Financial Analysis), an analysis of the financial performance of the business is enabled, which allows users to quickly and easily see the current state and business activities of the company. With this program, it is possible to analyze the financial statements according to the results of periodic calculation and current business results, including balance sheet and income statement, to analyze expenditures and revenues and capital structure and perform ratio analysis, as well as numerous other analyses of financial statements. Through the BIS-ERP-WEB software, it is also possible to carry out a variety of financial and statistical analyses within the supplementary software packages (BI)⁵. The asw:sapiens solution relies upon and qualitatively upgrades asw:dominus. This solution is used to support decision-making through collection, transformation, and analysis of business data. For the purpose of operational and strategic decision-making and tracking daily activities, a wide array of reports is created and then fully distributed across the web; they can also be exported to MS Excel, OpenOffice Calc, and Adobe PDF. For the purpose of advanced reporting and business analysis, a special program segment in the BI class has been developed, called Infosys MATRIX. The reports and analyses are based on the existing database, while MATRIX uses data from a specially organized analytical database for creating reports and analyses. This database is created at the request of the operator (user) and is based on the data from the main database.

Based on the previous analysis, it can be noticed that the percentage of all examined applications in terms of the characteristics and functionality necessary for supporting web financial reporting ranges from 55.56% to 100.00% (Figure 1). This indicates a satisfactory level of quality and

⁴ Secure Socket Layer, or SSL, is the predominant internet communication security protocol, especially in the case of web services that relate to e-commerce and e-banking.

⁵ Business intelligence (BI) includes methods and techniques used by businesses to analyze business data [1]. BI technologies give us chronological, up-to-date, and predictive views of the operations of a business. The functions that BI technologies frequently perform include reporting, web analysis, analytics, data mining, process mining, complex event processing, business performance management, benchmarking, text mining, predictive analytics, and prescriptive analytics.

functionality of software solutions in relation to business requirements and financial reporting in contemporary conditions.

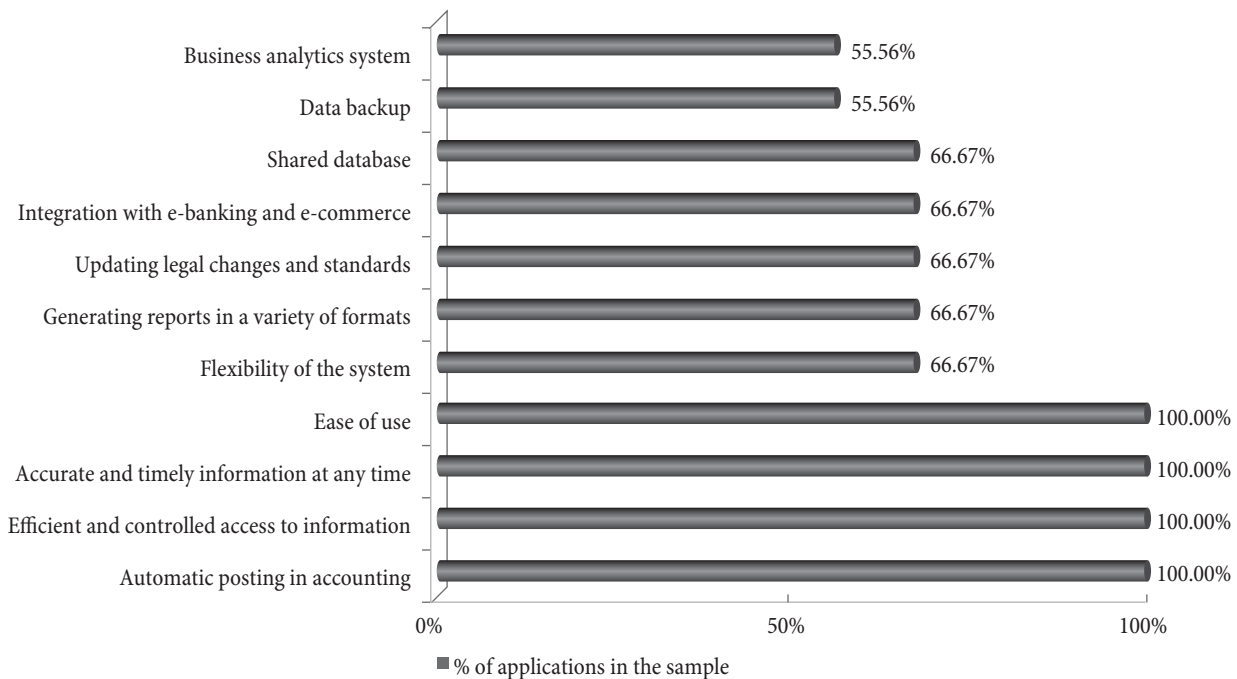
Comparison of Serbian and foreign software packages for supporting web financial reporting

In order to assess the level of quality and functionality of software support to web financial reporting in the Republic of Serbia in relation to the level of those used worldwide, we present below the characteristics of top ten online accounting software solutions used around the world [18]: 1) FreshBooks (FreshBooks, Toronto, Canada), 2) Sage (Sage Software, Inc., Newcastle upon Tyne, UK, England),

3) QuickBooks (Intuit Inc., California, US), 4) Xero (Xero Limited, New Zealand), 5) Zoho (Zoho Corporation, California, US), 6) KashFlow (KashFlow Software Ltd., London, UK), 7) Paychex Online (Paychex, Inc., Penfield, New York, US), 8) FreeAgent (FreeAgent Central, Edinburgh, UK), 9) LessAccounting (Less Everything, Florida, US), 10) Kashoo (Kashoo Cloud Accounting Inc., Vancouver, Canada). The assessment of these global solutions takes into account 1) their accounting and business functions, 2) software implementation and launch, and 3) quality of providing customer support.

By examining their significant features, a comparison of their characteristics with those of the applications from our sample will be carried out in parallel.

Figure 1: Percentage of examined applications that have the given characteristics



Source: [11, p. 225].

Table 3: General characteristics of top ten accounting software products

Accounting software	Type of business and user	Notable feature	Starting price
FreshBooks	services	unlimited invoicing	US\$9.95
Sage	developing	Sage One	US\$10.00
QuickBooks	small and medium-sized	compatibility	US\$10.36
Xero	international small	client portal	US\$9.00
Zoho	small	about 500 integrations	US\$6.30
KashFlow	UK companies	filing VAT returns	US\$5.00
Paychex Online	payroll service	integration of payroll calculation	US\$12.95
FreeAgent	part-time associates	time and cost tracking	US\$24.00
LessAccounting	services	support for work processes	US\$20.00
Kashoo	small	simple expense tracking	US\$12.95

Source: [11, p. 227].

Table 3 provides an overview of general features of these accounting software products according to 1) the types of businesses and activities that the software suits best, 2) the significant features of each software product compared to the others, and 3) the starting price.

Top ten accounting software products were compared using general software ratings, as well as the ratings of 1) accounting and business features, 2) software implementation and launch, and 3) quality of customer support (Table 4).

Below is a comparison and review of the ratings of top ten software products according to the above-mentioned categories, with a parallel comparison of their features with those of the applications this research focused on.

The assessment of accounting and business features and the ease of use of the accounting software is based on the testing of the software in performing routine accounting operations (creating invoices and certain estimates, tracking expenses, paying bills, and creating reports). Ease of use ranges from 90% (e.g. FreshBooks) to 69% (Paychex Online) – Table 5.

Certain conclusions can be drawn based on the comparison between the features of top online accounting

software products and the applications⁶ we researched. We have concluded that the ease of use is a common feature of all tested applications used in Serbian enterprises. This involves performing routine daily accounting tasks (invoicing, expense tracking, report creation, payroll, staff management), with certain applications supporting integration with e-banking and e-commerce systems.

Evaluation of the implementation and launch of a new enterprise accounting system included testing the ease of use of top accounting software products for new users (businesses) based on the extent to which the software vendor provided users with guidance and support in implementing and adjusting the software. Apart from that, the compatibility of the software with the bank, the main dashboard and options for its customization, and the possibility of mobile access were also taken into consideration. The level of ease with which these solutions are used ranges from 95% (Zoho) to 75% (FreeAgent, LessAccounting) – Table 6.

⁶ We compared the characteristics of top ten online accounting software products with the features of online accounting software products (Minimax, e-računi, Billans) from our suite of applications.

Table 4: Overview of online accounting software ratings

No.	Accounting software	Overall rating	Accounting and business features	Implementation and launch	Support and business education
1	FreshBooks	9.83	9.75	9.75	10.00
2	Sage	9.65	9.75	9.38	9.75
3	QuickBooks	9.47	9.75	8.63	9.75
4	Xero	9.40	9.63	9.63	8.75
5	Zoho	9.25	9.75	9.38	8.13
6	KashFlow	7.70	8.25	9.65	4.63
7	Paychex Online	7.52	8.50	8.63	4.50
8	FreeAgent	7.13	7.50	8.00	5.50
9	LessAccounting	7.03	7.50	6.63	6.50
10	Kashoo	6.90	7.25	8.63	4.50

Source: [11, p. 228].

Table 5: Ease of use of the accounting software

Ease of use	Fresh Books	Sage	Quick Books	Xero	Zoho	Kash Flow	Paychex Online	Free Agent	Less Accounting	Kashoo
	90%	90%	90%	85%	90%	80%	69%	80%	75%	70%
Creating invoices, estimates, and quotas	√	√	√	√	√	√	√	√	√	√
Tracking and paying bills	√	√	√	√	√		√	√	√	√
Sales and order management	√	√	√	√	√	√	√		√	√
Item and service management	√	√	√	√	√	√	√	√		
Time and expense tracking	√	√	√	√	√	√	√	√	√	√
E-commerce and online sales	√	√	√	√	√	√			√	
Salary calculation and human resources	√	√	√	√	√	√	√			√

Source: [11, p. 229].

Some conclusions can be drawn from the comparison of the software features given in the previous table with the features of the solutions that were the subject matter of the present research. Certain applications explored in the present research enable integration with e-banking and e-commerce systems, import of data from other applications (Minimax, Billans), as well as the possibility of mobile access (Minimax, e-računi, Billans). When considering the customizability of the dashboard, we noticed that this is a feature of only some solutions (FreshBooks, Xero, KashFlow). The applications examined in the present research also have limitations in terms of dashboard customizability, whereas most of them provide good data transparency and adequate support from the manufacturer regarding the availability of instructions and software settings.

Top ten software solutions were also compared according to the assessment of customer support quality (from 100% - FreshBooks to 60% - KashFlow) – Table 7. The ratings are based on providing customer support directly over the phone and through online support. The best solutions considered in this research provide fast and useful customer service and updated online information. The following aspects were assessed in terms of support quality: 1) free access to the software by an accountant or other authorized representative, 2) continuous business education, 3) active user communities and 4) updated video content.

When we consider the quality of support that the software manufacturers provide to our users, the tested applications lead us to the following conclusions. The provided customer support is of high quality. For certain applications (e.g., Minimax), the support system is integrated into the program, while users are also provided with phone or email support, as well as instructions and video content to help them use the program. The users of the Billans app are provided not only with help and support through the Billans partner network, but also with direct paid support and online training and free telephone and online support related to the use of the program (10-minute assistance). To master working in the e-računi program, online guidance, telephone support, and remote support are available to users⁷.

Based on the comparative analysis of Serbian and foreign software packages, we can conclude that the features and functionalities supporting web financial reporting match.

Conclusion

Companies in the Republic of Serbia have various software solutions for web financial reporting available, from modern ERP solutions to online bookkeeping software, primarily intended for managing business records and compiling

⁷ With the help of remote support software, the operator is given access to the user's computer via the internet.

Table 6: Ease of use of the accounting software for new users (businesses)

Ease of use for new businesses (users)	Fresh Books	Sage	Quick Books	Xero	Zoho	Kash Flow	Paychex Online	Free Agent	Less Accounting	Kashoo
	85%	95%	85%	80%	95%	80%	85%	75%	75%	85%
Banking transaction import	√	√	√	√	√	√	√	√	√	√
Dashboard customization	√			√		√				
Mobile access	√	√	√	√	√	√	√	√		√

Source: [11, p. 231].

Table 7: Quality of support provided

Support quality	Fresh Books	Sage	Quick Books	Xero	Zoho	Kash Flow	Paychex Online	Free Agent	Less Accounting	Kashoo
	100%	95%	95%	80%	85%	60%	75%	75%	75%	75%
Free access to the software by an accountant	√	√	√	√	√	√		√	√	
Continuous business education	√	√	√	√	√				√	
Active user community	√	√	√	√	√					
Updated video content	√	√	√	√						

Source: [11, p. 233].

financial statements. The results of the survey indicate that there is adequate support in terms of the quality and functionality of web financial reporting applications in the practice of domestic enterprises, in line with the demands of modern business and management. The conclusion is that when it comes to significant characteristics and functionalities needed to support this type of reporting, the percentage of the tested applications ranges from 55.56% to 100.00%. When it comes to the user-friendly feature, the basic advantages of their application are the ease of their use, maintenance, updating and upgrading and effective support in working with the program. What is characteristic of 100% of the examined applications is automatic document processing, i.e., automatic creation of financial statements and automatic posting in accounting. In addition, all examined software solutions 1) produce accurate and timely information at all times, in accordance with the needs of accountancy, management, and other users; 2) are characterized by the system's ease of use; and 3) provide controlled and efficient access to financial and accounting information. Timely information provided at all times is an especially significant feature in the management's decision-making process, while simple data entry reduces the possibility of occurrence of human errors, which improves the financial reporting process. Business control is achieved by allowing data to be accessed at any time and from any location, while quick access to data contributes to the simplification of business processes in the company. The results also show that two-thirds of the examined applications are generally flexible, i.e., adaptable to the needs of all users, especially the management. The flexibility of applications improves business efficiency, which is the basis for the development and expansion of the company. Generating reports in a variety of formats is also a feature of 66.67% of the total surveyed applications. They allow reports to be generated in PDF, MS Excel, HTML, and XML formats and enable graphical representation of reports. The same percentage of applications provide 1) up-to-date billing data through automatic updating of legal changes and standards in the program; 2) support for the connection with e-banking and e-commerce systems; and 3) the possibility of a simplified exchange of data between clients and accounting agencies.

The characteristic of 55.56% of the applications examined is a high level of data security, while the same percentage of applications also include a business analytics system, which enables business activities to be reviewed at all levels in the company.

The results of the research, based on the comparative analysis of Serbian and foreign software packages in terms of supporting web financial reporting, show that there is an adequate level of quality in the functionality of the solutions used in the practice of Serbian companies when compared to those used worldwide. The conclusion is based on the fact that all tested applications used in the practice of our companies are characterized by ease of use in performing daily accounting tasks. In addition, they provide integration with e-banking and e-commerce systems and the possibility to access and import data from other applications. The results point to some limitations regarding dashboard adjustability in both Serbian and foreign software solutions. Compared to foreign software packages, the conclusion is that most of the examined applications ensure good transparency of data, which are concentrated in one place, and that software vendors provide high-quality software support.

Bearing in mind the continuous progress of IT, software solutions in the domain of web financial reporting need to be constantly developed. Choosing an adequate software solution in this domain requires consideration of all previously analyzed features and functionalities that a given solution provides, taking into account the costs of system acquisition, implementation, and maintenance, while the final choice will depend primarily on the specific needs of each company.

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FINANCIAL REPORTING ON INCOME TAX IN SERBIA AND CROATIA: AN EMPIRICAL ANALYSIS*

Finansijsko izveštavanje o porezu na dobitak u Srbiji i
Hrvatskoj – empirijska analiza

Abstract

The paper examines the quality of financial reporting on income tax in Serbia and Croatia in order to determine the extent to which disclosed information on income tax in these countries is useful for economic decision making. The research based on financial statements of listed and non-listed companies for 2016 reveals that disclosed information on the income tax is not entirely in accordance with the relevant regulation. Therefore, there is a significant room for improvement of income tax financial reporting practices in both countries. The quality of disclosed income tax information is not related to the presence of companies in the stock market, as capital markets in Serbia and Croatia do not provide strong incentives for disclosing adequate information on income tax. The research also reveals significant differences in the prevailing sources of deferred tax assets and deferred tax liabilities between Serbia and Croatia, which indicates that the income tax financial reporting is conditioned by the specifics of the national environment.

Keywords: *income taxes, financial reporting, deferred tax assets, deferred tax liabilities, disclosure, IAS 12.*

Sažetak

U radu se ispituje kvalitet finansijskog izveštavanja o porezu na dobitak u Srbiji i Hrvatskoj u cilju utvrđivanja stepena u kojem su obelodanjene informacije o porezu na dobitak u ovim zemljama korisne za donošenje ekonomskih odluka. Istraživanje, bazirano na finansijskim izveštajima listiranih i nelistiranih kompanija za 2016. godinu, pokazalo je da obelodanjene informacije o porezu na dobitak nisu u potpunosti u skladu sa relevantnom regulativom. Stoga, prisutan je značajan prostor za napredak praksi finansijskog izveštavanja o porezu na dobitak u obe zemlje. Kvalitet obelodanjenih informacija o porezu na dobitak nije povezan sa prisustvom kompanija na tržištu akcija, jer tržišta kapitala u Srbiji i Hrvatskoj ne pružaju dovoljne podsticaje za obelodanjivanje adekvatnih informacija o porezu na dobitak. Takođe, istraživanjem su otkrivene značajne razlike u preovlađujućim izvorima odloženih poreskih sredstava i odloženih poreskih obaveza između Srbije i Hrvatske, što ukazuje na to da je finansijsko izveštavanje o porezu na dobitak uslovljeno specifičnostima nacionalnog okruženja.

Ključne reči: *porez na dobitak, finansijsko izveštavanje, odložena poreska sredstva, odložene poreske obaveze, obelodanjivanje, MRS 12.*

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Introduction

Taxes paid on income, along with value-added tax and payroll taxes, are the key company taxes. The importance of income tax led to the emergence of a new accounting discipline – income tax accounting. Financial reporting on income taxes is an important and complex area of this discipline. Its complexity is primarily caused by differences in accounting and taxable income calculation, as well as by the cross-national differences in tax systems [11].

The income tax financial reporting is focused on two main problems: (1) reporting of current income tax, as a tax payable to the state for an accounting period, which is determined by applying the statutory tax rate to taxable income followed by deductions of any tax incentives, and (2) reporting of deferred income tax, arising from a difference between accounting and taxable income. Both problems have two aspects as they simultaneously affect the balance sheet and income statement positions. In addition to the problem of recognition and measurement of assets, liabilities, income and expenses related to income taxes, the problem of income tax disclosures (primarily in the notes to the financial statements) is very important.

The present research examines financial reporting practices on income tax under International Financial Reporting Standards (IFRS). The research is based on a comparative analysis of the financial reporting practices in Serbia, as a candidate for European Union (EU) membership, and Croatia, as a full EU member. The research is based on the financial statements of listed (public) stock companies and limited liability companies in these countries, and is conducted on a sample of 108 companies – 54 per country.

The aim of the paper is to critically examine the quality of financial reporting on income tax in Serbia and Croatia. The quality is perceived from the users' point of view (the aspect of financial statements users), i.e., from the extent to which the information on the income tax disclosed in annual financial statements helps financial statements' users to understand the relationship between accounting and taxable income and sources of deferred tax assets, liabilities, income and expenses. The importance of research on the quality of income tax disclosures stems from the relevance of these disclosures for economic

decisions. For instance, Samara [34, p. 138] points out that “deferred tax items possess information content that investors deem relevant”.

The paper contributes to the prior research on financial reporting on income tax and research on general quality of financial reporting in Serbia and neighboring countries. The research results can be of interest for managers and owners of companies as well as for investors.

The structure of the paper is as follows. The first section provides an overview of the literature related to the relationship between (a) accounting pre-tax income and taxable income, and (b) current and deferred income tax, as well as the regulation for income tax financial reporting. The research hypotheses are defined in this section. The sample and research methodology are described in the second section. The research results are presented and discussed in the third section.

Literature review and hypotheses development

A relation between accounting and taxes has been studied widely in previous decades [18], [35]. Since financial reporting and tax reporting may exhibit a strong relationship [12], income tax represents an important part of company financial reporting. A radical change in accounting treatment of income tax has been brought by International Accounting Standard (IAS) 12 – Income Taxes, which prescribes accounting treatment of income tax. Prior to the IAS 12 implementation, accounting treatment of income tax was quite heterogeneous [18]. However, there is still abundant academic discussion about accounting treatment of income tax, particularly regarding deferred income tax [5].

IAS 12 is especially important when tax regulation differs from financial reporting regulation [2] and, therefore, taxable income deviates from accounting pre-tax income. Such deviation appears if tax regulation differs from the accounting one in respect of (a) the moment of recognition of certain expenses and revenues, resulting in temporary book-tax differences, and (b) the justification of recognition of certain expenses and revenues, resulting in permanent book-tax differences

[32]. A temporary book-tax difference is the difference that will be reversed in certain future period through the difference of the same amount but the opposite direction, while the permanent one cannot be reversed in the future. Temporary differences cause the deferred tax assets, deferred tax liabilities, deferred tax expenses and deferred tax income recognition and measurement problems, as well as the problems of their disclosure. Furtherly, the problem of deferred tax accounting appears in countries with separate financial and tax reporting systems [27, p. 33], such as Serbia and Croatia.

If there are temporary and/or permanent differences, the current effective tax rate as a ratio between current tax expense and accounting pre-tax income [17], deviates from the statutory tax rate. Deviations between accounting pre-tax income and taxable income, and therefore between effective tax rate and the statutory one, can be highly significant. It is also possible that a company with accounting pre-tax income does not pay any income tax, and that a company with an accounting pre-tax loss pays an income tax. Different tax incentives can lower effective tax rate well below the statutory tax rate. The empirical research conducted by Yin [40] shows that the effective tax rate of the largest U.S. public companies is continuously below the statutory tax rate. The potential outcome of accounting pre-tax and taxable income inequality is a management tendency to maximize the accounting pre-tax income and minimize the taxable income [24].

Obradović, Čupić and Dimitrijević [26] find that deferred income tax accounting is one of the financial reporting areas bringing the greatest difficulties to the financial statements preparers in Serbia. Deferred tax items can be calculated using different methods [13], which can be reduced to two broader approaches. The first approach is based on recognition and measurement of deferred tax in income statement, whereby deferred tax items in balance sheet are the results of the previous calculation. The essence of the second approach is to first determine the deferred tax items in balance sheet and then to determine the deferred tax items in income statement. IAS 12 supports the second approach [36], which is in line with the orientation of IFRS to the problems of recognition and measurement of assets and liabilities [27, p. 141].

Deferred tax assets are the income tax recoverable in future periods, while deferred tax liabilities represent the income tax payable in future periods [6]. Deferred tax liabilities are recognized for taxable temporary differences in the amount of income tax that is expected to be paid in future periods. On the other hand, deferred tax assets are recognized for deductible temporary differences, but only if it is probable that taxable income will be available for utilizing temporary difference. In accordance with IAS 12 (paragraph 72), an entity shall offset deferred tax assets and liabilities (1) if it has a legal right to offset current tax assets and liabilities, and (2) if deferred tax assets and liabilities are related to the same tax authority. IAS 1 (paragraph 56) prescribes the presentation of deferred tax in balance sheet as non-current item. It is worth noting that the US GAAP prescribed the separation of deferred tax assets and deferred tax liabilities on their current and non-current components until 2015, when they imposed the same classification as IAS 1 [20]. However, Bauman and Shaw [4] indicate that presentation of all deferred tax assets and liabilities as non-current items could threaten the usefulness of financial statements for investors.

Information on income taxes presented in financial statements is not much useful unless it is followed by adequate disclosures [16]. IAS 12 (paragraphs 80 and 81) contains an extensive list of income tax information to be disclosed. Key requirements relate to (a) separate disclosure of current tax expense and deferred tax expense or income, (b) an explanation of the relationship between the accounting pre-tax and the taxable income, and (c) disclosing the structure (sources) of deferred tax assets and liabilities [39].

The application of IFRS (including IAS 12) for companies in Serbia started in 2004, on the basis of the Accounting and Auditing Law of 2002 [8]. On the other hand, the implementation of IFRS (only IAS at that time) in Croatia began in 1993 on the basis of the Accounting Law of 1992 [23]. It is important to note that, in accordance with the Accounting Law of 2013 (article 20), IFRS are mandatory, among other companies, for large companies and all listed companies in Serbia. The same applies in Croatia, according to the Accounting Law of 2015 (article 17).

Assuming transparency as a desirable feature of financial statements [3], it is rational to assume that companies disclose adequate income tax information. However, the research by Tumpach and Stankova [38] reveals that disclosures regarding the relations between accounting income determined in accordance with IFRS and taxable income of the companies in Slovakia are quite unsatisfactory, because the majority of the companies in the sample do not disclose the information on those relations or present the information in inadequate manner. Vučković-Milutinović and Lukić [39] find that income tax disclosures in Serbia are not entirely in line with the IAS 12, as companies do not disclose all the information required by the standard. The research on disclosures on related parties [19], segments [29] and biological assets [25] also reveal that companies in Serbia do not strictly comply with the provisions of relevant standards (IAS 24, IFRS 8 and IAS 41, respectively). Mamić Sačer and Ramač Posavec [23] find that accountants in Croatia cope with numerous problems in the application of IFRS, conditioned by insufficient understanding and complexity of IFRS and inadequate translations of professional terms in IFRS. Pivac, Vuko and Cular [31] show that quality of disclosures in the financial statements of listed companies in Serbia and Croatia is at a medium level, while the average quality in Serbia is slightly higher than in Croatia. The first mentioned research [39] directly relates to the income tax disclosures, but only in Serbia and in earlier periods, while the results of other research speak more about the general financial reporting environment.

Gorgan et al. [14] argue that financial markets rely on confidence, pointing out to the importance of accurate financial statements that represent the economic reality. Pagano and Roel [30] argue that listed companies in many countries are subject to tougher disclosure requirements than non-listed companies. Regardless of official requirements, the need for detailed financial statements disclosures is primarily related to listed companies. Street and Bryant [37] find that listed companies in the United States generally have a higher level of disclosures than other companies. Furthermore, many theoretical [1, p. 242], [10, p. 383] and empirical research [33], [39] shows that depreciation is the most frequent source of deferred taxes. Therefore, research hypotheses are formulated as follows:

- H₁: Companies in Serbia and Croatia do not disclose adequate information on income taxes.
- H₂: The listed companies in Serbia and Croatia disclose more adequate information on income taxes in relation to non-listed companies.
- H₃: Depreciation is the most common source of deferred tax assets and deferred tax liabilities in companies in Serbia and Croatia.

Sample and research methodology

The research methodology is primarily based on an inductive approach, i.e., on making the conclusions on the financial reporting quality according to IAS 12 on the basis of the empirical research of the sample composed of 108 non-financial companies in Serbia (54 companies) and Croatia (54 companies) which apply full IFRS. The research is based on the statutory financial statements of the sampled companies for 2016. In this year, both in Serbia and in Croatia, a proportional taxation systems were imposed, with a statutory income tax rate of 15% and 20%, respectively.

Since all the companies submit tax balance and tax return, the impact of current income tax on the sample development is minor. On the other hand, the sample consists only of companies which disclosed materially significant net deferred tax assets or net deferred tax liabilities in balance sheet. There are no quantitative criteria for determining the materiality neither in IFRS nor in the International Standards of Auditing [14], but we accept the level of 0.5% of total assets, which represents the materiality threshold often used by auditing firms [9].

Given the restrictiveness of the sampling conditions, it can be concluded that the sample is of appropriate size. For example, Pivac et al. [31] sampled 30 companies per country. Sampling of public stock companies (PSC) was made on the basis of data from the Belgrade Stock Exchange [41] and the Zagreb Stock Exchange [44], while limited liability companies (LLC) were sampled on the basis of the list of 100 largest companies in 2016 ranked by several criteria, published by the Business Registers Agency of the Republic of Serbia, and the list of 400 largest companies

in Croatia according to total revenues in 2016 published in the journal “Privredni vjesnik” in 2017. The financial statements of the sampled companies have been retrieved from the websites of the national company registers of Serbia and Croatia [43; 42]. The sampling procedure has been conducted as follows. Due to the limited number of companies, we have first sampled PSCs in Croatia. We have sampled 27 non-financial companies meeting the mentioned criteria. Then, we have randomly sampled the same number of LLCs in Croatia, and PSCs and LLCs in Serbia that meet mentioned criteria. Sample structure according to residence and legal form of companies is presented in Table 1.

Table 1: Sample structure

	Serbia		Croatia		Total
	PSC	LLC	PSC	LLC	
Number of companies	27	27	27	27	108

The research hypotheses have been tested using the following methodology:

- the first hypothesis – by the analysis of adequacy of basic disclosures on income taxes: (1) the amounts of current and deferred tax expense/income, regardless of whether these amounts are explicitly stated or can be identified from other published information (disclosure 1), (2) the most important reasons for the deviation of taxable income from accounting pre-tax income or effective tax rate from the statutory one and the amount of deviation related to those reasons (disclosure 2), and (3) the sources of deferred tax assets and liabilities and amounts related to those sources (disclosure 3);
- the second hypothesis – by comparing the data for stock companies and limited liability companies;
- the third hypothesis – by reviewing the notes to the financial statements.

The provisions of IAS 12, as the official basis for the income tax financial reporting of the analyzed companies in Serbia and Croatia, are the starting point for examining the quality of income tax disclosures. The conclusions on the disclosure adequacy are based on the comparison of companies' disclosures with the requirements of this standard.

Results and discussion

Before testing the research hypotheses, the analysis of effective tax rate and share of net deferred tax assets or liabilities in the total assets is conducted. According to the descriptive statistics, presented in Table 2, both the mean (12.47%) and median (10.77%) effective tax rate in Serbia in 2016 are lower than the statutory tax rate. In contrary, both the mean (28.39%) and median (20.36%) effective tax rate in Croatia are higher than statutory tax rate. In Serbia, the mean effective tax rate is higher in stock companies, while the median effective tax rate is higher in limited liability companies. In Croatia, both the mean and median effective tax rates are higher in the limited liability companies. Since the sample is small, the mean values are under a strong influence of extreme values, so median results might be more appropriate than mean results.

Table 2: Descriptive statistics of current effective tax rates

Element	Legal form		Total
	PSC	LLC	
Serbia			
Number of companies*	14	25	39
Mean	17.32%	9.76%	12.47%
Median	8.36%	11.27%	10.77%
Standard deviation	24.73%	7.70%	16.13%
Minimum	0.00%	0.00%	0.00%
Maximum	79.55%	26.19%	79.55%
Croatia			
Number of companies*	14	23	37
Mean	15.39%	36.32%	28.39%
Median	18.09%	21.06%	20.36%
Standard deviation	14.19%	83.85%	66.89%
Minimum	0.00%	0.00%	0.00%
Maximum	44.24%	414.17%	414.17%

Note: *companies with accounting pre-tax income

Table 3 shows that most of the companies in Serbia present net deferred tax liabilities, while the most of companies in Croatia present net deferred tax assets. The results of descriptive statistics of the materiality of net deferred tax assets or liabilities, i.e., their share in total assets or total sources of assets, presented in Table 4, show that the items of net deferred tax assets and liabilities are generally more significant in companies in Croatia than in Serbia. Further, these items are more significant in listed than in non-listed companies in both countries.

Table 3: Character of deferred tax items

Element	Legal form		Total
	PSC	LLC	
Serbia			
Number of companies	27	27	54
Deferred tax assets	5	12	17
Deferred tax liabilities	22	15	37
Croatia			
Number of companies	27	27	54
Deferred tax assets	9	23	32
Deferred tax liabilities	18	4	22
Total			
Number of companies	54	54	108
Deferred tax assets	14	35	49
Deferred tax liabilities	40	19	59

Table 4: Descriptive statistics on the significance of net deferred tax assets/liabilities

Element	Legal form		Total
	PSC	LLC	
Serbia			
Number of companies	27	27	54
Mean	2.74%	1.98%	2.36%
Median	1.90%	1.28%	1.63%
Standard deviation	2.10%	1.65%	1.91%
Minimum	0.63%	0.51%	0.51%
Maximum	8.66%	8.21%	8.66%
Croatia			
Number of companies	27	27	54
Mean	4.03%	1.99%	3.01%
Median	3.43%	1.52%	1.91%
Standard deviation	3.09%	1.59%	2.64%
Minimum	0.73%	0.53%	0.53%
Maximum	12.20%	7.53%	12.20%
Total			
Number of companies	54	54	108
Mean	3.39%	1.98%	2.69%
Median	2.24%	1.47%	1.77%
Standard deviation	2.70%	1.60%	2.32%
Minimum	0.63%	0.51%	0.51%
Maximum	12.20%	8.21%	12.20%

Data necessary for testing the first research hypothesis is presented in Tables 5 and 6. Table 5 shows the number and share of companies that disclose certain income tax information specified earlier (disclosures 1, 2 and 3), while Table 6 shows the number and percentage share of companies with all three adequate disclosures.

The highest level of adequacy is related to disclosure 1 (separate presentation of the current and deferred tax). In Serbia, adequacy rate is 100%, since the separate reporting of current tax expense and deferred tax expense/income

Table 5: Individual income tax disclosures

Country	Legal form	<i>n</i> *	Disclosure 1		Disclosure 2		Disclosure 3	
Serbia	PSC	27	27	(100.00%)	12	(44.44%)	11	(40.74%)
	LLC	27	27	(100.00%)	18	(66.67%)	9	(33.33%)
	Total	54	54	(100.00%)	30	(55.56%)	20	(37.04%)
Croatia	PSC	27	24	(88.89%)	16	(59.26%)	17	(62.96%)
	LLC	27	25	(92.59%)	19	(70.37%)	18	(66.67%)
	Total	54	49	(90.74%)	35	(64.81%)	35	(64.81%)
Total		108	103	(95.37%)	65	(60.19%)	55	(50.93%)

Note: *n – number of sampled companies

Table 6: Complete income tax disclosures

Country	Legal form	<i>n</i> *	Number of companies	
Serbia	PSC	27	5	(18.52%)
	LLC	27	5	(18.52%)
	Total	54	10	(18.52%)
Croatia	PSC	27	8	(29.63%)
	LLC	27	11	(40.74%)
	Total	54	19	(35.19%)
Total		108	29	(26.85%)

Note: *n – number of sampled companies

is prescribed by the official income statement scheme. On the other hand, in the scheme of the profit and loss account (GFI-POD form) in Croatia, the current and deferred tax expense/income are aggregated into one item, which means that the separate disclosures should be provided in the notes to the financial statements.

A lower adequacy appears for disclosure 2 (the reasons and amounts regarding deviation of taxable income from accounting pre-tax income). Most companies in both countries (60.19%) disclose adequate information, with a higher adequacy in Croatia than in Serbia. The most common shortcomings are:

- disclosure of the effects of non-deductible expenses and non-taxable income combined without specifying the amount for each category, i.e., disclosure of the net effect of adjusting the accounting pre-tax income to tax regulation;
- disclosure of the amount of decrease or increase in pre-tax income adjustment to taxable income, without specifying the reasons; and
- disclosure of the effects of temporary and permanent differences between accounting and tax regulations, without specifying the reasons.

The lowest adequacy is recorded for disclosure 3 (sources of deferred tax assets and liabilities and the

amounts related to these sources). Furtherly, there is the highest difference in the adequacy between companies in Serbia and Croatia, as companies in Croatia disclose more adequate information. In fact, most of the companies specify the sources of deferred tax in their notes to the financial statements, but they do it imprecisely. The most common shortcomings are:

- specifying the balance sheet items underlying deferred tax (e.g., property, plant and equipment) without specifying the reason,
- indicating temporary differences between accounting and tax value of assets, without specifying the reason;
- disclosing the sources of deferred tax assets and liabilities change during the reporting period, without explaining the source of the opening balance;
- specifying all of the deferred tax assets and liabilities sources without corresponding amounts; and
- disclosing the most significant sources of deferred taxes, without mentioning the other sources.

Many of the observed companies, primarily in Serbia, disclose only balance sheet items underlying deferred tax. This practice has been accepted even by some audit firms. Since the same balance sheet item may be a source of deferred tax due to variety of reasons (for example, deferred tax related to property, plant and equipment may arise due to depreciation, revaluation or impairment), such disclosures should be considered incomplete from the aspect of the financial statements users.

Data presented in Table 6 show that a share of sampled companies with all three adequate disclosures is quite low in both countries – every fifth company in Serbia and every third company in Croatia discloses full information on income taxes.

In order to determine whether the differences in income taxes disclosures between companies in Serbia and Croatia are statistically significant, hi-square tests of independence are conducted. In the case of disclosure 1, the assumption of the test regarding the least expected cell frequency is not met, so the Fischer's exact probability indicator is used. According to this indicator, the difference is not statistically significant ($p > 0.05$). In the case of disclosure 2, the mentioned assumption is met. Since each variable has two categories, the Yates' correction is

applicable, and we find that the difference is not statistically significant ($p > 0.05$). The Yates' correction is applicable for the same reason in the case of disclosure 3, and we find that the difference is statistically significant ($p < 0.05$) with a medium effect size according to the generally accepted criteria [21], since phi coefficient is 0.278.

A general conclusion is that companies in Serbia and Croatia do not disclose all income tax information prescribed by IAS 12. Therefore, the first research hypothesis cannot be rejected. This conclusion is in line with Pivac et al. [31], which show that the disclosure quality in the financial statements in Serbia and Croatia is not at a high level. However, contrary to Pivac et al. [31], research shows that disclosure quality is slightly higher in Croatia than in Serbia, though they have monitored a wider range of disclosures.

The low disclosure quality is largely related to the imprecise disclosure of the deferred tax sources, which means that users of financial statements are left to judge solely on the specific deferred tax sources. Since many companies with an inadequate disclosure of materially significant deferred tax sources received a positive audit opinion, it is clear that incentives by the auditing profession are quite weak. However, the findings in this paper regarding disclosure adequacy also point to possible shortcomings of IAS 12. In that regard, Kvaal and Nobes [22, p. 242] raise the question as to whether the IAS 12 disclosure requirements are sufficiently explicit and concise to ensure understandable tax disclosures.

Table 5 shows that, in general, stock companies are not more dominant than limited liability companies regarding adequacy of income tax disclosures. On the contrary, in Serbia, adequacy of disclosure 2 is considerably higher in limited liability companies, while adequacy of disclosure 3 is slightly higher in stock companies. In Croatia, adequacy of each disclosure is higher in limited liability companies. Table 6 shows that there is no difference between public stock companies and limited liability companies regarding the disclosure adequacy in Serbia, while in Croatia limited liability companies disclose more adequate information. The hi-square test of independence reveals that the legal form of companies, at the whole sample level, has no statistically significant impact on the adequacy of income

tax disclosure. Namely, no statistical significance ($p > 0.05$ in all three cases) is found for any of the examined disclosures (1, 2 and 3). Furtherly, hi-square tests at the country level show that differences between public stock and limited liability companies are not statistically significant. Accordingly, it cannot be concluded that the disclosures of stock companies are more adequate than the disclosures of limited liability companies or vice versa, both at the whole sample level and the country level. Therefore, the second research hypothesis is rejected.

Reasons for the second research hypothesis rejection can be partially found in low incentives by the capital markets in Serbia and Croatia, since these capital markets cannot be considered as liquid and attractive to an extent that would encourage companies to provide adequate disclosures. Listed companies in Serbia and Croatia are primarily financed by private bank loans rather than public issues of shares or bonds. In addition, the level of detail of financial reporting, imposed by the capital market regulators in Serbia and Croatia, does not differ substantially from the requirements imposed to limited liability companies.

In Serbian companies that report net deferred tax assets, the most frequent source of deferred taxes (in 7 of 17 companies) relates to unused tax credits. This finding is expected since (according to IAS 12) only deferred tax assets may arise from unused tax credits. In companies with net deferred tax liabilities, the most frequent source of deferred tax (in 11 of 37 companies) is non-current assets depreciation. In Croatian companies that present net deferred tax assets, the most frequent source of deferred tax (in 15 of 32 companies) refers to expenses related to long-term provisions, which are recognized in the tax report in the period of payment rather than in the period of their recognition in financial statements. In companies with net deferred tax liabilities, the most frequent source (in 15 of 22 companies) is the revaluation of non-current assets. This finding is consistent with the fact that an increase in the revaluation reserve is subject of income tax, but not at the moment of assets revaluation. We note that some companies in Serbia do not calculate and report long-term provisions and related deferred tax as they claim that such provisions are not of material significance. In addition,

some companies do not report unused tax credits as they do not expect to record taxable income in the foreseeable future, which suggests that the preference of the financial statements preparers for prudence or optimism can affect the predominant source of deferred tax at the company and country level.

Table 7 shows the most frequent sources of deferred tax of companies that adequately disclose deferred tax sources. The depreciation of non-current assets, mentioned in the third hypothesis, is the most frequent source of deferred tax in Serbia, while in Croatia it is not among the three most frequent sources (depreciation is the source of deferred tax only in three cases). This finding can be partly explained by the method of depreciation applied. In Serbia, the linear depreciation method is dominantly used for financial reporting purposes [28], while the diminishing balance method is used for tax purposes in accordance with the Corporate Income Tax Law, so that temporary differences appear. In Croatia, on the other hand, the linear method is dominantly used both for financial reporting [7] and tax purposes (Income Tax Law), so temporary differences do not appear.

Table 7: The most frequent sources of deferred tax assets and deferred tax liabilities

	Deferred tax sources	Number of companies		
		PSC	LLC	Total
Serbia				
1.	Depreciation of non-current assets	9	7	16
2.	Long-term provisions	3	5	8
3.	Unused tax credits	3	4	7
Croatia				
1.	Long-term provisions	2	14	16
2.	Non-current assets revaluation	12	4	16
3.	Impairment of assets	2	9	11

According to Table 7, there are significant differences in the sources of deferred tax between Serbia and Croatia. Long-term provisions are the only source that is among the three most frequent sources in both countries appearing in 24 out of 55 companies disclosing information on deferred tax sources properly. Hence, long-term provisions are the most frequent source of deferred tax assets and liabilities at the sample level. Therefore, the third research hypothesis is rejected. The same conclusion applies to the companies in Croatia. However, for companies in Serbia, the third

hypothesis cannot be rejected, since depreciation is the most common source of deferred tax.

Conclusion

The paper captured 108 companies from Serbia and Croatia in order to examine quality of financial reporting on income tax prescribed by IAS 12. The research in the paper reveals that disclosures on income tax in Serbia and Croatia are only partially adequate. The key reason for such a finding is imprecise disclosure of deferred tax sources by companies. The largest number of companies discloses only the balance sheet items underlying deferred tax, leaving financial statements users to judge (often randomly) the specific reasons. Random judgment on the basis of experience or intuition might be extremely delicate.

Since the capital markets in Serbia and Croatia are not developed enough, public stock companies are not highly motivated to properly disclose information on income tax. Income tax disclosures in Serbia and Croatia are not more adequate in public stock companies compared to limited liability companies. Regarding companies in Croatia, information disclosed by limited liability companies is even more adequate than those disclosed by the stock companies, but the statistical significance of the differences in the disclosure quality is not found.

Due to diversity of national tax systems in Serbia and Croatia, there is a significant difference in deferred tax sources. In Serbia, the dominant source is the non-current assets depreciation, while in Croatia the dominant sources are long-term provisions and non-current assets revaluation. It means that the income tax financial reporting is significantly influenced by national specificities. The research suggests that external auditors, state institutions responsible for financial reporting regulation and professional accountancy associations in Serbia and Croatia should pay more attention to the income tax information disclosed in the notes to financial statements. In this regard, the research results are consistent with plenty of prior research [19], [25], [29], [31], [39], showing a significant room for improving the disclosure practices in the financial statements in Serbia and neighboring countries.

The paper raises a number of issues in the field of income tax financial reporting. The future research in this area should focus on the impact of other factors (such as the origin of equity – domestic or foreign, size and profitability of companies and external auditors' appointment) on the adequacy of income tax financial reporting.

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ANALYSIS OF ACCOUNTANTS' ATTITUDES ON REGULATION USING DATA MINING

Analiza stavova računovođa o regulativi primenom
Data Mining-a

Abstract

The subject of this research is evaluation of legal and international accounting regulations in terms of major deficiencies from the perspective of their users. Identification of the shortcomings of the current accounting regulations is important for improvement of laws governing accounting and audit practices, as they are in the process of public debate in the Republic of Serbia. The research was conducted to provide answers to the following research questions: What are the main deficiencies of regulations as considered by accountants? How do accountants get information on accounting regulations? And are the two research questions related? The targeted population comprises accountants and auditors employed in the private sector. Data collection was carried throughout the period of six months, during which we collected 338 fully completed questionnaires for the purposes of the study. Collected data was analysed using clustering data mining technique. Clustering algorithms enabled segmentation of surveyed accountants into well-separated and homogeneous groups of similar accountants. Analysis of the resulting clusters gave insights into the opinion and stance of accountants who exhibit similar characteristics. These insights form a solid basis for drawing conclusions on deficiencies of accounting regulations perceived by accountants in Serbia, which they are dealing with in day-to-day business.

Keywords: *accounting regulations, financial reporting, opinion, users, quality, information, clustering analysis.*

Sažetak

Predmet istraživanja u radu jeste procena zakonske i međunarodne računovodstvene regulative u pogledu glavnih nedostataka iz perspektive njihovih korisnika. Identifikacija nedostataka aktuelne računovodstvene regulative važna je zbog unapređenja zakona u oblasti računovodstva i revizije, čiji nacrti se u trenutku pisanja ovog rada nalaze na javnoj raspravi u Republici Srbiji. Istraživanje je sprovedeno sa ciljem pružanja odgovora na sledeća istraživačka pitanja: Koji su glavni nedostaci regulative po mišljenju računovođa? Kako se računovođe informišu o računovodstvenoj regulativi? I da li su dva pomenuta istraživačka pitanja povezana? U ovu svrhu, identifikovali smo ciljanu populaciju koja obuhvata računovođe i revizore iz privatnog sektora. Prikupljanje podataka sprovedeno je tokom perioda od šest meseci, nakon kojih su za potrebe istraživanja uzeta u obzir 338 kompletno popunjena upitnika. Prikupljeni podaci analizirani su upotrebom data mining tehnike klasterovanja. Algoritmi za klasterovanje podataka omogućili su segmentaciju anketiranih računovođa u jasno razdvojene i homogene grupe sličnih računovođa. Analiza rezultujućih klastera dala je uvid u mišljenje i stavove sličnih računovođa. Ovi uvidi predstavljaju osnovu za donošenje zaključaka o nedostacima zakonske računovodstvene regulative koje uočavaju računovođe u Srbiji i sa kojima se nose u svakodnevnom poslu.

Ključne reči: *računovodstvena regulativa, finansijsko izveštavanje, mišljenje, korisnici, kvalitet, informacije, analiza klastera.*

Introduction

Financial reporting is a legal obligation of all legal entities in the Republic of Serbia. Bookkeeping and preparing financial reports is a complex process that should be governed by regulations. Depending on the hierarchy and the legislator, the regulatory framework is classified into international, statutory (legislation) and internal accounting regulation. International accounting regulations (IAR) embrace standards, guidelines, interpretations, and a framework adopted by professional accounting organisations. Legislation, i.e., statutory accounting regulations (LAR) include laws and by-laws that directly regulate the field of accounting and auditing in the Republic of Serbia. Depending on the regulations which are used to recognise, evaluate, present and disclose positions in the financial reports and regulations used for bookkeeping, legal entities in the private sector of the Republic of Serbia are divided into the following three groups:

1. Legal entities applying International Financial Reporting Standards (IFRS) as part of IAR;
2. Legal entities applying International Financial Reporting Standard for Small and Medium-Sized Entities as part of IAR;
3. Legal entities applying the by-law issued by the Minister of Finance, titled the Rulebook on the Manner of Recognition, Valuation, Presentation and Disclosure of Positions in Individual Financial Reports of Micro and Other Legal Entities.

The criterion for the application of a particular reporting basis is the size of the legal entity, the parent company issue, as well as the voluntary basis. In addition to the above, all three groups of legal entities are obliged to apply the laws and by-laws in the field of LAR.

Poor legal solutions expose legal entities to additional costs and damage the reputation of the accounting profession. Changes in regulations, such as new bookkeeping account codes, changes to account groups in the chart of accounts, or some terminological changes related to the formulation of balance sheet items, require correction in accounting software, changes in accounting schemes and bring additional costs to legal entities, which usually exceed the benefits of these changes. There is much room for LAR improvement,

which would significantly advance the quality of financial reporting, contribute to greater comparability of financial reports and their easier understanding by users. It would also significantly reduce errors in recording business changes and creating financial reports. High quality of the regulatory framework leads to an improved quality of financial reports, which further increases transparency of the financial position of a reporting entity. It also leads to an increase in investments, reduction of financial risks and overall better economic situation in the country.

When referring to the quality as a feature of financial reports, it is important to emphasise that quality is only relevant from the perspective of users of financial reports, in terms of whether their expectations regarding information needs are met or not. Considering the consequences financial reports have on business decisions, their quality is a matter of public interest. Business decisions are made based on the information provided in financial statements. With respect thereto, poor quality of financial statements can have consequences on business decisions, and the quality of the financial statements can be viewed as a matter of public interest. For these reasons, this issue is a subject of interest in the field of accounting regulations, professional institutions and organisations, authorities, and the scientific literature.

The primary objective of the research presented in this paper is to evaluate the attitudes of accountants as direct beneficiaries of IAR, LAR and financial reporting quality. The secondary objective of the research is to identify current LAR deficiencies in relation to IAR.

The paper is organised as follows. The section following Introduction provides an overview of relevant research conducted in this domain. The next section presents methodology applied to our research, the process of selection and collection of data, as well as the approach to their analysis. The fourth section is the central part of the paper where we present developed models and provide an in-depth analysis of accountants' opinions and attitudes towards IAR, LAR and quality of financial reporting. In this section, and corresponding subsections, we also provide interpretation of identified deficiencies of IAR and LAR. The last section provides conclusions and directions for future work.

Related work

Accounting regulations represent a relatively new research area. Scientific literature overview of accounting regulations has shown that there is a lack of scientific papers on accountants' attitude about their quality in Serbia. Our paper aims to reduce this gap in the scientific literature. Research on accounting regulations in Serbia was not conducted prior to 2014. The research presented in our paper is part of a more comprehensive study that is also the first of this kind in Serbia [16], followed by a research study of the Serbian professional organisation [15]. In the mentioned context, the following papers and studies especially testify to the scientific and professional elaboration of the analysed issue.

The study of the Association of Accountants and Auditors of Serbia [15] created on the basis of the analysis of attitudes of accountants on the existing regulatory framework and the quality of financial reporting, was aimed at examining the actual situation in this field from the perspective of accountants who are greatly informed on current problems. Identification of weak points in the field of adoption of LAR, the application of IAR and the training of accountants was the second goal of the research study. The third goal was to provide a constructive support to regulatory institutions in the process of adopting new LAR. At the end of the study, the following key positions of accountants were observed: poor legal solutions and lack of an updated translation of IAR led to the jeopardized public interest and deterioration in the profession; given the undeniable advantages of IAR application, all reporting entities should be allowed to apply IAR, regardless of the character of their classification by size; finally, specific improvements of LAR in the domain of reporting basis, charts of accounts, delivery deadlines, signing and control of financial reports have been proposed.

At the end of each year, the International Federation of Accountants conducts a research on the challenges faced by small and medium-sized entities around the world. The latest study carried out at the end of 2016 [13] showed that most entities in Europe (47%) stated that their biggest challenge in business was keeping pace with new regulations and standards.

The European Commission [7] conducted a public consultation on the effects of the application of IFRS in the EU in order to seek the opinion of all stakeholders on the Regulation no. 1606/2002 [30]. The Commission supports IFRS as global standards and continues to invite the US Securities and Exchange Commission (SEC) to adopt IFRS to be used by domestic companies. Results showed that most of respondents (86%) think that the application of IFRS in the EU, as the main part of IAR, improved the transparency of companies' financial reports compared to what it was before the mandatory adoption. Most respondents think that the introduction of IFRS contributed to a greater comparability at national, EU and global level (70%, 92%, and 79% respectively) compared to what it was before the mandatory adoption. More than two-thirds of respondents (71%) state that introduction of IFRS improved investor protection through better information and stewardship by management. Around one-third (32%) of respondents believe that IFRS improved investors' protection to a great extent.

In their empirical study, authors of [26] found that accounting standards' convergence increases the comparability of the accounting information of Chinese enterprises with that of IFRS-compliant countries. According to the study presented in [33], accounting standards' convergence and improved accounting information quality can increase the comparability of information, which is affected by the institutional environment of the country wherein the enterprise is located. Authors in [9] provided direct evidence that comparability of accounting information increases the total volume and quality of corporate information and reduces analysts' information acquisition costs. Many other studies found that the comparability of accounting information is one of the features of financial reports and accounting information quality.

Data mining clustering algorithms are often used in research from the accounting domain for various problems. Accounting databases are successfully clustered into homogeneous and well-separated groups of similar transactions, clusters, and the results allowed the authors of [1] to provide comparable information in financial reports. Another task successfully solved by the clustering technique

is discrepancy detection in the field of audit. The authors in [31] examined applicability of clustering for automation of filtering fraudulent activities during an audit. They used cluster analysis to help auditors focus their efforts when evaluating group life insurance claims. A number of papers deal with the issue of assessment of accounting convergence [4], [5], [6], [10], [19], [20], [23], [25], and in some of them the authors deal with the development of new methods, based on underlying concepts of data mining approaches, to measure advances in harmonization [11], [21]. In [21] the authors propose a new method of matching and fuzzy clustering analysis to assess the convergence progress of the latest China's accounting standards (CAS) with IFRS from whole and single standards respectively. To the best of our knowledge, cluster analysis was not used to analyse accountants' opinion on regulations in Serbia in order to identify the aggravating aspects of using LAR and IAR. The research presented in our paper takes into account opinion of accountants on various aspects of LAR and IAR, drawn from the survey, and the results of the clustering analysis enabled us to gain insights on key aspects where accountants are experiencing problems using LAR and IAR in everyday business transactions. Generated insights are also useful from the perspective of harmonisation of LAR with IAR and for identifying ways to improve quality of financial reports and accounting information.

Methodology

The subject of this research is evaluation of LAR and IAR quality in terms of their major deficiencies. An identification of deficiencies of current accounting regulations is important for improving the Law on Accounting and the Law on Auditing of the Republic of Serbia. Numerous discussions and roundtables are underway on this topic, and this paper is a useful scientific basis for substantiating the views of accountants during the public debates. The main objective of the analysis presented in this paper is to examine the opinion of accountants regarding accounting regulatory framework, both international and legal, in order to identify their main drawbacks recognised by accountants, and to assess the opinion of the profession on responsibilities for the quality of financial reporting. Such

analysis is useful because it enables identification of sources of dissatisfaction among accountants and directions for LAR improvement. Therefore, more specific objective of the research could be formulated as two questions. What are the main deficiencies of LAR and IAR as considered by accountants? How do accountants get information on LAR and IAR?

To address these specific objectives, the authors have independently planned and carried out the research in order to collect relevant data [16]. We have opted for a questionnaire as an appropriate approach to the subject of the research. Questionnaire structuring and selection of questions were performed using the Delphi method with ranking [18], while respecting all procedures in iterations as suggested in [12]. The questionnaire contains 33 questions [16]. The answers to the closed-ended questions were created using the Likert scale [8], [14]. The targeted population comprises accountants and auditors employed in the private sector regardless of years of experience. Selection of the statistical sample for our research has been conducted randomly, since each accountant from the population had an equal likelihood of being sampled. Selection of one respondent did not influence selection of other respondents in the sample. Data collection was carried throughout the period of six months. Within this period, we collected 338 fully completed questionnaires. The size of our sample, in terms of its sufficiency, was evaluated according to proposed approach in [28]:

$$N > (50 + 8 * m)$$

where m is the number of independent variables, and N is the sample size. For the purpose of this research, a total of 33 variables were used, and thus $N > (50 + 8 * 33)$, i.e., the sample must be greater than 314 respondents. As we have collected 338 responses, we can conclude that our sample satisfies this prerequisite and that it is statistically significant.

Collected data was analysed using clustering data mining technique. Clustering helps to better understand complex data structures by grouping data in an unsupervised way, and reveals hidden and unique patterns within each cluster, i.e., a group of similar data points or objects [3], [32], [24]. Such grouping of data points ensures that the data grouped into one cluster are closer to each other and

to their “cluster center”, i.e., centroid, than they are to the centers of other clusters. This means that one cluster comprises objects which are the most similar to each other and most different from objects of other clusters. This approach has enabled us to group similar respondents according to expressed attitudes towards deficiencies of LAR and IAR and to better understand differences and underlying patterns in collected data. Among different approaches to clustering, we have selected a partition-based clustering approach which rests on the principle that a cluster should contain at least one object, and that each object must belong to exactly one cluster [17]. This can be defined as k-Means problem, where the number of clusters (k) is defined by the analyst and each k is represented by the so-called centroid. A set of n data points $X \subset R^d$ is given [2]. Centroid is usually the mean of a group of data points and is typically applied to objects in a continuous n -dimensional space [29]. The goal is to choose k centres C and to minimise the potential function, i.e., to minimise the total squared distance between each data point and its closest centre:

$$\phi = \sum_{x \in X} \min_{c \in C} \|x - c\|^2$$

Clustering is implicitly defined by the choice of these centres. One cluster is a collection of data points that are closer to their centre than to any other centre and finding an exact solution to the k-Means problem, even for two clusters, is NP-hard [2]. In our research we deployed k-Means algorithm, as one of the most popular partition-based algorithms, which is also the simplest and fastest solution to k-Means problems [3]. This algorithm starts with arbitrarily chosen k centres $C = \{c_1, c_2, \dots, c_k\}$. Each data point in a dataset is then assigned to the nearest centre, and each centre is recomputed [2]. These steps are repeated until the overall process is stabilised and ϕ is minimised. Determination of the optimal number of clusters is identified as one of the key issues in clustering, since it can introduce a certain amount of subjectivity given the value of k is provided by the analyst. Several approaches are suggested to estimate the ideal number of clusters [3], [17], [22]. For evaluation of optimal number of clusters, we employed the Elbow method where k is the turning point on the graph of k v/s *Avg. distance to centroid* [17], [27].

The objective is to minimise sum of squared distance or the potential function, as explained above.

Results and discussion

As our goal is to assess the opinion of accountants on LAR and IAR, we have developed two different models corresponding to this goal. The first model helped us to evaluate profession's attitudes towards deficiencies of LAR and their opinion on responsibilities towards the quality of financial reporting, while the second model helped us to evaluate profession's opinion on deficiencies of IAR. The first model is presented and discussed in the subsection below, and the second in the next subsection.

Assessment of accountants' opinion on LAR

In assessment of accountants' opinion on main deficiencies of LAR, we have considered the following attributes. The size of the enterprise defines reporting basis which is used in financial reports (see Introduction for more details on this). For this reason we have included the size of the legal entity where respondent is employed (Figure 1: *Size*) in our analysis. The values of this attribute are micro legal entities and medium-sized legal entities using IAR, denoted in Figure 1 as 1 and 2, respectively. Given that among respondents we had accountants, chief financial officers (CFOs), and owners of legal entities, denoted in Figure 1 as 1, 2, and 3 for the attribute Position, respectively, the position of the respondent in a legal entity (Figure 1: *Position*) is taken into account in this analysis. In general, the respondent's position in a legal entity represents an important parameter which can indicate differences in attitudes among various positions that can arise from intensity and frequency of application or use of LAR. Respondents may differ according to the possession of an accountancy qualification (Figure 1: *Accountancy qualification*), with values 1 (yes) and 0 (no). An accountancy qualification defines, however not solely, the level of professional education and intensity of continuous professional education that the respondent has mastered. Respondents with an accountancy qualification may have more information and knowledge, and with respect to that they may have a better understanding

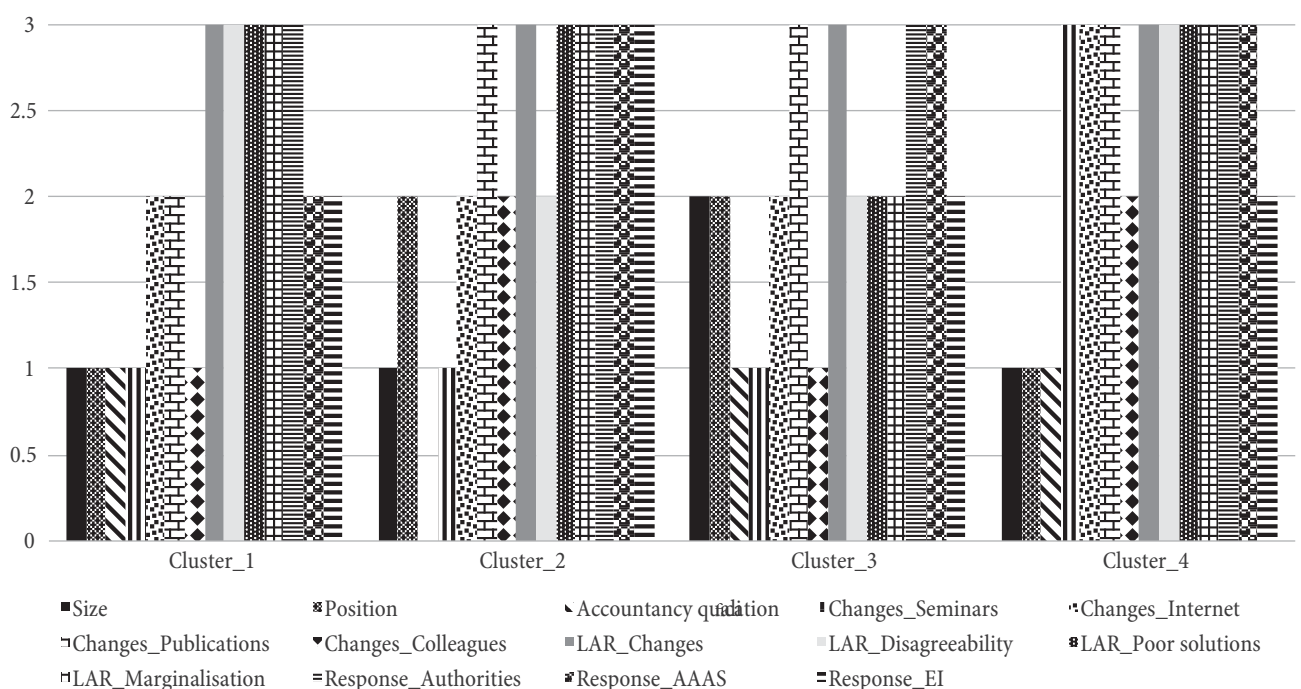
of the reasons for making certain legislative provisions. The main attributes of our analysis are characteristics of LAR and responsibilities for the quality of financial reporting in Serbia. The following characteristics of LAR were assessed by accountants: frequent changes in LAR (Figure 1: *LAR_Changes*), disagreeability of LAR and IAR (Figure 1: *LAR_Disagreeability*), poor LAR solutions (Figure 1: *LAR_Poor solutions*), and marginalisation of the accounting profession (Figure 1: *LAR_Marginalisation*). Respondents evaluated the degree of responsibility for the quality of financial reporting in Serbia of the state and its authorities (Figure 1: *Response_Authorities*), Association of Accountants and Auditors of Serbia (Figure 1: *Response_AAAS*), as well as educational institutions (Figure 1: *Response_EI*). These two key attributes of respondents (accountants) are evaluated on the scale from 0 to 3, as represented in Figure 1, where 0 represents lack of attitude, 1 indicates disagreement, 2 partial agreement, and 3 complete agreement. Although sources of information about changes in regulatory framework fall out of the main scope of our research, we have included these attributes (professional seminars, the internet, professional or printed publications, and colleagues as a potential sources of information) in order to assess whether there are certain links among the main sources of information utilised by

accountants and their perception on deficiencies of LAR. Surveyed accountants evaluated frequency of utilisation of these sources of information on the scale from 0 to 3, as represented in Figure 1, where 0 refers to the source which was never used by respondent, 1 denotes source which is sometimes used, 2 denotes frequent use, and 3 denotes a source which is used on a regular basis. In the modelling phase and according to approach described in the methodology section, we have assessed the optimal number of clusters based on the Elbow method [17], [27], which pointed to the optimum of four clusters. Figure 1 illustrates our optimal model with four clusters and their representative cluster centroids.

Clusters 1 and 4 comprise certified accountants from micro legal entities, while clusters 2 and 3 comprise CFOs, and therefore interpretation of cluster centroids illustrated by Figure 1 will be presented in this order.

Cluster 1 predominantly encompasses accountants with an accountancy qualification, employed in micro legal entities. These accountants often use the internet and professional or printed publications as a source of information on changes in accounting laws and by-laws, while they only occasionally attend professional seminars and consult colleagues to obtain the same information. These accountants strongly criticise LAR in Serbia. In

Figure 1: Visualisation of clusters of accountants according to their opinion on LAR



Source: Authors.

their opinion, LAR is completely characterised by frequent changes in laws and by-laws, non-compliance with IAR, poor legal solutions and marginalisation of accounting profession. While complete agreement on responsibility of authorities for the quality of financial reporting in Serbia is notable within all four clusters of accountants, difference among clusters is observable in their attitude towards responsibility of other institutions. Accountants within Cluster 1 believe that the Association of Accountants and Auditors of Serbia and educational institutions in Serbia are responsible to some extent for the quality of financial reporting in Serbia.

Cluster 4 also encompasses accountants with an accountancy qualification, employed in micro legal entities. However, these accountants differ from accountants in Cluster 1 by stronger criticism and more intensive way of getting informed about changes in accounting laws and by-laws, and they are fully up to date with the mentioned changes. They always attend professional seminars, consult online sources and professional or printed publications, and often consult with colleagues. As is the case with the members of the first cluster, they strongly criticise LAR in Serbia, but in contrast to them, they believe that along with authorities, the Association of Accountants and Auditors of Serbia is equally responsible for the quality of financial reporting, while educational institutions are responsible only to some extent.

Cluster 2 encompasses mainly CFOs employed in micro legal entities. These CFOs use available sources of information on changes in accounting laws and by-laws more intensively than accountants in the first cluster do. Professional or printed publications are always used, while CFOs often consult colleagues and the internet sources. Same as accountants from other clusters, CFOs in Cluster 2 believe that LAR in Serbia is subject to frequent changes. They consider the legislation to be partially inconsistent with the IAR with completely poor legal solutions and complete marginalisation of accounting profession. This is the only cluster whose members deem the authorities, the Association of Accountants and Auditors of Serbia and educational institutions equally responsible for the quality of financial reporting in Serbia.

CFOs with an accountancy qualification who are employed in medium-sized legal entities using IAR are encompassed in Cluster 3. These CFOs obtain information on changes in LAR mostly through professional or printed publications, followed by the internet as the source of information. Compared to other clusters, their attitude towards LAR in Serbia is the most favourable. In addition to frequent changes, these CFOs believe that LAR disagrees only to some extent with IAR. Also, they partially agree that LAR has poor solutions and that accounting profession is marginalised. According to the opinion of CFOs in this cluster, responsibility for the quality of financial reporting mostly falls on authorities and the Association of Accountants and Auditors of Serbia, while educational institutions are just partially responsible.

Based on presented results of our analysis, we can conclude that certified accountants employed in micro legal entities (predominantly bookkeeping agencies) have a much stronger attitude towards LAR than CFOs with an accountancy qualification working in medium-sized legal entities. Accountants from bookkeeping agencies use LAR in the widest and most frequent way on a daily basis, so their opinion on LAR is more relevant than the opinion of CFOs, who mostly use IAR and are not primarily directed to enforce LAR. Respondents who are better versed in LAR have a stronger opinion about LAR than respondents who are not as familiarised with LAR. This is expected, because respondents who have more knowledge about LAR and experience using LAR are more aware of the problems and shortcomings thereof. The findings presented in this section for the case of Serbia comply with the results of the study conducted in EU which indicated that the biggest challenge for EU businesses today is to keep pace with new regulations [13]. Accountants from Serbia experience the same challenge, as corroborated by our research. They have indicated the frequent changes of LAR as one of the greatest shortcomings. Also, our findings confirm the results of the Association of Accountants and Auditors of Serbia's study [15] that poor legal solutions led to the jeopardized public interest and deterioration of accounting profession. Very similar weak points in the field of adoption of LAR were identified, too.

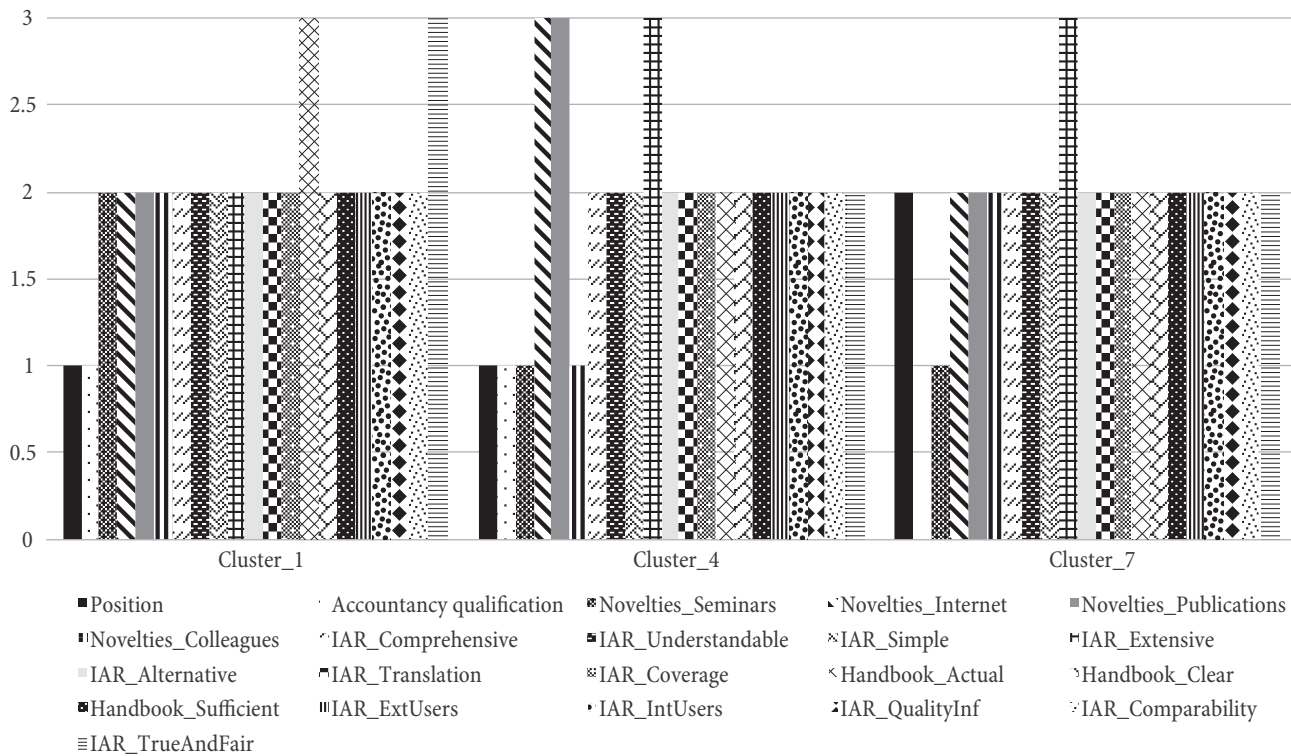
Assessment of accountants' opinion on IAR

The second model is focused on the opinion of accountants on IAR. In order to conduct a comprehensive evaluation of their opinion, our model is based on the following attributes. Respondents in our research are accountants, CFOs, and owners of legal entities. This attribute is denoted in Figure 2 and Figure 3 as *Position* with values 1, 2, and 3, respectively. Also, respondents can have an accountancy qualification (Figure 2 and Figure 3: *Accountancy qualification* value 1) or not (Figure 2 and Figure 3: *Accountancy qualification* value 0). Three main attributes refer to 1) the assessment of the quality of IAR, 2) availability of handbooks for crafting the financial reports based on IAR, and 3) the quality of these financial reports. We observed the quality of IAR through their comprehensiveness (Figure 2 and Figure 3: *IAR_Comprehensive*) – whether they cover transactions from different industries and branches; whether they are understandable or not (Figure 2 and Figure 3: *IAR_Understandable*); simplicity (Figure 2 and Figure 3: *IAR_Simple*); extensiveness (Figure 2 and Figure 3: *IAR_Extensive*); number of alternatives accountants have (Figure 2 and Figure 3: *IAR_Alternative*); how good their translation in Serbian is (Figure 2 and Figure 3: *IAR_Translation*); and their coverage (Figure 2 and Figure 3: *IAR_Coverage*) – whether they cover all aspects and types of financial reporting. Evaluation of availability of handbooks for preparation of financial reports based on IAR was conducted based on their actuality (Figure 2 and Figure 3: *Handbook_Actual*), clarity (Figure 2 and Figure 3: *Handbook_Clear*), and sufficiency (Figure 2 and Figure 3: *Handbook_Sufficient*). The quality of financial reports prepared based on IAR is evaluated according to the following criteria: whether they satisfy the information needs of internal and external users (Figure 2 and Figure 3: *IAR_IntUsers* and *IAR_ExtUsers*), quality of information of reports prepared in such way (Figure 2 and Figure 3: *IAR_QualityInf*), comparability of information (Figure 2 and Figure 3: *IAR_Comparability*), and true and fair view of financial position, business success and cash flows of legal entity (Figure 2 and Figure 3: *IAR_TrueAndFair*). These three attributes were assessed by respondents, accountants, on the scale from 0 to 3, as presented in Figure 2 and Figure 3, where 0 refers to lack of opinion on the

issue, 1 indicates that respondents disagree with the issue, 2 indicates partial agreement, and 3 complete agreement of respondents. Similar to the evaluation of LAR, we took into consideration the sources of information about IAR novelties, professional seminars (Figure 2 and Figure 3: *Novelties_Seminars*), the internet (Figure 2 and Figure 3: *Novelties_Internet*), professional or printed publications (Figure 2 and Figure 3: *Novelties_Publications*), and colleagues (Figure 2 and Figure 3: *Novelties_Colleagues*) as a potential sources of information on IAR. The main motivation for using these attributes was to assess whether there are some links between the informational approach of accountants and the drawbacks of IAR they have emphasised, or difficulties they encounter during IAR use. Respondents evaluated frequency of utilisation of these sources of information on the scale from 0 to 3, as represented in Figure 2 and Figure 3, where 0 refers to the source which was never used by respondent, 1 denotes source which is sometimes used, 2 denotes frequent use, and 3 denotes source which is used on a regular basis. Finding the model with optimal number of clusters was conducted based on the Elbow method [17], [27] as explained in the methodology section. Collected data is optimally grouped into seven clusters. Clusters 1, 4, and 7 exhibit certain similarities, while the same applies for Clusters 2, 3, 5, and 6. Therefore, the interpretation of the resulting model will be presented in this order and visualisation of cluster centroids and their values for each attribute is grouped accordingly and presented in two figures. Figure 2 illustrates Clusters 1, 4, and 7, while Figure 3 illustrates Clusters 2, 3, 5, and 6.

Cluster 1, presented in Figure 2, encompasses accountants with an accountancy qualification who often use all available sources of information on novelties in the domain of IAR. These accountants are not fully satisfied with the quality of IAR and perceive them as partially comprehensive, understandable or clear for use. According to them, IAR is not as extensive nor with many alternatives and it does not cover all necessary aspects of drafting financial reports in Serbia. They consider as a problem an inadequate translation of IAR into Serbian. Handbooks for preparation of financial reports based on IAR and other written materials are completely actual

Figure 2: Visualisation of clusters of accountants according to the opinion on IAR: Clusters 1, 4, and 7



Source: Authors.

and are partially clear and sufficient. Accountants in Cluster 1 consider financial reports prepared under IAR to be of partial quality and to fulfil information needs of external and internal users to some extent, and that they offer partly understandable, relevant and reliable information which are partly internationally comparable. These accountants completely believe that such financial reports reflect financial position of a legal entity truly and fairly, as well as their business success and cash flows.

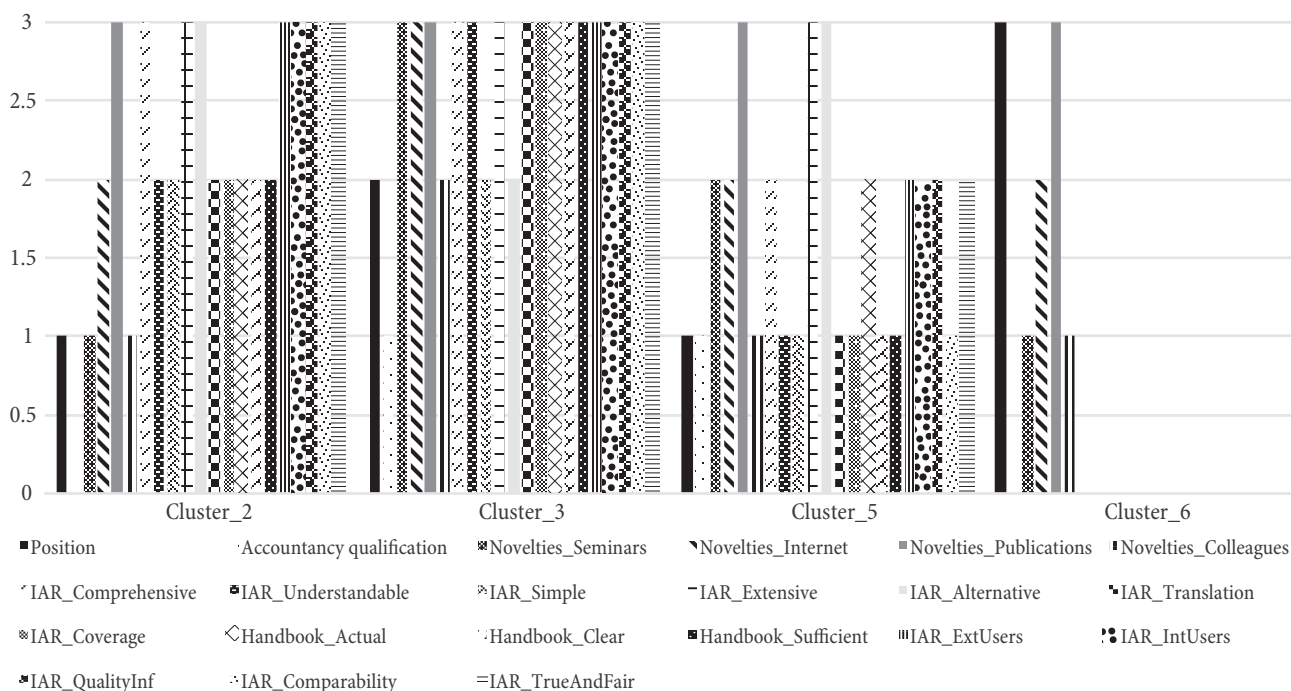
Cluster 4 also comprises accountants with an accountancy qualification who express somewhat different pattern of getting informed on novelties about IAR compared to accountants in Cluster 1. They sometimes attend seminars or consult colleagues, while they always use the internet and professional or printed publications as a source of information. They share most of the attitudes towards the quality of IAR with accountants in Cluster 1. However, we can observe one difference in their stance: accountants in Cluster 4 consider IAR completely extensive. On all other issues, they exhibit partial agreement.

Very similar to accountants in Clusters 1 and 4 are accountants in Cluster 7. They differ on the position of an accountant in a legal entity. Accountants comprised

in Cluster 7 are predominantly CFOs who do not have an accountancy qualification and who only occasionally attend professional seminars. Unlike the first cluster, and in compliance with attitudes of accountants in the fourth cluster, accountants of Cluster 7 consider IAR to be extensive. They also believe that handbooks are partially up-to-date and consider the financial reports prepared under IAR to reflect only to some extent truly and fairly the financial position, business success and cash flows of the legal entity.

Cluster 2 is predominantly comprised of accountants without an accountancy qualification, who always use professional or printed publications to get informed on novelties in the domain of IAR, while they often use internet sources and only occasionally attend professional seminars or consult with colleagues. These accountants believe that IAR is comprehensive, extensive and has many alternatives, while it is partially understandable and easy to use, and partially covers the required aspects of the preparation of financial reports in Serbia. Also, they believe that IAR is not adequately translated into Serbian. These accountants are partially satisfied with the available handbooks for IAR or other written

Figure 3: Visualisation of clusters of accountants according to the opinion on IAR: Clusters 2, 3, 5 and 6



Source: Authors.

materials, while they are fully satisfied with the quality of the IAR-based financial reports (they fully meet the information needs of external and internal users, provide comprehensible, relevant and reliable information that is comparable on international level and they truly and fairly reflect financial position, business success and cash flows of legal entity).

Cluster 3 consists of accountants who agree the most with all the aspects that have been evaluated. These are predominantly CFOs with an accountancy qualification who, unlike other clusters, make maximum use of all available sources of information about IAR news (professional seminars, the internet, professional or printed publications are always used, while colleagues are often consulted). Accountants in Cluster 3 perceive IAR positively. They believe IAR is comprehensive, easy to understand, adequately translated into Serbian, covers all necessary aspects of the preparation of financial reports in Serbia, and to some extent easy to use and provides alternatives. This is the only cluster that reflects attitudes of accountants who are fully satisfied with the available IAR handbooks and other written materials. These accountants share satisfaction with the quality of financial reports prepared under IAR with accountants in Cluster 2. Clusters 2 and 3

are the only two clusters that show complete satisfaction with the quality of such financial reports.

Cluster 5 represents the group of accountants with an accountancy qualification who are most dissatisfied. Their pattern of obtaining information does not differ significantly from other clusters, as they frequently attend professional seminars and frequently use online sources to get informed on novelties in the domain of IAR, always use professional or printed publications and periodically consult colleagues. This group of accountants, similar to others, believe that IAR is only partially comprehensive. However, they criticise all other aspects. According to them, IAR is completely incomprehensible, complicated to apply, comprehensive and with many alternatives, it does not cover all necessary aspects of the preparation of financial reports in Serbia and is inadequately translated into Serbian. Also, accountants of Cluster 5 are dissatisfied with the available handbooks and other written materials for IAR use. They find them only partially topical, vague and insufficient. They also express partial satisfaction with the quality of the financial reports prepared on the basis of IAR as they partly meet the needs of internal and external users, provide partly understandable, relevant and reliable information which are not comparable at the

international level, while to some extent they give a true and fair image of the financial position, performance and cash flows of a legal entity.

Cluster 6 comprises predominantly legal representatives who are somewhat informed about IAR. They only occasionally attend professional seminars and occasionally consult with colleagues, while they frequently use online sources of information on IAR, and always read professional or printed publications. The respondents of Cluster 6 did not express their views on other evaluated aspects due to the fact they do not apply IAR in practice and they are not involved in the preparation of financial reports. Therefore, they do not have an opinion thereon.

Based on presented results of our analysis, we can conclude that the more informed respondents are about IAR novelties, and the more frequently they attend various forms of the continuing professional education (training and seminars), the more satisfied they are with all evaluated aspects of IAR. Usually, this is referred to CFOs with an accountancy qualification who are employed in legal entities that use IAR. As such, they are the most competent to evaluate the analysed aspects of IAR. Our results also confirm the results of the earlier study presented in [15], which found that a major disruption to application and understanding of IAR is outdated translation of IAR. Our results confirm that the comparability of accounting information, achieved by applying IAR, is one of the features of financial reports quality as [26], [33], [9], and many other studies found.

Conclusion

On its path to a full EU membership, the Republic of Serbia must harmonise its accounting legislation with international accounting regulations. The accountants' dissatisfaction with current accounting legislation and the quality of financial reporting is a consequence of non-compliance of legislation with international accounting regulations regarding the six major issues listed below.

- The financial reports' quality control: Directive 2013/34/EU requires the national laws of the Member States to regulate the responsibility for the preparation, presentation and disclosure of financial reports.

The regulation implies the adoption of specific legal provisions that define the responsibilities and obligations of administrative, supervisory and administrative bodies, but also sanctions for their non-compliance. The Serbian Law on Accounting does not prescribe these obligations or sanctions for economic offenses. If there are no sanctions of this kind, the financial reports' quality becomes a constantly threatened category.

- The responsibility for the preparation, presentation and disclosure of financial reports: The responsibility is legally divided between the legal representative, managing authority, the supervisory body of the legal entity and the person in charge of bookkeeping and preparing the financial reports. However, the risk of irresponsibility is greatly magnified by the facts stated in the previous paragraph.
- The content of the mandatory annual financial reports' set: Six mandatory financial reports have been prescribed in the national legislation. The existence of the Statement of Other Comprehensive Income impairs comparability, both internationally (because IFRS does not prescribe this report as a separate report in the mandatory set of financial reports) and nationally - between entities of different sizes.
- The extensiveness of financial reports' forms: The Balance Sheet form contains 156 items, whereas IFRS requires 31 items, while the Income Statement form consists of 92 items, whereas according to IFRS this statement should include 30 items. Therefore, official financial reports from the Republic of Serbia are not comparable with financial reports from countries that apply IFRS. In this case, it is confirmed that having too much information is not always an advantage, but leads to opacity, incomparability and higher costs than benefits.
- Status and position of the accounting profession: The national legislation ignores the profession by stipulating that educational background, work experience and other conditions for a person performing bookkeeping and financial report preparation are regulated by a legal entity in its general act. These conditions are a matter of completely free choice of a legal

entity. The institution of a professional accountant is not mentioned in the legislation. Registration of bookkeeping agencies is similarly (not) regulated. The competence (required knowledge, experience and professional competence) of persons directly working on the preparation of financial reports for the account and on behalf of other legal entities is not legally defined, and thus made irrelevant.

- The Code of Ethics and continuing professional education: Two important segments of international accounting regulations (IAR) without which it is impossible to achieve quality financial reporting - International Code of Ethics for Professional Accountants, including International Independence Standards, and International Education Standards - are unknown to the national legislation (LAR). There is no public demonstration of public interest protection that would reflect the existence of procedures that foresee the possibility of losing the right to pursue the accounting profession and the provision of professional services.

Recommendations for further research are in the direction of repeating the research after the adoption of new laws on accounting and audit in the Republic of Serbia, which is expected in the first half of 2020. This paper is just one of many that has recognised the deficiencies in the national legislation in this field, and it remains a hope that future papers will address the benefits of the new laws rather than their disadvantages.

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FINANCIAL REPORTING PRACTICES OF SERBIAN CORPORATE GROUPS: COMPLIANCE WITH GLOBAL PROFESSIONAL REGULATIONS

Praksa finansijskog izveštavanja korporativnih grupa u Srbiji – usklađenost sa globalnom profesionalnom regulativom

Abstract

In this study, we analyze compliance with global professional regulations on a sample of Serbian joint-stock parent companies, focusing on the selected disclosures in their consolidated financial statements. Providing relevant and transparent information on the corporate group as a whole, consolidated financial statements are proclaimed to be useful information sources for the existing and potential capital providers of parent companies. Conformity with global professional accounting regulations is seen as an important prerequisite of high-quality financial reporting. However, country- and entity-specific factors remain influential, resulting in financial statements of differing features. Lacking intense regulatory and market pressures, the management of Serbian corporate groups appears not to be strongly committed to achieving prime-quality disclosures in consolidated financial statements. We find that the differences in compliance levels of analyzed companies could be explained by the differences in the size of the parent company, its ownership structure, type of auditor and profitability of the group. The results of our research may be useful for investors, corporate managers, regulators and future researchers looking at the quality of consolidated financial reporting.

Keywords: *compliance with accounting regulations, consolidated financial statements, business combinations, IFRS, transparency.*

Sažetak

U ovom istraživanju analiziramo usklađenost sa globalnom profesionalnom regulativom na uzorku matičnih kompanija u Srbiji, organizovanih u formi akcionarskih društava, fokusirajući se na odabrana obelodanjivanja u njihovim konsolidovanim finansijskim izveštajima. Pružajući relevantne i transparentne informacije o korporativnoj grupi kao jedinstvenoj celini, konsolidovani finansijski izveštaji su proklamovani kao koristan izvor informacija za postojeće i potencijalne snabdevače kapitala matičnih društava. Usklađenost sa globalnom profesionalnom računovodstvenom regulativom smatra se važnim preduslovom visokog kvaliteta finansijskog izveštavanja. Ipak, faktori od uticaja na nivou države i izveštajnog entiteta ostaju od značaja, kreirajući finansijske izveštaje različitih karakteristika. U odsustvu jakih regulatornih i tržišnih pritisaka, deluje da rukovodstvo korporativnih grupa u Srbiji nije veoma posvećeno postizanju visokokvalitetnih obelodanjivanja u konsolidovanim finansijskim izveštajima. Mi nalazimo da se razlike u nivou usklađenosti za analizirane kompanije mogu objasniti razlikama u veličini matice, njenoj vlasničkoj strukturi, vrsti revizora i profitabilnosti grupe. Rezultati našeg istraživanja mogu biti od koristi investitorima, korporativnim menadžerima, regulatorima i budućim istraživačima kvaliteta konsolidovanog finansijskog izveštavanja.

Ključne reči: *usklađenost sa računovodstvenom regulativom, konsolidovani finansijski izveštaji, poslovne kombinacije, IFRS, transparentnost.*

Introduction

Increasing the demand of investors, creditors, professional analysts, regulators and other users for transparent and internationally comparable financial reporting, the globalization of capital markets is usually recognized as the main driving force behind the worldwide convergence of professional accounting regulations [13]. Relevant and faithfully represented financial information on reporting entities, which is also universally comparable regardless of the entity's domicile country, is considered to be a valuable means for decreasing informational asymmetries, enabling the users to better evaluate their expected returns from the respective company and to hold the management to account for the company's resources more efficiently. Thus, enhanced quality and transparency of external financial reporting are believed to lower the estimation risks and improve investment decisions of individual users, facilitating the allocation of capital, both locally and globally, and lowering the overall cost of capital for companies [16], [12]. Hence, an efficient financial reporting and disclosure system is considered to be crucial for the development of economically efficient corporations, capital markets and the national economy as a whole [4].

Repeatedly being in the spotlight in the periods of intense financial scandals and crises since the beginning of the 20th century, the matters of quality of financial reporting and usefulness of disclosed information for intended users are still not unequivocally definable and easily attainable in practice. Having a complex and comprehensive infrastructure [22], the quality of disclosed financial information is oftentimes mistakenly attributed to the quality of accounting standards alone, promoting them as an "instant solution" to all of the problems [5]. However, at least as important is the matter of their implementation [13]. Whether the company's management shall use the financial statements as a valuable communication channel, trying to motivate the existing and potential capital providers to invest [28], or not (potentially misusing them for other self-serving purposes), will ultimately depend on its reporting incentives, shaped by the local market and political forces. Research identify the strength of countries' enforcement systems, the development of

capital market, national laws, governance structures and cultural factors as significant country-level determinants of financial reporting features [5], [26], [13], [15]. At the company-level, preparer incentives vary according to the company's listing status, size, ownership concentration, profitability, the issuance of equity or debt, type of auditor (Big 4 vs. Non-big 4), existence of audit committees and industry [13].

Proclaimed as an obligatory financial reporting framework for publicly accountable entities in over 140 national jurisdictions worldwide [23], the International Standards of Financial Reporting (IFRS) imposed themselves as the "gold standard" of quality. Intended to develop a universal financial-accounting "language" for corporate entities across the globe, IFRS are believed to be especially beneficial for transnational groups. Hence, the European Commission introduced the mandatory use of IFRS in the preparation of consolidated financial statements of all publicly traded companies listed in the EU, starting from 2005 [9]. However, after more than a decade has passed, there is still evidence that financial reporting practices and the overall quality of disclosed information continue to differ across Europe [13].

Corporate entities registered in the Republic of Serbia mandatorily file their consolidated financial statements in accordance to IFRS since the Law on Accounting and Auditing came into force in 2002 (the enactment date for banks and other financial institutions was January 1st, 2003; for other legal entities and entrepreneurs, it was January 1st, 2004). Nevertheless, as an economy with an emerging capital market, the country struggles with relatively weak market forces and regulatory infrastructure not strong enough to boost the improvement in the overall quality of financial reporting [35]. According to the research of the World Bank from 2015 [36], economic decision-makers in Serbia generally lack confidence in the reliability of financial statements, and the overall use of disclosed information is not strong enough to create an incentive for corporate entities to invest in the improvement of quality, reliability and transparency of their accounting and auditing. In such circumstances, not perceiving any additional benefits from financial reporting other than legal compliance, reporting entities appear to focus solely on

minimizing the costs of disclosures, altogether producing financial information of disputable quality [36].

Focusing on compliance with the selected required disclosures in consolidated financial statements that are particularly characteristic of the group as a reporting entity, we investigate the financial reporting practices on a sample of Serbian corporate groups. Failing to fully comply with the accounting disclosure requirements in their financial statements, the management withholds potentially valuable information from the capital market [13]. Being either intentional or a consequence of neglect or misinterpretation of the disclosure rules, such practice undoubtedly hinders the usefulness, relevance and transparency of the financial statements, even though they remain formally presented as of “prime IFRS quality”. Aiming to analyze the possible company-level determinants of reporting quality, we explore the effects of parent company size, ownership structure, type of auditor and profitability of the group.

The paper is structured as follows. After the introduction, we briefly highlight the potential benefits of organizing a business as a group of companies, accentuating the significance of corporate groups as market participants and reporting entities, both globally and locally. The next section is a summarized presentation of the features of financial reporting on group’s (and parent’s) performance. The analysis of disclosure compliance in consolidated financial statements of Serbian corporate groups follows. The paper closes with a brief conclusion.

Group structure as a corporate advantage

Organizing a business in the form of a group of centrally managed companies can bring forth numerous potential advantages [32], including commercial, regulatory, legal and tax benefits, as well as the overall mitigation of risk. In general, a parent company can control more businesses, with less capital (not having to purchase the entire capital to obtain control over the targeted entity), diversifying investments across multiple industries and geographical segments. Centralizing the resources of a parent and its subsidiaries under common management can produce valuable synergies, increasing the purchasing and negotiating

power of an economic entity as a whole and enabling better financing terms and overall investment opportunities.

Subsidiaries can be used to ringfence valuable assets of the parent and protect it from liabilities and lawsuits that may arise from specific lines of business, especially when it comes to new ventures. Acquisition of companies is oftentimes seen as a fruitful strategy for diversification into new markets or lines of business. Likewise, the disposal of certain business segments will normally be much easier if they are organized as separate subsidiaries, instead of divisions. Having in mind that subsidiaries are usually safeguarded from possible financial problems of other group members (unless there are mutual guarantees), negative consequences of bankrupt subsidiaries remain localized.

Controlling a group enables the parent to centralize certain assets or functions, making them available to other group members by leasing or licensing, while protecting them from local commercial and financing risks. This is especially beneficial when it comes to special skills and know-how, held by the parent or any other subsidiary, which can be used across the entire group in creating value for shareholders. Inter-company transactions are a well-known tool for managing performance at group level, enabling the parent to exploit the resources it controls, both directly and indirectly, to the fullest. Finally, certain jurisdictions offer attractive tax exemptions and reliefs for groups of companies.

Making the most out of the aforementioned benefits, contemporary corporate groups dominate worldwide economies. According to 2015 data, 69 of the world’s top 100 wealthiest economic entities were corporations, rather than national economies [14]. As stated by the Fortune Global 500¹ list for 2019, nine out of top ten worldwide largest companies as measured by revenue [11] were in fact corporate groups, with parents organized as joint-stock companies. These entities had over 5 million employees in 2019, earning a profit of USD 216,544 million, with total revenues amounting to USD 3,213,475 million, and total assets of USD 3,500,198 million [11].

In the Republic of Serbia, corporate groups are recognized by the Companies Act, and their financial

¹ Annual ranking of top 500 corporations worldwide as measured by revenue, compiled and published by Fortune magazine.

reporting practices are regulated in accordance with the Law on Accounting, the Law on Auditing and the Law on the Capital Market. Business entities organized as groups, managed by parent companies registered in the Republic of Serbia, can be recognized as a significant determinant of the national economy. According to 2018 data, these groups employed 27.5% of the total corporate sector workforce, generating 32.5% of the total revenue and 32.7% of total expenses, while owning 34.8% of total assets and 36.2% of total equity [3]. Figure 1 presents the results of operations, assets and equity of Serbian corporate groups in 2018 and 2017 (latest available data at the moment of the analysis).

Financial reporting on group performance – Accentuating the economic substance

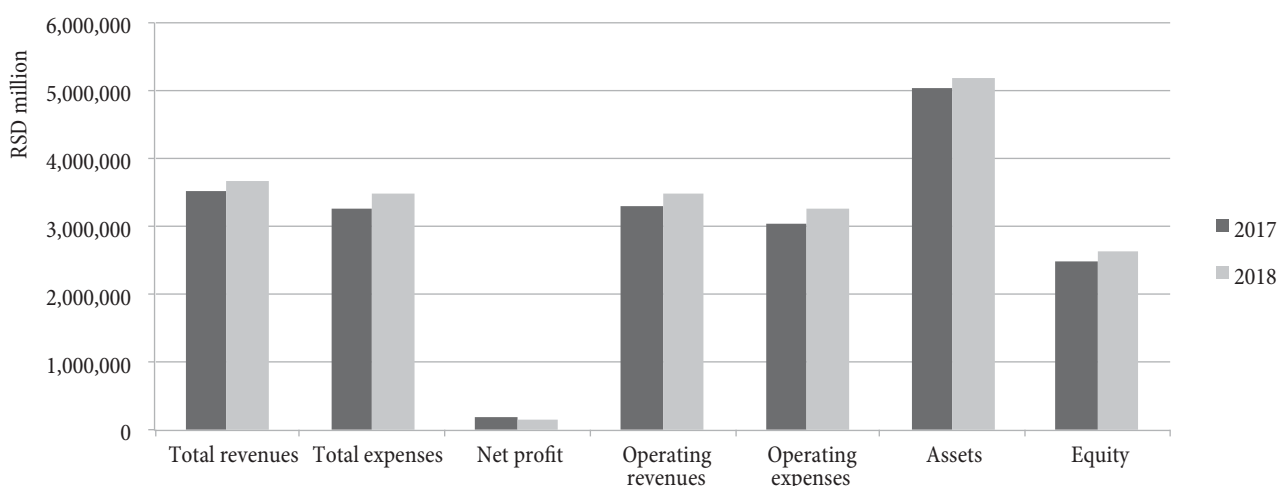
Considering the overall economic power of corporate groups, their international coverage, numerous existing and potential stakeholders, as well as their usually complex hierarchical structures and elusive internal transactions and relations, the importance of transparent financial reporting and disclosure at group level need not be particularly emphasized. Encircling the parent company and all the entities it controls, both directly and indirectly, corporate groups operate as unique economic structures with no legal personality. The mere existence of control, i.e., a parent-subsidiary relationship, becomes the matter of paramount importance in terms of financial reporting, urging the parent to lift the legal veil of its subsidiaries and

report to the public on their consolidated financial position, performance, cash flows and changes in equity, as if they were nothing but divisions of a standalone legal entity. Obligatory for parent companies (with certain exemptions, as stated in [19, par. 4]), consolidated financial statements are proclaimed to be “useful for existing and potential investors, lenders and other creditors of the parent in their assessment of the prospects for future net cash inflows to the parent” [20, par. 3.15]. Meanwhile, separate financial statements of a parent may be optionally required by local regulations, but they can never serve as a substitute for consolidated statements.

Parent company as a standalone reporting entity

The overall objective of external financial reporting can be summarized in the presentation of relevant and faithfully represented financial information on the reporting entity, useful to its existing and potential capital providers, i.e., to their investment decisions related to the respective entity [20]. These decisions usually depend on the users’ perceptions of the amount, timing and uncertainty of future net cash inflows to the relevant reporting entity, and their assessments of management’s stewardship of the entity’s resources [20]. Hence, financial statements are designed to inform about the economic resources of the entity, claims against the entity and their changes during the reporting period, including the financial consequences of the management’s decisions related to deployment of

Figure 1: Results of operations, assets and equity of Serbian corporate groups



Source: Author's illustration based on [3].

entity's economic resources. Seeking to predict, compare and evaluate cash consequences of their economic decisions, users are believed to find such information valuable [2].

However, when it comes to parent companies, setting the boundaries of a reporting entity within the lines of its legal personality has the potential to jeopardize the informational interests of its primary users. Namely, the power of control, as "a valuable right with numerous benefits" [8, p. 27], implies that some of the economic resources controlled by the parent, and some of the cash consequences of its management's decisions are actually located and materialized within other entities, not necessarily recognized as reporting entities in their own right (subsidiaries). Presenting those resources as a single aggregate line item of financial investments in a subsidiary, separate financial statements of a parent inevitably prevent their users from clearly seeing the actual businesses – their resources and related claims – the parent has invested in. Hence, users remain denied of the complete insight into different sources of the parent's income streams [1].

Regardless of the selected accounting method for valuation of investments in subsidiaries [18, par. 10], it is evident that the very focus on the parent as a legal entity suppresses the ability of its separate financial statements to inform the users on the value of its subsidiaries – focusing solely on the parent's share of that value and ignoring possible non-controlling interests. By legally paying (or transferring some other form of compensation) for the proportion of the subsidiary's economic resources equal to its capital share, the parent is able to claim only commensurable amounts of the subsidiary's profit. However, the fact that the parent's management administers the total economic resources of a subsidiary and is responsible for the subsidiary's earned profit in its entirety, makes the complete picture a necessary decision-making prerequisite.

Recognizing profits stemming from investments in subsidiaries only in the amount of their declared dividends attributable to the parent, its separate financial statements will reflect only a portion of the subsidiary's earnings that was actually absorbed by the parent during the reporting period (unless these investments are measured by using the equity method, in which case dividends will be

recognized as a decrease of the investment). This single information is of little value when it comes to evaluation of past performance of the parent's financial investments and assessment of its expected future outlooks. Lacking completeness and persistence, dividends from subsidiaries are not good indicators of the parent's actual earnings, related to the investments in controlled entities [25]. This can be attributed to various factors: the nonbinding legal nature of dividends (the relation between profits earned and dividends declared is not causal by default), the fact that they are usually declared after the reporting period in which the distributable profit was actually earned (becoming a lagging performance indicator), the fact that they are seldom equal to the subsidiary's annual net profit (while their entire profit can be seen as a result of the parent company's management efforts), and the fact that they are susceptible to the effects of transfer pricing.

The power of the parent to direct relevant activities and economic resources across the entire group enables the management to design, initiate or limit the transactions of the parent and its subsidiaries for the sake of achieving "higher" group-level goals. Consequently, separate financial statements of group members become "biased and as such incapable to provide significant information to third parties" [31, p. 12]. Although this quality is usually attributed to financial statements of subsidiaries, it is important to note that it is also true when it comes to the statements of a parent alone, especially if the parent is not a pure holding and engages in commercial activities, as well.

Providing information about the parent's directly owned assets, related liabilities, equity, income and expenses, separate financial statements of the parent can be useful for its existing and potential capital providers, having in mind the usual legal link between their claims against the parent and net assets and earnings of a parent as a standalone legal entity. Namely, dividends declared to the parent's shareholders are generally tied to the amount of net profit of the parent. Likewise, a claim against the parent typically doesn't imply a claim against its subsidiaries, as well. However, this piece of information is considered insufficient to meet the information needs of the parent's users [20]. Namely, separate financial statements of a parent do not enable the users to perceive the net cash inflows

to the subsidiaries, which are a major determinant of subsidiaries' further distributions to the parent, i.e., the total net cash inflows to the parent alone.

Consolidated financial statements – Expanding the borders of a parent company

Considering the aforementioned informational limits of a parent company's separate financial statements, stemming from their focus on the parent as a legal entity, consolidated financial statements emerged as a medium that enables a more complete and transparent presentation of the overall economic power and earnings of the parent company, thereby providing more useful inputs for the assessments of its past performances and the projections of its future outlooks, promising the investors and creditors more reliable estimates and better economic decisions.

Focusing on a group as an economic entity in its own right, consolidated financial statements provide information about its assets, liabilities, equity, income and expenses, treating the parent and its subsidiaries as a single reporting entity. These statements are based on special accounting procedures of aggregating separate line items of the group members' financial records (previously adjusted as necessary to ensure their formal and substantial uniformity), followed by careful eliminations of effects of all undertaken intra-group transactions and events, presenting solely the results a group has earned in transactions with third parties. Although the consolidated result is not usually available for distribution to shareholders of a parent in its entirety (due to legal restrictions and minority interests), it is a maximum amount that can be distributed without compromising the net economic substance of the group. As such, consolidated earnings are considered to be of great importance and of useful value for investment decisions of the existing and potential investors and creditors of a parent company.

Due to the limited scope of this paper, in continuation of this section we shall briefly focus on key informational features of consolidated financial statements, which determine their potential competitive advantages as decision-making inputs for primary users – the presentation of the composition of the group, business combinations and their

financial effects. In the remainder of the paper, we shall examine those features in greater detail on a sample of Serbian corporate groups.

Presentation of group's composition. Lacking the status of a legal entity, corporate groups have reporting boundaries that are somewhat subject to the discretion of their management. Obliging the investor to consolidate all of his subsidiaries, international professional accounting regulations award him the right to determine whether he actually controls the entity he has invested in [19]. Not being able to fully comprehend the relations between a parent and all of his potential subsidiaries, external investors and creditors of the parent company rely upon the veracity of information the management has publicly disclosed, as well as on its choices and estimates in the preparation of consolidated financial statements.

Careful recognition and consolidation of all the entities a parent actually controls, whether directly or indirectly, are the essential preconditions of consolidated financial statements' informational capacity. The usual nonexistence of group-level accounting records, coupled with the resulting reliance of consolidated financial statements on group members' separate financial information, make consolidation perimeter an appealing mean for the managing group's disclosed financial position and performance. In this respect, research warn of managements' tendencies to conceal some of its underperforming subsidiaries, keeping them off-balance sheet [30], [6] and to strategically structure the parent's ownership percentage to avoid consolidation of certain investees [7]. Coming in the spotlight during the global financial crisis of 2007, consequences of such behavior turned out to be extremely serious and far-reaching, resulting in thorough revision of global professional accounting regulations for corporate groups in the following years.

Setting out the definition of control, as a main identifier of the parent-subsidiary relationship, accounting standards underpin the preparation of consolidated financial statements, ensuring the completeness and accuracy of the consolidation perimeter. Prevailing regulations introduce three constituents of control: power over the investee; exposure (or rights) to variable returns from the investor's involvement with the investee and the ability of the investor

to use its power over the investee to affect the amount of his own variable returns [19, par. 7]. Considered more appropriate [7], such principle-based definition of control requires parent companies to consolidate (controlled) entities in which they have variable (both positive and negative) returns, limiting the discretionary power of the management to willingly exclude the loss-making subsidiaries from the consolidation perimeter. Likewise, the focus on the power of the parent to influence his own returns from the investee makes the actual percentage of the parent's ownership less relevant, disabling the management to use it as an excuse for non-consolidation.

In order to enable the users to evaluate the nature of a parent company's interests in its investees, their effects on the parent's overall financial position, past and future performance and cash flows, including the associated risks, the management of the parent company is required to provide detailed and relevant disclosures in its consolidated financial statements. Allowing the users to better understand the structure of the group, its internal relations and transactions and their effects on the parent company, i.e., the amounts, dynamics and risks of their own expected future returns (coming from the investment in the parent company), the following disclosures are considered to be of special importance [17]:

- Significant judgments and assumptions made by the parent's management in determining the existence of control over a subsidiary, including the changes in these judgments and assumptions during the reporting period. This is particularly beneficial for the comprehension of atypical cases, i.e., investees that are not consolidated as subsidiaries even though the parent holds more than half of the voting rights, and subsidiaries that are controlled despite the parent having less than half of the voting rights.
- Information about the composition of the group and related changes during the reporting period, including the consequences of changes in ownership interest in subsidiaries, whether they result in loss of control or not.
- Information about the interest that possible non-controlling interests have in the group's activities and cash flows, including the nature and extent of

significant restrictions on parent's ability to use the group's assets and settle liabilities.

Presentation of business combinations and their financial effects. Attainment of control and the establishment of a parent-subsidiary relationship is probably the single most important event in the life of a corporate group, being not just its cornerstone, but also one of the key mechanisms of its future growth. Reporting on the financial consequences of the acquisition of subsidiaries, consolidated financial statements aim to provide relevant and faithfully represented information on the overall economic strength of the consolidated entity at the moment of the acquisition. This includes the moment of the group's establishment (i.e., when a parent gains control over its first subsidiary, becoming obliged to present consolidated statements), but also any other moment in a group's life when the consolidation perimeter is expanded to include new subsidiaries.

Based on the postulates of the entity theory, financial reporting on a corporate group's performance rests on the belief that by acquiring control over an entity, the parent company actually acquires the rights to the entity's economic resources, including the related claims against that entity and respecting its possible non-controlling interests. Hence, at the acquisition date, a parent shall recognize (in consolidated financial statements) the subsidiary's identifiable assets acquired, liabilities assumed and any non-controlling interests in the subsidiary, including the resulting goodwill (or bargain purchase gain) from the acquisition, measuring them at fair value (with certain exceptions) [21].

Bearing the costs of the acquisition, equaling the fair value of transferred cash or other assets, incurred liabilities, issued equity interests or some other form of consideration, a parent shall recognize the financial effect of the acquisition as goodwill (when the costs of the acquisition exceed the fair value of the subsidiary's recognized net assets, including the assets that become recognizable in the very moment of acquisition) or a gain from a bargain purchase (otherwise). Representing the "future economic benefits arising from other assets acquired in a business combination that are not individually identified and separately recognized" [21], goodwill is undoubtedly a

valuable informational input for the users' decision making. Considering the motives of the parent to pay more than the actual value of acquired net assets, two components of goodwill can be recognized. The first one comprises a going concern value, i.e., the value of the ability of the acquired business to continue its operations in the future (for example, due to its competitive position, established processes, know-how and culture). The other component is the value of various synergies that a parent expects to occur from combining the business of the new subsidiary with the existing operations of other group members.

Trying to understand whether the price paid for the subsidiary was reasonable and whether the acquisition was a success [24], users rely on the quality of goodwill-related disclosures in consolidated financial statements. Better information could improve their ability to assess the overall performance of the group, as well as of the parent alone, in the years following the acquisition, and to hold the parent's management to account for its acquisition-related decisions more effectively. Information which could help the users to improve their understanding of the acquisition's subsequent performance, i.e., how well an acquisition is performing in relation to the management's initial expectations, is considered paramount. However, the prevailing accounting regulations do not specifically require such disclosures. Even so, the obligatory annual goodwill impairment test could provide certain information in this regard. With an objective to ensure that the company's assets are carried at no more than their recoverable amounts, the impairment test still cannot measure goodwill (and its impairment) directly, but in conjunction with other assets it was allocated to (considering the fact that goodwill does not generate independent cash flows).

Analysis of compliance with IFRS-required disclosures in consolidated financial statements of joint-stock parent companies in Serbia

Sample, data collection and research design

Our study is based on a sample of 76 Serbian joint-stock parent companies, mandatorily filing audited consolidated financial statements for 2018 in accordance with local

regulations that stipulate the implementation of the International Financial Reporting Standards (IFRS). These companies make up for 1.39% of the total 667 parent companies registered in the Serbian Business Registers Agency's database for 2018 (the latest available data at the time of the analysis)[3]. However, they controlled 24.84% of the total consolidated assets and generated 22.76% of the total consolidated operating revenue for 2018 [3]. The audited consolidated financial statements of the selected 76 companies for 2018, with the accompanying Notes, were hand-collected from the Serbian Business Registers Agency's public database of financial statements.

As "the most significant organizational form of corporate entities" [27, p. 67] specially designed to accumulate substantial sums of capital via a large number of individually small investments, joint-stock companies have numerous and diversified shareholders. Despite not being the most frequent form of economic entities, joint-stock companies earn the largest amounts of revenue worldwide [11]. Hence, the reliability and transparency of their external financial reporting become matters of the utmost importance. Ensuring the credibility of consolidated financial statements by providing an independent and competent assurance that the financial position and performance of the group are fairly presented, their external audit is deemed mandatory. Having in mind the overall importance of joint-stock parent companies as reporting entities, we consider our research focus to be valid and our sample to be representative.

We analyze the disclosures in consolidated financial statements of the selected companies, including the face of the financial statements and accompanying notes, aiming to investigate their compliance with the prevailing disclosure requirements regarding the following matters:

- Composition of the group and changes in the consolidation perimeter during the reporting period,
- Significant judgments and assumptions used in determining control,
- Sources of the parent's control over subsidiaries,
- Existence of non-controlling interests and disclosures of their share in a group's activities and cash flows,
- Acquisitions during the reporting period and related disclosures (description of acquisitions, fair value of

the consideration transferred, fair value of acquired net assets, goodwill/bargain purchase gain),

- Goodwill recognition, subsequent impairment and related disclosures (description of goodwill, implementation of the annual impairment test, description of the assumptions used or explanation for the absence of test/impairment) and
- Disclosure of consolidated earnings per share.

Additionally, we examine the frequency of different types of auditors' opinions on the consolidated financial statements for 2018 filed by the companies from the sample, aiming to get a clearer insight into their overall quality. Making an effort to better understand possible determinants of financial reporting quality and compliance with the required disclosures, we further investigate the effects of company-related factors, including the size of the parent company, its ownership structure, type of auditor and profitability of the group.

Results and discussion

The results of the analysis of the disclosure of information that could help the users to better understand the composition of the group, changes in the consolidation perimeter during the reporting period, as well as the parent's sources of control and shares of the group's activities and cash flows attributable to non-controlling interests on a sample of 76 consolidated financial statements for 2018 for the selected parent companies in Serbia are provided in Table 1.

The overall impression is that the management of Serbian parent companies does not seem to perceive or use consolidated financial statements as a communication channel with external shareholders. Namely, even the elementary requirement to disclose the composition of the group is not met in 2.63% of the cases. The quality of disclosures regarding the changes in the structure of the group could be improved in terms of clarity and completeness, having in mind that in 42.11% of the analyzed consolidated statements it is impossible to discern whether such changes have occurred or not and what their financial consequences were. Especially worrying is the finding that almost 65% of parent companies do not publish any information on the judgments and assumptions that were used in determining the existence of control over subsidiaries. According to available disclosures, the majority of ownership (i.e., voting rights) is the prevailing source of control in Serbian companies. Hence, it is possible that the management finds the disclosures on the sources of control redundant. Less than half of the analyzed groups have non-controlling interests, but only one third of them discloses additional information in this regard. Even though a negligible number of groups had new acquisitions during the analyzed period, it is very promising that all of them provided necessary disclosures regarding the fair values of transferred consideration, acquired net assets and the resulted goodwill, including the additional descriptions on the nature of the acquisitions and the assumptions and estimates used.

Table 1: Disclosures on the composition of the group and scope of consolidation in consolidated financial statements

Disclosures in notes to consolidated financial statements	Disclosed		Not disclosed	
	n	%	n	%
The composition of the group	74	97.37%	2	2.63%
Changes in the composition of the group in the reporting period	44	57.89%	32	42.11%
Significant judgments and assumptions used in determining control	27	35.53%	49	64.47%
Majority of ownership is the primary element of control	63	82.89%	13	17.11%
Group has noncontrolling interests	31	40.79%	45	59.21%
For the subsample of groups with noncontrolling interests:				
The interest that noncontrolling interests have in the group's activities and cash flows	9	29.03%	22	70.97%
Group had new acquisitions during the reporting period	3	3.95%	73	96.05%
For the subsample of groups with acquisitions:				
Description of acquisitions	3	100.00%	0	0.00%
Fair value of the consideration transferred	3	100.00%	0	0.00%
Fair value of acquired net assets	3	100.00%	0	0.00%

Source: Author's calculation.

When it comes to financial effects of previous acquisitions, only 15.79% of the analyzed groups recognize goodwill in their consolidated financial statements. Reaching a similar finding on a different sample of Serbian parent companies, Spasić [33] concludes that high costs and complexity of the allocation of purchase price discourage the management to recognize goodwill. Additionally, we must also bear in mind that the selected groups may have been operating for a long time without new acquisitions, in which case they would have probably already fully impaired possible goodwill in their consolidated statements. In the subsample of companies that recognize goodwill, one third doesn't provide any additional disclosures in the accompanying notes. The recognition of impairment losses occurs in 33.33% of the cases, which is similar to the European average of 36%, according to the research of the European Securities and Markets Authority (ESMA) [10, par. 32]. However, only 25% of the companies that recognize goodwill provide additional valuable information regarding the annual impairment test. The results of the analysis of the disclosure of information on the subsequent measurement of goodwill on a sample of 76 consolidated financial statements in the Republic of Serbia for the analyzed period are presented in Table 2.

Providing an independent and competent assurance that consolidated financial statements give a true and fair view of the financial position and performance of the group, in accordance with the prevailing accounting regulations and policies, the auditor's opinion can serve as a preliminary indicator of their overall quality, awarding the management's statements and estimates in the financial reports much needed credibility. Signaling that either the financial statement contains substantially significant errors and omissions, or that the auditor could not obtain

sufficient evidence to be able to express an opinion, a modified auditor's opinion is normally considered to be alarming. The expectedly undermined trust of the existing and potential capital providers could result in limiting the availability of financing sources and raising its costs for the company, making the modified auditor's opinions a serious matter in developed countries. However, when it comes to emerging economies such as Serbia, where market forces and regulatory mechanisms are usually not strong enough to sanction the inadequate quality of financial reporting, the frequency of modified auditors' opinions is not low [35]. Our research shows that 43.42% of the analyzed consolidated financial statements for 2018 had modified auditor's opinion (the frequency of different types of auditors' opinions is provided in Table 3). Investigating a sample of Serbian listed companies for the 2015-2017 period, Vučković Milutinović finds an average proportion of modified auditors' opinions of 30.4%, with a peak of 42.4% in 2016 [35].

Aiming to comprehend the effects of company-specific factors on the management's tendency toward transparent and complete disclosures in consolidated financial statements, we further investigate the differences in disclosure compliance of the selected companies according to the size of the parent, ownership structure and type of auditor. Findings are presented in Table 4.

Table 3: Types of auditors' opinions on consolidated financial statements

Type of auditors' opinions	n	%
Unqualified opinion	43	56.58%
Qualified opinion	21	27.63%
Disclaimer of opinion	10	13.16%
Adverse opinion	2	2.63%

Source: Author's calculation.

Table 2: Recognition of goodwill and goodwill impairment and relevant disclosures in consolidated financial statements

Disclosures in consolidated financial statements and accompanying notes	Disclosed		Not disclosed	
	n	%	n	%
Group recognizes goodwill in the consolidated balance sheet	12	15.79%	64	84.21%
For the subsample of groups recognizing goodwill:				
Description of goodwill	8	66.67%	4	33.33%
Annual goodwill impairment recognized	4	33.33%	8	66.67%
Description of annual goodwill impairment test – Assumptions used or reasons for the absence of implementation	3	25.00%	9	75.00%

Source: Author's calculation.

Size. Disclosure costs, public scrutiny and political pressures create a positive association between the size of the reporting entity and compliance with accounting requirements, making high-quality financial reporting more easily attainable and more important for large-sized companies [13]. The dominant share of large enterprises in total assets, revenues, number of employees and the creation of value, as well as their possibility of attracting high amounts of capital and undertaking projects unavailable for small-sized companies, make the large-sized public corporate entities crucial in the emerging economies [29]. Hence, the quality of their financial reporting becomes a

matter of paramount importance. Figure 2 presents the total assets and total revenues of the sampled parent companies according to size. Classification of parent companies by size was carried out in accordance with the prevailing provisions of the Serbian Law on Accounting, i.e., by using the data from their separate financial statements.

Our findings speak in favor of the company size as a determinant of compliance with international standards. Namely, the frequency of unqualified auditors' opinions increases with the size of the parent company. The same is valid for the disclosure of consolidated earnings per share (EPS), leading to a conclusion that large-sized

Table 4: Possible determinants of disclosure in consolidated financial statements

Disclosures in consolidated financial statements and accompanying notes	Size of the parent						Ownership of the parent				Type of auditor			
	Micro and small (27)		Medium (19)		Large (30)		Dispersed (18)		Concentrated (58)		Big4 (13)		Other (63)	
	n	% of subsample	n	% of subsample	n	% of subsample	n	% of subsample	n	% of subsample	n	% of subsample	n	% of subsample
Disclosures on the composition of the group	27	100.00%	18	94.74%	29	96.67%	17	94.44%	57	98.28%	13	100.00%	61	96.83%
Disclosures on the changes in the composition of the group in the reporting period	14	51.85%	13	68.42%	17	56.67%	9	50.00%	35	60.34%	10	76.92%	34	53.97%
Disclosures on the significant judgments and assumptions used in determining control	5	18.52%	10	52.63%	12	40.00%	6	33.33%	21	36.21%	8	61.54%	19	30.16%
Majority of ownership is the primary element of control over subsidiaries	23	85.19%	16	84.21%	24	80.00%	16	88.89%	47	81.03%	11	84.62%	52	82.54%
Group has non-controlling interests	8	29.63%	8	42.11%	15	50.00%	5	27.78%	26	44.83%	11	84.62%	20	31.75%
<i>Disclosures on the interest that non-controlling interests have in the group's activities and cash flows</i>	0	0.00%	2	25.00%	7	46.67%	2	40.00%	7	26.92%	5	45.45%	4	20.00%
Group had new acquisitions during the reporting period	0	0.00%	0	0.00%	3	10.00%	0	0.00%	3	5.17%	2	15.38%	1	1.59%
<i>Description of acquisitions</i>	-	-	-	-	3	100.00%	-	-	3	100.00%	2	100.00%	1	100.00%
<i>Disclosures on the fair value of the consideration transferred</i>	-	-	-	-	3	100.00%	-	-	3	100.00%	2	100.00%	1	100.00%
<i>Disclosures on the fair value of acquired net assets</i>	-	-	-	-	3	100.00%	-	-	3	100.00%	2	100.00%	1	100.00%
Group recognizes goodwill	2	7.41%	4	21.05%	6	20.00%	2	11.11%	10	17.24%	4	30.77%	8	12.70%
<i>Description of goodwill</i>	2	100.00%	2	50.00%	4	66.67%	1	50.00%	6	60.00%	3	75.00%	5	62.50%
<i>Annual goodwill impairment recognized</i>	0	0.00%	1	25.00%	3	50.00%	0	0.00%	4	40.00%	2	50.00%	2	25.00%
<i>Description of annual goodwill impairment test – Assumptions used or reasons for the absence of implementation</i>	0	0.00%	0	0.00%	3	50.00%	0	0.00%	3	30.00%	2	50.00%	1	12.50%
Unqualified opinion	12	44.44%	10	52.63%	21	70.00%	8	44.44%	35	60.34%	11	84.62%	32	50.79%
Qualified opinion	10	37.04%	5	26.32%	6	20.00%	7	38.89%	14	24.14%	2	15.38%	19	30.16%
Disclaimer of opinion	4	14.81%	4	21.05%	2	6.67%	3	16.67%	7	12.07%	0	0.00%	10	15.87%
Adverse opinion	1	3.70%	0	0.00%	1	3.33%	0	0.00%	2	3.45%	0	0.00%	2	3.17%
Disclosure of consolidated EPS	2	7.41%	7	36.84%	12	40.00%	3	16.67%	18	31.03%	8	61.54%	13	20.63%

Source: Author's calculation.

companies possibly have more awareness of the consolidated statements as a communication channel with the existing and potential capital providers. As opposed to micro and small parent companies, the larger ones generally show higher levels of compliance, except when it comes to disclosures of the group's composition and the description of previously acquired goodwill. Similar conclusions can be found in the research of Spasić and Denčić-Mihajlov, who find a difference in the transparency of disclosures between large and small companies listed in the Serbian regulated market [34].

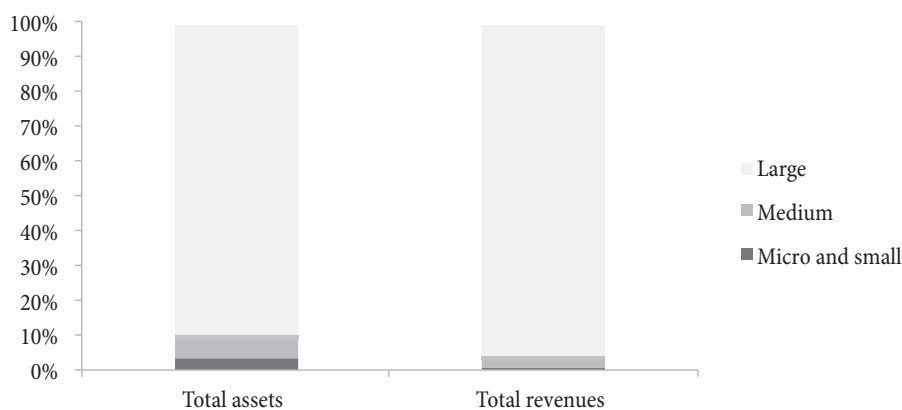
Ownership. Investors of companies with widely dispersed ownership usually lack the power and economically reasonable incentives to be able to monitor the management. Hence, such companies generally tend to adopt the policy of increased transparency in their financial statements, trying to overcome the agency problems and reduce information asymmetries. On the other hand, the majority owner is expected to be able to actively monitor and direct the management's decisions, and to have private access to all the necessary information. Accordingly, such closely-held companies may have little interest in disclosure. Glaum, Schmidt, Street and Vogel find that the level of compliance is the highest in companies with a moderate level of ownership concentration [13]. Our findings suggest that parent companies with concentrated ownership show better compliance levels when it comes to the analyzed disclosure requirements in consolidated financial statements. The fact that these companies also have a significantly higher frequency of the Big4 auditors than the companies with dispersed ownership (20.69%

as opposed to 5.56%) may have been relevant, as well. Analyzing further the effects of the type of the majority owner (state, domestic natural person, domestic legal entity, foreign legal entity) we find that parent companies that are majority-owned by foreign legal entities achieve the highest levels of compliance in terms of the analyzed disclosure requirements (these findings are not tabulated). Hence, it is possible that good financial reporting practices of foreign corporate owners have been translated onto their Serbian companies.

Type of auditor. The reputation of the auditor is usually considered as an additional "guarantee" of the financial statements' quality. Having in mind their size and international presence, the Big4 audit firms have particularly strong interests in preserving their credibility. They also have more available resources to invest in high-quality audit and are less dependent on individual clients compared to smaller-sized and local auditors. Hence, generally there is a positive association between the type of auditor and the perceived quality of audited financial statements [13]. However, we must also bear in mind that some of the greatest international financial scandals involved companies with prestigious auditors and unqualified opinions (a well-known example is Enron; see more in [28]).

Our findings confirm the expected relationship. Namely, corporate groups with Big 4 auditors showed higher levels of compliance in all categories of the analyzed disclosure requirements. They also exhibited a higher frequency of unqualified opinions on their consolidated financial statements. The proportion of modified auditors' opinions is higher in the subsample of groups with other

Figure 2: Total revenues and total assets of the analyzed parent companies according to size



Source: Author's illustration based on [3].

auditors, which is somewhat unexpected since local auditors are oftentimes associated with “selling of opinions” [36]. However, these results are in line with the analysis of Vučković Milutinović conducted on a different sample of Serbian listed companies [35].

The involvement of Big 4 auditors is generally much lower than it is common in the developed markets (17% of the sampled companies had Big 4 auditors). Vučković Milutinović finds an average proportion of one third Big 4 audits for Serbian listed companies in the 2015-2017 period [35]. This might have been a consequence of the significant number of poor-performance corporate groups in the analyzed sample (42% with net losses), which probably cannot afford a Big 4 auditor. Additionally, Big 4 auditors might also avoid such clients due to avoiding risk [35]. We find that Big 4 auditors are mostly oriented toward large-sized companies (84.62%), companies with concentrated ownership (92.31%) and companies with positive net results (84.61%).

Finally, we wanted to additionally investigate the effect of the profitability on corporate groups’ compliance levels in consolidated financial statements. Having in mind the overall problems in the Serbian economy, much of the corporate entities struggle to keep their businesses going.

In the absence of capital market pressures for high-quality financial reporting, the incentives of the management of the loss-making companies will probably be directed towards cutting all costs that are perceived as non-vital for the company. Those could include the costs of accounting, disclosure and audit. Hence, underperforming corporate groups are expected to show lower levels of compliance and transparency in their financial statements (in the absence of capital market and regulatory pressures). As presented in Table 5, our analysis confirms these expectations.

Conclusion

Reducing asymmetries between the supply and demand for financial information on the corporate entities’ activities and performance, an efficient financial reporting and disclosure system is one of the key mechanisms for building trust in the capital markets. Enabling the users to better evaluate their expected returns from the respective company and to hold the management to account for the company’s resources more efficiently, relevant, faithfully represented and globally comparable financial information on reporting entities are believed to reduce the estimation

Table 5: Profitability of the group as a determinant of disclosure in consolidated financial statements

Disclosures in consolidated financial statements and accompanying notes	Type of the consolidated net result			
	Profit (44)		Loss (32)	
	n	% of subsample	n	% of subsample
Disclosures on the composition of the group	42	95.45%	32	100.00%
Disclosures on the changes in the composition of the group in the reporting period	21	47.73%	6	18.75%
Disclosures on the significant judgments and assumptions used in determining control	30	68.18%	14	43.75%
Majority of ownership is the primary element of control	38	86.36%	25	78.13%
Group has non-controlling interests	17	38.64%	14	43.75%
<i>Disclosures on the interest that non-controlling interests have in the group’s activities and cash flows</i>	7	41.18%	2	14.29%
Group had new acquisitions during the reporting period	3	6.82%	0	0.00%
<i>Description of acquisitions</i>	3	100.00%	-	-
<i>Disclosures on the fair value of the consideration transferred</i>	3	100.00%	-	-
<i>Disclosures on the fair value of acquired net assets</i>	3	100.00%	-	-
Group recognizes goodwill	9	20.45%	3	9.38%
<i>Description of goodwill</i>	6	66.67%	2	66.67%
<i>Annual goodwill impairment recognized</i>	4	44.44%	0	0.00%
<i>Description of annual goodwill impairment test – Assumptions used or reasons for the absence of implementation</i>	3	33.33%	0	0.00%
Unqualified opinion	34	77.27%	9	28.13%
Qualified opinion	7	15.91%	14	43.75%
Disclaimer of opinion	3	6.82%	7	21.88%
Adverse opinion	0	0.00%	2	6.25%
Disclosure of consolidated EPS	17	38.64%	4	12.50%

Source: Author’s calculation.

risks and improve investment decisions of individual users, lowering the overall cost of capital, facilitating its allocation and driving the development of the economy as a whole.

Dominating economies and capital markets worldwide, corporate groups become reporting entities of special importance. Having in mind their overall economic power, international coverage, numerous stakeholders, complex hierarchical structures and elusive internal transactions and relations, the importance of transparent financial reporting and disclosure at the group level need not be particularly emphasized.

Being one of the pillars of the financial reporting system's quality infrastructure, high-quality standards of financial reporting are important, but not sufficient guarantees of the veracity and transparency of a company's disclosed financial information. Equally important are the numerous factors that shape the management's incentives for providing relevant and user-oriented financial statements.

Our study examines compliance on a sample of Serbian joint-stock parent companies mandatorily preparing their consolidated financial statements in accordance with IFRS. We focus on the disclosures we believe to be the key informational advantages of consolidated financial statements as decision-making inputs for the existing and potential capital providers of parent companies. Namely, we examine the compliance with the IFRS-required disclosures regarding the structure of the group and its changes during the reporting period, as well as financial effects of previous and new acquisitions. Despite introducing IFRS as a "gold standard" of high-quality financial reporting, Serbia is still struggling with weaknesses in regulatory mechanisms and a lack of activity in the capital market. In the absence of strong market and regulatory pressures, the quality of financial reporting is expected to deteriorate.

Our overall impression is that the management of Serbian parent companies does not seem to use the consolidated financial statements as a communication channel with the existing and potential capital providers of the parent. Our in-depth analysis confirms the effects of company-specific factors on compliance levels, including the size of the parent company, its ownership structure, type of auditor and profitability of the group. We believe that increasing the clarity and completeness of the provided

disclosures could help the users to better understand the expected amounts, dynamics and uncertainties of the parent company's different income streams. Being more informed, investors and creditors are expected to be more willing to invest, adjusting their required returns downwards with the decrease of the entity-specific estimation risks. Restoring confidence in the capital market, improved disclosures in financial statements could prove beneficial for renewing investments, market activity and the economy as a whole.

We believe our study has informational benefits for various capital market participants, raising awareness on the importance of relevance and veracity of the reporting entities' disclosed financial information. The existing and potential capital providers, as primary users of financial statements, could be reminded of the need to evaluate the quality of financial statements prior to making any final investment-related decisions. The company's management could be motivated to enhance its compliance levels and financial reporting transparency, seeking to attain new financial resources at acceptable terms. Finally, regulatory authorities could be alerted of the importance of building effective and working enforcement mechanisms that will translate IFRS standards into financial statements of desirable qualities for their intended users.

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FRAUD PREVENTION MEASURES IN SERBIAN SMALL AND MEDIUM-SIZED ENTERPRISES: EXISTENCE AND EFFECTIVENESS

Mere za sprečavanje prevara u malim i srednjim
preduzećima u Republici Srbiji – prisustvo i efikasnost

Abstract

The aim of this paper is to examine the influence of enterprise characteristics on the degree of application of fraud prevention measures. In addition, this paper is supposed to show whether respondents' characteristics affect their opinion about the effectiveness of different fraud prevention measures, as well as if there is a difference between the degree of their implementation and respondents' opinion on their effectiveness. The research was conducted in November 2018 and the data were collected using a questionnaire which was taken over to a great extent from N'Guilla Sow, Basiruddin, Mohammad and Zaleha Abdul Rasid [17, pp. 514-517]. Although the non-parametric statistical techniques used showed that there is (1) no influence of enterprise characteristics on the existence of fraud prevention measures and (2) no influence of respondents' characteristics on their opinion about the effectiveness of fraud prevention measures, the median analysis showed that there is some influence. We have also found that there is some difference between the level of existence of the said measures and respondents' opinion about their effectiveness.

Keywords: *fraud, fraud prevention measures, internal control, small and medium-sized enterprises, financial reporting.*

Sažetak

Cilj rada je ispitivanje uticaja karakteristika preduzeća na stepen primene mera za sprečavanje prevara. Osim toga, rad treba da pokaže da li karakteristike ispitanika utiču na mišljenje o efektivnosti različitih mera za sprečavanje prevara, kao i da li postoji razlika između stepena primene mera za sprečavanje prevara i mišljenja ispitanika o njihovoj efektivnosti. Ovo istraživanje je sprovedeno tokom novembra 2018. godine i podaci su prikupljeni putem ankete koja je u velikoj meri preuzeta od N'Guilla Sow, Basiruddin, Mohammad i Zaleha Abdul Rasid [17, pp. 514-517]. Iako su upotrebljene neparametarske statističke tehnike pokazale da (1) ne postoji uticaj karakteristika preduzeća na prisustvo mera za sprečavanje prevara i (2) ne postoji uticaj karakteristika ispitanika na mišljenja o efikasnosti mera za sprečavanje prevara, analiza medijana je pokazala da ipak postoji neki uticaj. Istraživanje je, takođe, ukazalo da postoje razlike između nivoa postojanja mera i mišljenja ispitanika u vezi efektivnosti tih mera za sprečavanje prevara.

Cljučne reči: *prevara, mere za sprečavanje prevara, interna kontrola, mala i srednja preduzeća, finansijsko izveštavanje.*

Introduction

In many countries worldwide, fraud that happened in big enterprises, precisely because of their size and influence on the economy of the entire country, leave a deep mark on the economy of those countries. However, this does not mean that fraud in small and medium-sized enterprises (SMEs) should be neglected or that prevention thereof should be disregarded. Many research studies have shown that fraud committed in SMEs causes less financial loss in comparison to fraud in big enterprises. However, cumulative financial loss caused by fraud in SMEs largely surpasses the financial loss incurred by big enterprises. For these reasons, it is highly important for fraud prevention techniques to be adequately applied in all enterprises, regardless of their size. Furthermore, the significance of analysing fraud prevention measures in SMEs stems from the fact that their importance is “widely discussed, primarily due to a fact that their development is seen as the opportunity to solve key problems that national economies face related to the growth of economic activity, employment and GDP” [16, p. 325].

The subject of this research paper are the data on the existence of fraud prevention measures, as well as respondents’ opinion on the effectiveness of these measures, regardless of whether they are applied in certain SMEs. The aim of this paper is to examine the influence of enterprise characteristics (size and type of activity) on the degree of application of fraud prevention measures. In addition, this paper is supposed to show whether respondents’ characteristics (job position, education and work experience) affect their opinion about the effectiveness of different anti-fraud measures, as well as if there is a difference between the degree of implementation of these measures and the opinion of respondents on their effectiveness. This paper tests the following hypotheses:

- H_1 : There is no difference between the degree of existence of fraud prevention measures and respondents’ opinion about their effectiveness.
- H_2 : Enterprise characteristics will not significantly influence the degree of implementation of fraud prevention measures.

- $H_{2,1}$: The size of an enterprise will not significantly influence the degree of implementation of fraud prevention measures.
- $H_{2,2}$: If enterprises differ in terms of their activity, this will not significantly influence the degree of implementation of fraud prevention measures.
- H_3 : Respondents’ characteristics will not significantly influence their opinion about the effectiveness of the given fraud prevention measures.
 - $H_{3,1}$: The respondent’s position in the enterprise will not significantly influence their opinion about the effectiveness of the given fraud prevention measures.
 - $H_{3,2}$: The respondent’s level of education will not significantly influence their opinion about the effectiveness of the given fraud prevention measures.
 - $H_{3,3}$: The respondent’s work experience will not significantly influence their opinion about the effectiveness of the given fraud prevention measures.

The rest of the paper is organized as follows. The next section addresses the literature review of fraud prevention measures and fraud in small and medium-sized enterprises. The third section describes the research sample and methodology, followed by the results and discussion in the fourth section. The last section contains concluding remarks.

Literature review

Fraud prevention measures

Preventing fraud creates an environment where there is less opportunity for fraud to occur [18, p. 16]. Discovering fraud on time is highly important in order to reduce or completely prevent financial loss that can be caused by the fraud. However, sometimes fraud is discovered too late and financial loss is inevitable. Because of that fraud prevention is crucial if a company wants to eliminate the possibility of fraud in the long run. Preventing fraud means creating business conditions which do not give fraud perpetrators

the possibility for manipulations. Companies used diverse fraud prevention measures to mitigate the risk of fraud in their business. Those measures include internal control, employee background checks, employee training and education on fraud issues, equipping employees with a fraud anonymous reporting system, etc. [5, p. 528], [6, p. 32], [13, p. 402], [21, p. 93].

Fraud discovery and prevention are inevitably connected and together make a fraud prevention system. In order to prevent fraud in financial reports, top management of a company should create a positive control environment. In the interest of doing that, members of the board of directors and audit committee should show adequate attitude towards internal anti-fraud processes and control, which includes expressing high integrity and positive ethical values. This also requires active participation in daily operations of an enterprise and frequent meetings aimed at discussing current activities and business performance. An effective internal control system requires and includes a reliable accounting system, adequate control policies and actions, as well as policies which ensure adequate protection of company assets. It also requires clearly defined accounting and financial reporting policies [23, p. 9].

One of the key elements of fraud prevention is the establishment and adequate organization of internal control. Internal control represents a collection of policies, measures, procedures and actions established by the management with the aim of reasonably ensuring that specific goals of the enterprise will be achieved through daily business activities [15, p. 48]. Practice has shown that enterprises with adequate and well-organized internal control leave minimum possibility for fraud to occur. Obviously, if the integrity of financial reporting is to be assured, internal control should be of high quality [3, p. 342]. Costs of establishing, implementing and creating effective internal control are very high, but benefits of discovering and preventing fraud are far greater. Depending on the role of internal control in the business process, it can be preventive, detective or corrective.

Well-established internal control consists of five interconnected components whose successful integration leads to successful achievement of all company goals. According to the Committee of Sponsoring Organizations

of the Treadway Commission – COSO, internal control components are the following: control environment, risk assessment, control activities, information and communication, and monitoring. Control environment is the basic and starting component of the internal control system and represents the foundation for the development of all the other components. Attitudes, awareness, and activities of the management and all the employees in the company regarding internal control and its significance represent the core element of this component. Risk assessment includes identifying and analysing risks which could negatively influence the achievement of company goals, as well as determining the ways for managing those risks. Control activities are activities of the management and other employees in the company which are conducted in order to ensure that doing business tasks leads to effective achievement of company goals. Information and communication cover the process of identifying, gathering and exchanging information necessary for achieving control goals. Monitoring represents the process of assessment of quality of the internal control performance over time [15, pp. 124-136].

One of the elements of fraud prevention in business is creating a so-called fair business environment in which employees respect ethical principles, management puts company goals above personal ones and employees' work is respected and appreciated. One of the first elements of creating such business environment is hiring honourable people. Practice has shown that constant background checking of employees is an excellent way of control [2, p. 101]. New employees should be checked by means of careful inspection of their biographical data. Inspection can also include searching publicly available databases.

For sensitive positions (for instance, department managers, controllers), hiring an external agency should be considered in order to obtain information about candidate's work experience, education, professional licence, recommendations, criminal records, military service and driver's licence. For highly sensitive positions, it is necessary to take into consideration hiring a private investigator in order to perform a thorough background check [7, p. 70]. Employees in charge of interviewing candidates should be adequately trained. They should not only know which

questions to ask, but also possess the ability to detect ambiguous and inadequate answers. Companies should always communicate with the previous employers and verify the recommendations which they have given for a certain employee. Due to litigation risk, previous employers will not disclose negative information about their former employees. However, they can willingly express a positive attitude about a candidate which can be more informative than just discovering date of employment [23, p. 9]. The second element which contributes to the creation of a fair business environment is creating a positive work environment, which is not possible overnight. The fact is that in certain enterprises there are more people who are ready to commit fraud than in other enterprises. In other words, some enterprises are much more vulnerable to fraud than others. In order for an enterprise to be less vulnerable to fraud, it needs to create a good corporative code of conduct, expecting employees to perform honest work, creating an “open door” system which would enable employees to have undisturbed communication, especially with the top management, and appointing fair and honest people to key positions in the company [7, p. 70].

Constant education of employees about the dangers of fraud largely contributes to fraud prevention because it raises employees' awareness of acceptable and unacceptable behaviour. They should know what to do when they notice someone acting contrary to the company's code of ethics. Training should make employees aware that by reporting manipulative actions they protect not only the company, but their jobs as well. The management should initiate such training, but should also be a role model employees can look up to in terms of what is acceptable. Establishing adequate policy and procedures can help fraud prevention, because if there are procedures which are hard to avoid and manipulate, the possibility of fraud is to a large extent eliminated. Apart from the aforementioned general fraud prevention measures, many companies use a number of other specific prevention measures. Measures which are to be used depend on many factors: size of the company, financial possibilities, personnel training, business characteristics of the company, country of operation, degree of development of the internal control system, legal obligations, etc. Some of the measures include video

surveillance, constant monitoring, judicial proceedings and conducting frequent and unannounced audits [22, p. 186].

Fraud in small and medium-sized enterprises

Fraud scandals do not harm only large companies, but also affect small businesses. According to the Report to the Nations on Occupational Fraud and Abuse [4, pp. 17, 26-27], the median loss incurred by small businesses was estimated at \$147,000, whereas the median loss for large organizations was \$100,000. Besides financial losses, fraud impacts the reputation of SMEs and the confidentiality of their stakeholders (customers, shareholders, creditors, etc.) [17, p. 500]. In addition, fraud represents one of the reasons SMEs fail in their strategic activities and, in extreme cases, it may put the whole company out of business. For instance, an entrepreneur may spot a good business opportunity to launch a new venture and establish their business plan with the assumption that their strategies will be employed smoothly. However, if one fails to take preventive measures against fraud, the business may fail. Finally, when fraud becomes a cost of doing business, it will put SMEs at a competitive disadvantage [1, p. 56]. Small businesses are at greater risk of fraud because they do not have the resources that larger companies have to install sophisticated security devices and elaborate audit and security procedures [10, p. 58]. For example, one of the basic elements for effective internal control is segregation of duties. The problem in small businesses is a limited number of staff. Although hiring additional employees is one clear solution to the problem, it is not always attainable. Some authors [9, p. 32] suggest other possible solutions: rotation of duties, monitoring by the management, hiring third parties to supplement in-house staff and conducting a top-down risk-based analysis.

Small businesses are most vulnerable to two types of fraud from within: asset misappropriation and corruption. Moreover, according to the study which was used in his research, Wells [25, p. 27] points out that the average length of time occupational fraud goes on before being discovered is about 18 months. By recognizing common warning signs or red flags of these schemes early, businesses can reduce or avoid losses. Fraud indicators include: rising

expenses and/or declining revenue, abnormally high inventory shrinkage, unfamiliar vendors or other payees and excessive spending by employees. Moreover, studies have shown that employees who engage in abuse of power at a workplace (e.g. excessive absenteeism, goldbricking, pilfering) are at higher risk to commit fraud [25, p. 28].

Within monitoring, the small business owner should consistently analyse financial statements on a periodic basis, e.g. at end of the month. Even with a limited understanding of accounting, the owner can compare current financial statements to the prior period or to the budget in order to find unusual disparities, i.e. differences from the expected results. The disparities can be reported to the office manager to ensure that accounting is being handled correctly. The owner can also periodically compare current revenues and expenses to the prior period, again looking for disparities, and then investigate and dispute them. Finally, the small business owner should be familiar enough with the accounting software to periodically assess voids, deletions, adjustments, journal entries or other similar transactions that would allow the bookkeeper to commit fraud by covering up (e.g. deleting) transactions [12, p. 64]. The ACFE's global fraud study revealed the following: just 56% of organizations with fewer than 100 employees represented in the survey conducted external audits of their financial statements, compared to 91% of businesses with 100 or more employees; employees received fraud training in just 18.5% of the small organizations in the survey, compared to the share of almost six in 10 larger organizations; management verified financial statements in 43% of the small organizations in the survey, compared to 81% of the larger ones; formal codes of conduct existed in just 50% of organizations with fewer than 100 employees in the survey, compared to 90% of organizations with 100 or more employees [24, p. 39]. Small business owners must be proactive in monitoring the activities of their employees [6, p. 32]. When small businesses and start-up companies experience a fraudulent event, they may be hit disproportionately harder than larger organizations and have more difficulty absorbing the losses. For those companies, a significant fraud incident can harm their reputation, cost innocent employees their jobs, cause personal investments to be lost, and make creditors wary

of helping the victimized business in the future. Despite such threats, many small business executives underestimate their company's fraud risk [8, p. 20].

Research sample and methodology

Target population were SMEs in the Republic of Serbia. The research was conducted using a random sample of 43 respondents, one in each enterprise. Sample structure is shown in Table 1.

Table 1: Sample structure

Variables	Items	Frequency (n = 43)	Percentage
Position	General Manager	6	13.95
	Accounting and Finance Manager	22	51.16
	Other employees	15	34.89
Gender	Female	33	76.74
	Male	10	23.26
Education	Secondary school	3	6.98
	Higher school	6	13.95
	University (undergraduate)	30	69.77
	Other	4	9.30
Experience	Below 5 years	6	13.95
	Between 5 and 10 years	3	6.98
	More than 10 years	34	79.07
Industry	Manufacturing	19	44.19
	Trade	6	13.95
	Services	18	41.86
Size of enterprise	Small	18	41.86
	Medium-sized	25	58.14

Source: Authors' calculations.

The research was conducted in November 2018. The data were collected using a questionnaire, which was taken over from N'Guilla Sow et al. [17, pp. 514-517] to a great extent. The questionnaire was sent to 354 email addresses of randomly selected SMEs, but we received only 43 answers. This means that the response rate is only 12.15%, which is the main limitation of this research. The questionnaire contained four main sections (Appendix A). The first section of the questionnaire covered the respondent's profile (position in the enterprise, gender, education, experience, size and activity of the enterprise in which the respondent is employed). The second section covered 13 questions on the degree of implementation of fraud prevention measures in respondents' enterprises: 6 questions about building a culture of honesty and high ethical standards, 3 questions about evaluating anti-fraud processes and control and 4

questions about developing an appropriate monitoring process. In this regard, 3 variables in the research are the following: (1) average score for building a culture of honesty and high ethical standards, (2) average score for evaluating anti-fraud processes and control and (3) average score for developing an appropriate monitoring process. Respondents' perception of the effectiveness of the anti-fraud measures mentioned in the second section of the questionnaire was the topic of the third section (also 13 questions arranged in 3 groups and 3 variables). The fourth section of the questionnaire was related to the overall effectiveness of fraud prevention measures (3 questions). As in the case of the research of N'Guilla Sow et al. [17, p. 505], respondents provided answers on the basis of a four-point Likert scale. The collected data was processed using the IBM SPSS Statistics 20 and Microsoft Excel. We used the 0.01 and 0.05 significance levels (α) to determine statistical significance.

Before the analysis of the collected data, we tested for the presence of multivariate atypical values. The maximum value of the Mahalanobis distance in the sample was 12.8880 (minimum = 1.6390, mean = 5.8600, standard deviation = 2.6100), and the critical value was $\chi_{26;0,001} = 22.4577$. We concluded that there were no atypical values at the test level $\alpha = 0.001$ in the sample. In this regard, it can be concluded that the condition of multivariate normality was fulfilled. Afterwards, we examined the normality of all variables in all groups (Appendix B). The Shapiro-Wilk statistics was employed because the number of respondents (sample) was below 50. The null statistical hypothesis was that empirical distribution can be approximated to normal distribution. The alternative statistical hypothesis was that empirical distribution cannot be approximated to normal distribution. The area of accepting the null hypothesis was $p \geq \alpha$. The area of rejecting the null hypothesis and accepting the alternative one was $p < \alpha$ [11, p. 53]. The assumptions of normality are accepted in all of the observed groups, with the exception of (1) evaluating anti-fraud processes and control – perceived effectiveness and (2) building a culture of honesty and high ethical standards – higher school. According to these assumptions, statistical techniques for data processing were chosen. Since our data were measured using the ordinal

scale, we used nonparametric tests. In order to test the first hypothesis (H_1), we used the Wilcoxon signed-rank test. For testing of the $H_{2,1}$ and $H_{3,3}$ hypotheses, we used the Mann-Whitney U test, while to test the $H_{2,2}$, $H_{3,1}$ and $H_{3,2}$ hypotheses, we used the Kruskal-Wallis H test.

Results and discussion

Before the hypotheses testing, we analysed the existence of fraud prevention measures in Serbian SMEs. Table 2 shows the median and mode for each question from Section 2 of the questionnaire. The scale used in this section of the questionnaire ranges from 1 (not used at all) to 4 (frequently used).

Table 2: Existence of fraud prevention measures in Serbian SMEs

Existence of fraud prevention measures	Median	Mode
positive workplace environment	4.00	4.00
background checks of employees	3.00	3.00
taking consistent action in response to reported fraud cases	3.00	4.00
ethical tone at the top	3.00	3.00
management's attention to fraud risk	3.00	4.00
code of conduct	3.00	4.00
verification of accounts by professionals	3.00	4.00
regulation enforcement	3.00	3.00
internal control	3.00	3.00
employee involvement (whistle-blowing)	3.00	2.00
fraud risk assessment	2.00	2.00
internal audit	2.00	2.00
fraud awareness training	2.00	2.00

Source: Authors' calculations.

As shown in Table 2, the highest median is present in the case of building a positive workplace environment. This measure also has high mode. Additional analysis shows that 22 (51.16%) respondents opted for 4 and 14 (32.56%) respondents chose 3 in this question (fraud prevention measure). This means that building a positive workplace environment has been used or has frequently been used in 36 (83.72%) enterprises. This measure is also the best ranked one in the research of N'Guilla Sow et al. [17, p. 507]. Nine fraud prevention measures have the median of 3. However, in the case of taking consistent action in response to reported fraud cases, management's attention to fraud risk, code of conduct and verification of accounts by professionals, the most often given answer is

“frequently used” (mode = 4). On the other hand, three fraud prevention measures with the lowest medians and modes are fraud risk assessment, internal audit and fraud awareness training. Besides internal audit and fraud awareness training, the third fraud prevention measure with the lowest score in Malaysian SMEs is verification of accounts by professionals [17, p. 507]. Our findings are also consistent with the research conducted by Laufer [13, p. 401] who pointed out that anti-fraud measures are less present in SMEs than in large enterprises. He explains that larger organizations devote more resources to preventing fraud. Generally, internal control and employees’ involvement (whistle-blowing) also have low scores, because these measures have not been used at all or have rarely been used in 21 (48.84%) and 19 (44.19%) enterprises, respectively. These results are consistent with certain empirical research studies which indicate that the practice of internal control among small businesses is poor or weak [19, p. 214], [9, p. 34]. Kapp and Heslop [12, p. 62] also point out that internal control tends to be less prevalent in small businesses that have fewer employees. However, they indicate that there are a lot of internal control practices that can and should be implemented in SMEs to prevent fraud, even with staffing constraints [12, p. 64].

After the analysis of the existence of fraud prevention measures, we analysed their effectiveness in Serbian SMEs. Table 3 shows the median and mode for each question from Section 3 of the questionnaire. The scale used in this section of the questionnaire ranges from 1 (absolutely ineffective) to 4 (absolutely effective). The list of fraud prevention measures is the same as in Section 2. However, respondents were asked to score how they perceived the effectiveness of those measures in preventing fraud, regardless of their existence in their enterprises.

All fraud prevention measures have the same medians, whereas the mode is the same for twelve measures. Positive workplace environment and ethical tone at the top are measures which are effective or absolutely effective according to the opinion of 36 (83.72%) respondents, whereas code of conduct, taking consistent action in response to reported fraud cases and management’s attention to fraud risk are effective or absolutely effective according to the opinion of 34 (79.07%)

Table 3: Effectiveness of fraud prevention measures in Serbian SMEs

Effectiveness of fraud prevention measures	Median	Mode
positive workplace environment	3.00	3.00
taking consistent action in response to reported fraud cases	3.00	4.00
ethical tone at the top	3.00	3.00
management’s attention to fraud risk	3.00	3.00
code of conduct	3.00	3.00
background checks of employees	3.00	3.00
internal control	3.00	3.00
regulation enforcement	3.00	3.00
verification of accounts by professionals	3.00	3.00
employee involvement (whistle-blowing)	3.00	3.00
fraud risk assessment	3.00	3.00
internal audit	3.00	3.00
fraud awareness training	3.00	3.00

Source: Authors’ calculations.

respondents. In contrast, employee involvement (whistle-blowing), fraud risk assessment, internal audit and fraud awareness training are ineffective or absolutely ineffective measures according respondents’ answers (about 40% of respondents scored them with 1 or 2). As in the case of the previously quoted research of N’Guilla Sow et al. [17, p. 208], the measure of building a positive workplace environment received a high score regarding its existence and perceived effectiveness. However, it is interesting that the effectiveness of ethical tone at the top is highly ranked in Serbian SMEs, while it is next to last in Malaysian SMEs. Furthermore, in Serbian SMEs the effectiveness of internal audit did not get a high score. When it comes to internal audit in Serbian companies, the results are not surprising. Empirical research of Ljubicavljević and Jovanović [14, p. 139] indicates that the level of internal audit in Serbian companies does not correspond with the achieved level of development of that profession in the countries with developed market economies, because the management of most companies in the Republic of Serbia does not recognize the contribution of internal audit to the improvement of business quality and risk management. About 28% of respondents think that internal control is an ineffective or absolutely ineffective fraud prevention measure. It means that SMEs without internal control or without appropriate internal control should consider using new internal control practices or improving the existing ones in order to prevent and detect errors and/or fraud.

Testing the H₁ hypothesis. Comparative analysis of the existence and effectiveness of 13 fraud prevention measures in Serbian SMEs is presented in Figure 1. In the case of only one fraud prevention measure, the existence median is higher than the median of effectiveness (the dark line is above the bright line). The median of existence is equal to the median of effectiveness in nine measures. For three anti-fraud measures, the median of effectiveness is higher than the median of existence (the bright line is above the dark line). Further analysis was performed to determine whether the differences between the medians of responses on existence and effectiveness of 3 variables in the research (average scores for building a culture of honesty and high ethical standards, evaluating anti-fraud processes and control and developing an appropriate monitoring process) are significant or not.

For testing of the H₁ hypothesis, we used the Wilcoxon signed-rank test. The results thereof (Table 4) show that there is no statistically significant difference between (a) the existence and effectiveness of building a culture of honesty and high ethical standards and (b) the existence and effectiveness of developing an appropriate monitoring process. As regards building a culture of honesty and high ethical standards, the median of existence is higher than the median of effectiveness, whereas for developing an appropriate monitoring process the effectiveness median

is higher than the median of existence. However, those differences are not statistically significant. Nevertheless, there is a statistically significant difference between the existence and effectiveness of evaluating anti-fraud processes and control. This means that the effectiveness of evaluating anti-fraud processes and control is higher than its existence in Serbian SMEs, because the median of effectiveness is higher than the median of existence for the said variable. According to the Koens' criteria [20, p. 233], this difference is in the middle ($r = 0.317$).

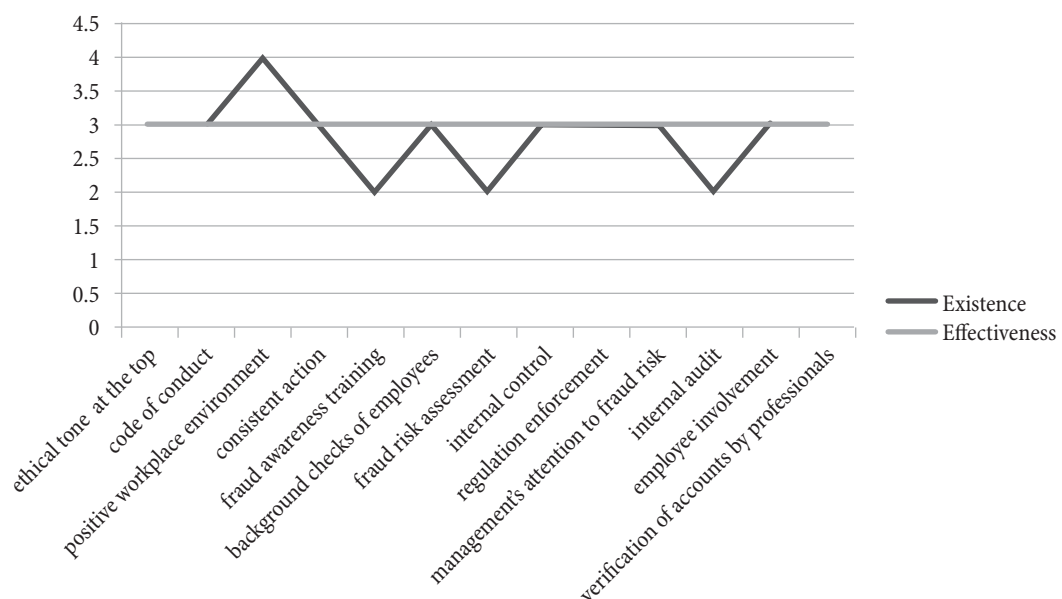
Table 4: Results of the Wilcoxon signed-rank test used for testing the difference between the existence and effectiveness of fraud prevention measures

Fraud prevention measures	Z	Sig.	r	Median of existence	Median of effectiveness
building a culture of honesty and high ethical standards	-0.530	0.596	0.057	3.170	3.000
evaluating anti-fraud processes and control	-2.941	0.003	0.317	2.670	3.000
developing an appropriate monitoring process	-1.687	0.092	0.182	2.750	3.000

Source: Authors' calculations.

Testing the H_{2.1} hypothesis. For testing of the H_{2.1} hypothesis, we used the Mann-Whitney U test. When we examined the influence of company size on the existence of fraud prevention measures in Serbian SMEs, we divided the sample into two groups. The first one included small

Figure 1: Existence vs. effectiveness of fraud prevention measures in Serbian SMEs (medians)



Source: Authors' calculations.

($n_1 = 18$) and the second included medium-sized enterprises ($n_2 = 25$). Table 5 shows the results of the Mann-Whitney U tests after examining whether company size influences the existence of the following fraud prevention measures: building a culture of honesty and high ethical standards, evaluating anti-fraud processes and control and developing an appropriate monitoring process. Furthermore, the results show that there is no significant difference in the existence of these measures between small and medium-sized enterprises. The differences between small and medium-sized enterprises are very small (see r values). However, if we observe the medians for all three variables from the aspect of company size, we can conclude that the medians are higher in medium-sized enterprises than in small ones for (a) evaluating anti-fraud processes and control and (b) developing an appropriate monitoring process. As regards building a culture of honesty and high ethical standards, the medians for small and medium-sized enterprises are equal. Regarding the internal control practice in the Republic of Serbia, as one of the most important fraud prevention measures, we singled out the research of Jovetić et al. [11, pp. 55-56]. They discussed the implementation of control activities from various aspects and found that there was some influence of company size on the implementation of control activities – average scores for some control activities (their existence in enterprises) were higher for medium-sized and large enterprises than for micro and small enterprises.

Testing the $H_{2,2}$ hypothesis. For testing of the $H_{2,2}$ hypothesis, we used the Kruskal-Wallis H test. When we examined the influence of industry on the existence of fraud prevention measures in Serbian SMEs, we divided the sample into three groups. The first group included manufacturing enterprises ($n_1 = 19$), the second included trade enterprises ($n_2 = 6$), while service enterprises ($n_3 =$

18) were in the third. The results of the Kruskal-Wallis H test (Table 6) indicate that there is no significant difference in the existence of anti-fraud measures between manufacturing, trade and service enterprises. If we observe the medians for all three variables from the aspect of industry, we can conclude that the medians are higher in the case of building a culture of honesty and high ethical standards than in the case of the other two variables; the medians are 3.17 (manufacture), 3.42 (trade) and 3.00 (services). Evaluating anti-fraud processes and control and developing an appropriate monitoring process are less applied in enterprises from all industries (medians range from 2.17 to 2.84). It can be assumed that a higher level of implementation of building a culture of honesty and high ethical standards compared with the other two variables is a consequence of obligation of many enterprises to establish an ethical code of conduct. On the other hand, it is much cheaper to establish and implement a culture of honesty and high ethical standards, because in order to establish anti-fraud processes and control and develop an appropriate monitoring process, many enterprises need to create special departments and sectors and employ and train new personnel. Given that the subject of this research are SMEs, lack of funding may be a limiting factor in the process of establishing the said measures. As for building a culture of honesty and high ethical standards and developing an appropriate monitoring process in trade enterprises, the medians are higher than in manufacturing and service enterprises because in trade enterprises there are fewer sectors and communication is better and easier. In that sense, it is easier to establish a culture of honesty and high ethical standards than in manufacturing enterprises. However, when it comes to evaluating anti-fraud processes and control, the medians in manufacturing and service enterprises are higher than

Table 5: Results of the Mann-Whitney U test – company size and existence of fraud prevention measures

Fraud prevention measures	Mann-Whitney U	Z	Sig.	r	Median for small enterprises	Median for medium-sized enterprises
building a culture of honesty and high ethical standards	197.000	-0.692	0.489	0.106	3.170	3.170
evaluating anti-fraud processes and control	186.500	-0.955	0.340	0.146	2.500	2.670
developing an appropriate monitoring process	208.500	-0.408	0.683	0.062	2.630	2.750

Source: Authors' calculations.

in trade enterprises, because in manufacturing enterprises there is a higher degree of control (both internal and external). That is why more attention is paid to evaluating anti-fraud processes and control.

Testing the $H_{3.1}$ hypothesis. For testing of the $H_{3.1}$ hypothesis, we used the Kruskal-Wallis H test. When we examined the influence of respondents' positions on the effectiveness of fraud prevention measures in Serbian SMEs, we divided the sample into three groups. The first group included general managers ($n_1 = 6$), the second included accounting and finance managers ($n_2 = 22$) and the third contained employees working in some other sectors in the enterprise ($n_3 = 15$). The significances obtained from the Kruskal-Wallis H test presented in Table 7 indicate that there is no significant difference in the effectiveness of fraud prevention measures between general managers, accounting and finance managers and employees working in other sectors in the enterprise. However, the medians for general managers with regard to (a) building a culture of honesty and high ethical standards and (b) developing an appropriate monitoring process are higher than those for accounting and finance managers and employees in some other sectors of the enterprise. In this sense, respondents' position influences their opinion about the effectiveness of anti-fraud measures. Unlike general managers, accounting and finance managers and employees working in some other sectors in the enterprise perform

operative tasks on a daily basis and have better insight into the effectiveness of these measures. That may be the reason they pay more attention to it. Better insight into the effectiveness of these measures could be the reason the median is higher for accounting and finance managers than for general managers when it comes to evaluating anti-fraud processes and control.

Testing the $H_{3.2}$ hypothesis. For testing of the $H_{3.2}$ hypothesis, we used the Kruskal-Wallis H test. In order to examine the influence of respondents' education on the effectiveness of fraud prevention measures in Serbian SMEs, we divided the sample into four groups (secondary school – $n_1 = 3$, higher school – $n_2 = 6$, university (undergraduate) – $n_3 = 30$ and other – $n_4 = 4$). The results of the Kruskal Wallis Tests (Table 8) show that education does not influence respondents' opinion about the effectiveness of fraud prevention measures. This means that there is no difference in respondents' opinion about the effectiveness of these measures regardless of their level of education. The median analysis shows that respondents with secondary school highly ranked the effectiveness of anti-fraud measures. There are only three respondents in this category, all of whom have work experience of more than 10 years, have more practical experience and are more aware of the effectiveness of these measures. The medians are also high in the category of other levels of education. In that category, there are several

Table 6: Results of the Kruskal-Wallis H test – industry and existence of fraud prevention measures

Fraud prevention measures	Chi-Square	df	Sig.	Median for manufacturing enterprises	Median for trade enterprises	Median for service enterprises
building a culture of honesty and high ethical standards	0.196	2	0.907	3.170	3.420	3.000
evaluating anti-fraud processes and control	0.565	2	0.754	2.670	2.170	2.840
developing an appropriate monitoring process	0.115	2	0.944	2.750	2.880	2.750

Source: Authors' calculations.

Table 7: Results of the Kruskal-Wallis H test – respondents' job titles and effectiveness of fraud prevention measures

Fraud prevention measures	Chi-Square	df	Sig.	Median for general managers	Median for accounting and finance managers	Median for employees from other sectors
building a culture of honesty and high ethical standards	0.390	2	0.823	3.250	2.920	3.000
evaluating anti-fraud processes and control	0.148	2	0.929	2.840	3.000	2.670
developing an appropriate monitoring process	0.713	2	0.700	3.130	3.000	3.000

Source: Authors' calculations.

respondents who completed master's and PhD studies. This is logical because more educated respondents have more knowledge about the benefits of different fraud prevention techniques.

Testing the $H_{3.3}$ hypothesis. For testing of the $H_{3.3}$ hypothesis, we used the Mann-Whitney U test. When we examined the influence of work experience on the effectiveness of fraud prevention measures in Serbian SMEs, we divided the sample into two groups. The first group included respondents with up to 10 years of experience ($n_1 = 9$), while the second comprised respondents with more than 10 years of work experience ($n_2 = 34$). The significances obtained after conducting the Mann-Whitney U tests (Table 9) show that work experience does not influence respondents' opinion about the effectiveness of fraud prevention measures. We concluded the same by observing the medians for both groups of respondents. This came as a slight surprise because we expected that respondents with more practical experience were more aware of the benefits of different fraud prevention techniques.

Section 4 of the questionnaire consists of 3 questions related to the overall effectiveness of fraud prevention measures. Respondents perceived the effectiveness of building a culture of honesty and high ethical standards, developing appropriate monitoring process and implementing effective internal control system as the same (medians and modes for all three variables amount to 3.00).

Conclusions

The analysis shows that there is no statistically significant difference between the existence and effectiveness of building a culture of honesty and high ethical standards and developing an appropriate monitoring process. However, there is a statistically significant difference between the existence and effectiveness of evaluating anti-fraud processes and control. This means that the first hypothesis (H_1) can be partially accepted and that there is some difference between the existence of anti-fraud measures and respondents' opinion about their effectiveness. In the case of three fraud prevention measures, the median of effectiveness is higher than the existence median, whereas for only one fraud prevention measure the median of existence is higher than the median of effectiveness. The median of existence is equal to that of effectiveness in nine fraud prevention measures.

The analysis of the influence of enterprise characteristics on the existence of fraud prevention measures shows that in that sense there is no significant difference between small and medium-sized enterprises. However, having observed the medians, we have revealed that the medians are higher in medium-sized enterprises than in small ones in the case of evaluating anti-fraud processes and control and developing an appropriate monitoring process. As regards building a culture of honesty and high ethical standards, the medians in small and medium-

Table 8: Results of the Kruskal-Wallis H test – respondents' education and effectiveness of fraud prevention measures

Fraud prevention measures	Chi-Square	df	Sig.	Median for secondary school	Median for higher school	Median for university (undergraduate)	Median for other
building a culture of honesty and high ethical standards	3.338	3	0.342	3.670	2.750	3.000	3.340
evaluating anti-fraud processes and control	3.672	3	0.299	3.670	2.670	3.000	3.340
developing an appropriate monitoring process	1.504	3	0.681	3.750	3.000	3.000	3.250

Source: Authors' calculations.

Table 9: Results of the Mann-Whitney U test – work experience and effectiveness of fraud prevention measures

Fraud prevention measures	Mann-Whitney U	Z	Sig.	r	Median for up to 10 years of experience	Median for more than 10 years of experience
building a culture of honesty and high ethical standards	145.500	-0.226	0.821	0.034	3.00	3.00
evaluating anti-fraud processes and control	149.000	-0.121	0.903	0.018	3.00	3.00
developing an appropriate monitoring process	133.500	-0.588	0.556	0.090	3.00	3.00

Source: Authors' calculations.

sized enterprises are equal. According to the previous results, we have concluded that the $H_{2,1}$ hypothesis can be partially accepted. This is consistent with the research of Jovetić et al. [11, p. 62] who found that the average scores of some control activities (their existence in enterprises) are higher for medium-sized and large enterprises than for micro and small enterprises. We have also found that there is no significant difference between the existence of fraud prevention measures in enterprises from different industries. The analysis of the medians for all three variables from the aspect of industry shows that in the case of building a culture of honesty and high ethical standards, the medians are mostly higher than for the other two variables. Generally, evaluating anti-fraud processes and control and developing an appropriate monitoring process are less applied in enterprises in all industries. We assumed that a higher level of implementation of building a culture of honesty and high ethical standards compared to the other two variables was the consequence of obligation of many enterprises to establish an ethical code of conduct. On the other hand, it is much cheaper to establish and implement a culture of honesty and high ethical standards. Lack of funding in SMEs may be a limiting factor in the process of establishing anti-fraud processes and control and developing an appropriate monitoring process. In the case of building a culture of honesty and high ethical standards and developing an appropriate monitoring process in trade enterprises, the medians are higher than in manufacturing and service enterprises, because in trade enterprises there are fewer sectors and communication is better and easier. However, when it comes to evaluating anti-fraud processes and control, the medians in manufacturing and service enterprises are higher than in trade enterprises, because there is a higher degree of control (both internal and external) in manufacturing enterprises. Accordingly, if enterprises differ in terms of business type, it has some influence on the existence of fraud prevention measures (the $H_{2,2}$ hypothesis can also be partially accepted). Finally, we have concluded that the characteristics of an enterprise (size and industry) have some influence on the existence of fraud prevention measures in Serbian SMEs.

The analysis of the influence of respondents' characteristics on the effectiveness of fraud prevention measures in Serbian SMEs shows that there is no significant difference in the effectiveness of fraud prevention measures between respondents depending on their position in the enterprise. However, additional analysis shows that the medians for general managers in case of (a) building a culture of honesty and high ethical standards and (b) developing an appropriate monitoring process are higher than those for accounting and finance managers and for employees in other sectors of the enterprise. In this sense, we have concluded that the job title of a respondent influences the opinion about the effectiveness of fraud prevention measures and that the $H_{3,1}$ hypothesis can be partially accepted. Unlike general managers, accounting and finance managers and employees working in other sectors of the enterprise perform operative tasks on a daily basis and have better insight into the effectiveness of fraud prevention measures than general managers. That may be the reason they pay more attention to the effectiveness of these measures. Better insight into the effectiveness of fraud prevention measures could be the reason the median is higher for accounting and finance managers than for general managers when it comes to evaluating anti-fraud processes and control. We have also found that there is no difference in opinion about the effectiveness of fraud prevention measures between respondents with different levels of education. However, the median analysis shows that respondents with secondary school (because of more than 10 years of work experience) and respondents who had completed master's and PhD studies (because they are better educated) ranked the effectiveness of fraud prevention measures higher than respondents with higher school and university (undergraduate). In this sense, $H_{3,2}$ can be partially accepted. Having tested the $H_{3,3}$ hypothesis, we have found that work experience does not significantly influence respondents' opinion about the effectiveness of fraud prevention measures. The analysis of medians also shows that there is no difference between respondents with more than 10 years of work experience and those with up to 10 years of experience. This means that the $H_{3,3}$ hypothesis can be accepted. This conclusion is slightly surprising, because we expected that respondents

with more practical experience were more aware of the benefits of different fraud prevention techniques. In accordance with the previous results, we have concluded that respondents' characteristics (job title and level of education) have some influence on their opinion about the effectiveness of fraud prevention measures in Serbian SMEs, unlike their work experience.

The main limitation of this research is the sample size. The willingness of target respondents to take part in the analysis was very low and collection of data through the questionnaire required large effort on the authors' side. Further research should be conducted so as to include more SMEs in the sample. Furthermore, it will be useful to include large enterprises into the analysis in order to compare fraud prevention measures in large enterprises and SMEs, not only in the Republic of Serbia, but in other countries as well. Closed-type questions in the questionnaire require a high level of estimation by respondents, especially for questions about their opinion on the effectiveness of fraud prevention measures. No questionnaire can cover all relevant segments of fraud prevention measures. In future, researchers should consider using some other data collection techniques (for example, observation and interviewing).

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THE STRUCTURAL CHANGES OF THE SERBIAN MERCHANDISE TRADE DURING TRANSITION PROCESS: COMPARATIVE ANALYSIS OF MAIN TRADE INDICATORS

Strukturne promene u srpskoj spoljnotrgovinskoj razmeni tokom tranzicionog perioda – komparativna analiza bitnih pokazatelja razmene

Abstract

The article discusses the structural changes in exports and imports during the transition process in Serbia. To address this issue, we calculated several indicators of the Serbian merchandise trade in the 2000-2018 period. After having computed the absolute growth of export and import and the values of intra-industry trade indices in the period under review, we compared the similarity of the export structure of Serbia and the import structure of the EU, which was used as a referent structure. To detect possible quality improvement of the Serbian trade sector, we analyzed qualitative changes of Serbia's exports (imports), through tendencies of goods at higher levels of processing, using more classifications, as such possible improvement would create important conditions for a sustainable and stronger export growth. After the calculation of trade specialization indicators, all obtained results were compared with those achieved by other Central and Eastern European (CEE) economies. The conclusion is that, despite strong Serbian export growth from 2000 to 2018 and moderate structural improvements, there are no conclusive signs of sufficient convergence to the EU import demand structure or sufficient growth of the share of goods at higher levels of processing in Serbian exports to imply the significant structural improvement of Serbia's trade, compared with CEE countries.

Keywords: *export structure, intra-industry trade, similarity indices, trade specialization.*

Sažetak

Rad se bavi strukturnim promenama izvoza i uvoza tokom procesa tranzicije u Srbiji. U tom smislu, izračunaćemo nekoliko indikatora spoljnotrgovinske razmene u periodu 2000-2018. Nakon analize apsolutnog rasta izvoza i uvoza i vrednosti pokazatelja intra-industrijske trgovine, poredimo sličnost strukture srpskog uvoza i izvoza sa referentnom strukturom spoljnotrgovinske razmene EU. Da bi se otkrilo moguće povećanje kvaliteta srpskog trgovinskog sektora, analiziramo kvalitativne promene srpskog izvoza (uvoza), kroz tendencije robe na višim nivoima prerade, koristeći više klasifikacija, čime se stvaraju važni preduslovi za održivi i jači rast izvoza. Nakon obračuna pokazatelja trgovinske specijalizacije, svi dobijeni rezultati upoređuju se s onima koje postižu ostale ekonomije srednje i istočne Evrope (CEE). Zaključak je da uprkos snažnom rastu srpskog izvoza od 2000. do 2018. godine i umerenim strukturnim unapređenjima, ne postoje konačni znaci dovoljne konvergencije ka strukturi uvozne potražnje u EU, te dovoljan rast udela robe na višim nivoima prerade u srpskom izvozu koji bi implicirao signifikantno strukturno poboljšanje trgovinske razmene Srbije u poređenju sa zemljama CEE.

Cljučne reči: *struktura izvoza, intra-industrijska trgovina, indeksi sličnosti, trgovinska specijalizacija.*

Introduction

In the majority of countries in transition, the average growth rates in 2010-2018 were less than half of those detected in the 2000-2007 period. That is why income convergence has slowed, in stark contrast to the post-recession period of the early 1990s, when quick income convergence was mainly driven by a strong rise in total factor productivity. This result is achieved by changing the pattern of trade and integrating the region into the global value chains (GVCs), enabling the fast introduction of new technologies and a general improvement in economic activity. Serbia has improved its position from a very low 21% of the G7 average to almost one-third. Nevertheless, with average growth rates recorded in 2010-2018, it would take about a hundred years to reach GDP PPP per capita of the G7 - much longer than in the case of Hungary or Romania, both of which took less than three decades [6].

When it comes to the trade, which is in some way a reflection of the overall economic performance, the situation is even worse for Serbia, which despite strong growth in the last 19 years has exports and imports per capita five to ten times lower compared to the ones in advanced transition countries. As it is known, the transition process in Serbia only began at the end of 2000, later than in most other European post-communist countries, which along with the country's isolation during the 1990s may explain a large part of current problems. Therefore, the intention of this paper is to evaluate trade progress achieved in the period since 2000 and compare it with the ones achieved by other economies in the region. To address this issue, we will calculate several indicators of the Serbian merchandise trade in 2000-2019. First, the values of intra-industry trade indices as well as similarity indices of Serbia's export structure and the EU import structure were calculated, including trade concentration indicators. Then, to detect possible quality improvement of the Serbian trade sector, we analyzed qualitative changes of Serbia's exports (imports) - using more classifications - through tendencies of goods at higher levels of processing, whose eventual increase would create important conditions for a sustainable and stronger growth of exports. All obtained results were compared with those achieved by other CEE economies.

The rest of the paper is organized as follows. The section following Introduction surveys the literature related to our topic. The next section presents the dynamics of the Serbian merchandise trade and used data, followed by four sections where methodologies, major calculations, and analyses of results and their implications are provided (indices of intra-industry trade, trade specialization, convergence of the trade structures, comparative analysis of the trend of the technological structure and factor intensity of Serbian exports and imports). The final section presents concluding remarks.

Related literature

There are a lot of studies devoted to a structural change of trade performance of countries in transition, Serbia included. However, there are only few papers dealing with here proposed sets of indicators, especially analyzing them in a comparative perspective. In general, the literature dealing with the similar subject highlights six factors determining CEE countries' exports: structural changes in their exports, better access to EU markets, increased levels of productivity, imports, FDI, infrastructure quality, and the institutional environment. Damijan et al. [5], analyzing the export structure of CEE economies, found an increase in the share of medium and high-tech products and a corresponding fall in the share of resource-intensive, labor-intensive and low-tech products. Generally, there is gradual convergence with EU15 export structures, both at cross-sectoral and inter-sectoral levels, implying quality improvement. Findings in the mentioned article clearly suggest that structural upgrading of exports contributed positively to the rise of exports of those states. Very significant findings were that the share of vertical and horizontal inter-industrial trade with the EU has also increased [14], [4], [11].

Bierut and Kuziemska-Pawlak showed that in the 1995-2014 period, the share of the CEE countries' exports in world merchandise exports more than doubled. The main generator of this expansion is the inclusion of the region in the EU and global value chains (GVCs) thanks to their price/cost competitiveness and proximity of the EU markets - a trend occurring intensively in Serbia in

the last five years. Export structure points to the concept of the GVCs and the region's place in the GVCs as the supplier of mainly machinery and transport equipment (medium-tech goods), with the share of high-tech manufacturing exports remaining low. Between 1995 and 2014, the technological intensity increased, with medium-tech manufacturing exports replacing mainly labor and resource-intensive ones. Manufacturing exports technological structure is now more similar to the one in the EU15, but with the share of high-tech exports from the region remaining more than 10 p.p. lower than in more advanced EU countries. In the period under review, the six analyzed states (Czechia, Hungary, Slovakia, Poland, Bulgaria, and Romania) achieved significant growth in export market shares and considerable appreciation of their real effective exchange rates. Namely, an increase in the CEE countries' exports contributed to their GDP growth, leading to an appreciation of their real exchange rates - similarly to the Serbian dinar in the last five years - which is largely an automatic result in catching-up economies. It also means that price/cost factors, therefore, cannot be the only determinants of the region's improved export performance.

In a study by Radulescu et al. [28], by using co-integration tests and OLS panel estimations with a dataset between 2004 and 2015 for selected CEE countries (Poland, Slovakia, Bulgaria, Hungary, Czechia, and Romania), factors influencing growth of GDP p/c and economic competitiveness were found. The most important factor contributing to the increase in GDP p/c and the share of the selected CEE countries' exports in total world exports is the tertiary level of education, while it is followed by school dropout, the labor quality ratio, the share of renewable energy, and the employment rate. It is indicative that the share of the selected CEE countries' exports in total world exports displays a much greater impact on GDP p/c than vice versa. It is important to note other studies, such as one done by Basu and Das [1], who have used a nonparametric methodology to examine the relationship between skill and technology-intensive manufacture exports and GDP p/c, controlling for institutional quality and human capital in developing countries. The paper uses the database from the UN Comtrade Harmonized System (HS) four-digit level of

disaggregation to provide a new system of classification of traded goods by assigning each one of them according to their skill and technology content. The analysis is done for a set of 88 developing countries from 1995 to 2007. Study supports the view that as the skill and technology content of the exports increase, the impact on GDP p/c increases positively and significantly as well, after controlling for other policy variables.

A strong industrial base is essential for achieving long-term sustainable economic growth and export competitiveness, and hence manufacturing remains a significant contributor to exports in the CEE countries. Bearing this in mind, Olczyk and Kordalska [27] compared the determinants of the international competitiveness - measured by the net exports of the manufacturing sectors in Czechia and Poland - by using the database of 13 manufacturing sub-sectors in those states in the 1995-2011 period. They researched how much foreign and domestic demand, the level of labor costs, the level of sector innovation intensity, the level of sector openness to foreign markets as well as sector labor productivity influence the changes in the trade balance. For most of the Polish and Czech manufacturing sub-sectors, the creation of the positive trade balance is determined by relative demand growth. Increasing labor productivity influences heavily a positive trade balance of Polish goods in the majority of sub-sectors, while a key factor in Czech sub-sectors is decreasing unit labor costs.

On the other hand, some authors [9] analyzed the degree of trade restructuring between the EU and the new member states during the accession process, where intra-industry trade is selected as a composite indicator of trade structure. The model showed that high shares of intra-industry trade implied lower welfare losses and less resistance to further deepening of integration in the participating countries. Iyke [12], using a new constructed measure of trade openness (which captures a country's share of trade) estimated fixed-effects regressions for a panel of 17 CEE countries over the 1994-2014 period. The results show that increases in trade openness are associated with increases in real GDP p/c growth within these countries.

Dynamics of Serbian merchandise trade and used data

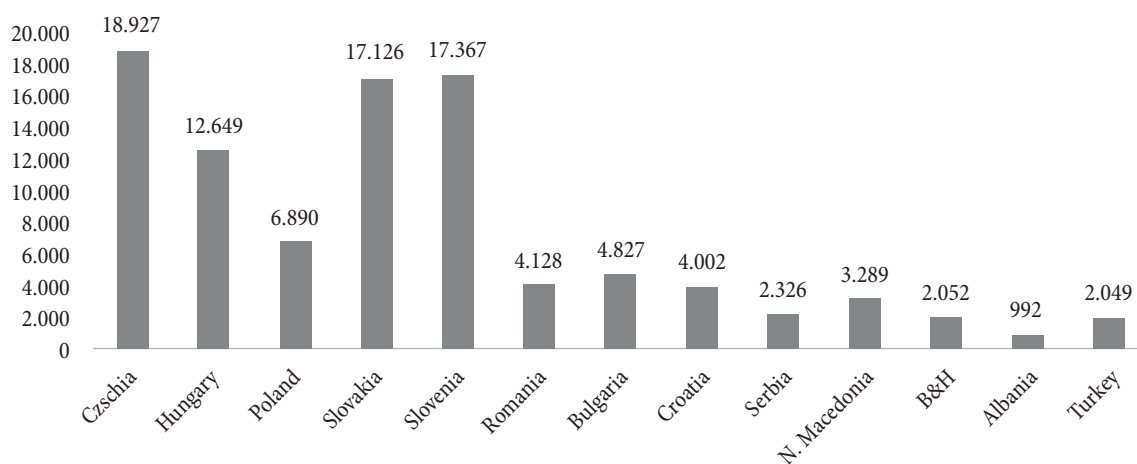
The dynamics of merchandise exports and imports of Serbia (and selected CEE countries, to compare obtained results) were expressed through the average annual growth of merchandise trade expressed in EUR. What may be seen, what is not surprising having in mind a very low base in 2000, and consequently in 2007, is comparatively looking strong growth of Serbian export (and import) in the observed period. From 2000 to 2018, the average export growth of Serbia was 12.8% (growing almost nine times), with merchandise import rising at the average growth rate of 10.5%, increasing its absolute level six times (estimate for Montenegro's share is incorporated in exports and imports in 2000). Due to a quicker growth rate from a very low base in the first years of the 21st century, the average export growth of Serbia amounted to 8.5% in the 2007-2018 period, while import has grown at an average of just 4.5% in the same period (a reason is a very strong growth in the 2000-2007 period of almost 21% on average). Assuming that Serbian export growth in 2019 will maintain the trend from the first ten months, then average export growth in 2007-2018 would amount to 8.4% (cumulatively 164%), while import would increase by 4.1% on average (cumulatively 62.4%). Under the same presumption, the average export growth in the 2000-2019 period would amount to 12.6% (rising 9.5 times) whereas import would increase 10.3% on average (growing by 6.5 times).

In the 2007-2018 period, Serbia's average export growth rate was higher than the one of EU28 (4.3%), as well as the ones of Bulgaria (7.1%), Croatia (4.5%), Hungary (4%), and Turkey (5.6%), B&H (7.9%), and North Macedonia (8.1%), but growth was achieved from a very low base. The cumulative growth of Serbian merchandise exports between 2007 and 2018 was almost 2.5 times higher (exactly 146%), B&H and North Macedonia both had export growth of 2.3 times and Turkey of 1.8 times. At the same time, export growth for Croatia was only 61%, for Bulgaria 112%, and for Hungary 53%.

To have additional comparative insight, we obtained data on export per capita for Serbia as well as for several other CEE economies. As expected, these data are disappointing, as Serbia's export p/c in 2018 is about eight times smaller than the one of Czechia and less than three-fifths of the one of Croatia, but larger than Turkey's export per capita, as well as those of B&H and Albania.

In the whole study, the period from 2007 to 2018 was analyzed, excluding Serbia where were additionally covered 2000, 2004 and 2006 (from national sources). We have used the structure of exports (and imports) by SITC (Standard International Trade Classification), Revision 4. SITC is the classification of international trade issued by the United Nations (UN). The data complying with the SITC classification are deducted from the Combined Nomenclature. On the basis of detailed nomenclatures (HS, CN), commodities are classified by SITC into rougher categories, e.g., with regard to their degree of processing.

Figure 1: Merchandise export per capita for selected countries in 2018 (EUR)



Source: Calculated on the basis of Eurostat data.

When it comes to data referring to absolute values of trade, we generally used Eurostat online database, as well as national statistic sources. The initial year is 2000, but the year that served for comparison was 2007, when Serbia was practically in an early phase of the EU integration process and, most importantly, the last year before the Great Recession. The last available year is 2018, excluding Serbia where we calculated absolute growth of trade including 2019. The data on countries' export structures are drawn from the UN Commodity Trade Statistics Database (Comtrade) covering 261 merchandise groups at the SITC 3-digit level for the years 2007 to 2018, with the Serbian export and import structure 2000, 2004 and 2006 as the only exception.

Indices of intra-industry trade

Intra-industry trade represents international trade within industries rather than between industries. Such trade is more beneficial than inter-industry trade because it stimulates innovation and exploits economies of scale. The most common, standard, indicator of measuring the share of intra-industry trade from a data set composed of both homogeneous and differentiated goods is Grubel-Lloyd index. The coefficient is given as the ratio of intra-industry trade in total trade. The index ranges from zero in the absence of intra-industry trade (and to 1 in the absence of inter-industry trade). In the aggregate intra-industry trade index higher ratios suggest that the economies of scale and various sources of gains are being exploited. Therefore, if the Grubel-Lloyd index is relatively large for a set of trade flow data, it can be inferred that a relatively large proportion of bilateral trade in this data set is associated with two-way trade in differentiated products [11].

$$GL = \sum_{i=1}^n w_i GL_i = \sum_{i=1}^n \frac{x_i + M_i}{\sum_{i=1}^n (x_i + M_i)} GL_i = \frac{\sum_{i=1}^n (x_i + M_i) - \sum_{i=1}^n |x_i - M_i|}{\sum_{i=1}^n (x_i + M_i)} \quad (1)$$

GL – intra-industry trade index for total trade between the two countries;

GL_i – intra-industry trade index for commodity class i (here: goods at 3-digit SITC level);

w_i – share of trade in product i in the total trade;

$X_i (M_i)$ – exports (imports) of product i from (to) given country to (from) a given country;

n – number of commodity classes (industries).

The low value of the coefficient indicates the possibility of significant structural adjustment costs due to increased competition from other countries, indicating that the country is not making significant incomes from horizontal and vertical integration into the world economy and is not taking advantage of selling products in large markets and from specialization in certain areas. It has been empirically proven that a possible increase in intra-industry share in total trade is an indicator of economic development (and indicator of eventually decreased gap in technology relative to more developed countries). For example, given very high imports of merchandise groups belonging to sector 7 (Machinery and transport equipment), the export growth of products that also belong to the same sector 7, which is expected having in mind strong increase of export-oriented FDI in Serbia in the last years, would automatically mean an increase of intra-industry trade almost by definition (of course, *ceteris paribus*).

Obtained results

On the basis of our calculations, Serbia's intra-industry trade in the 2000-2018 period was obtained and results are presented in Table 1. The same coefficient for the CEE economies was given in Table 2, to have a better comparative insight. Observing Standard Grubel-Lloyd index for Serbia, moderate growth is obvious, certainly with some years oscillating around trend (e.g., 2012-2014 and 2015-2017). Generally, the rising tendency of Grubel-Lloyd index is an encouraging trend.

Yet, the obtained level of intra-industry trade for Serbia, even almost constantly rising in the period under review, was the lowest among observed economies, apart from Turkey. In addition, the trend of growth of these coefficients is empirically detected generally. Namely, when CEE countries are concerned, there is obvious moderate growth in all selected economies.

Table 1: Standard Grubel-Lloyd index of intra-industry trade, Serbia's exports 2000-2018

	2018	2017	2016	2015	2014	2013	2012
standard G-L	0.540	0.516	0.502	0.521	0.498	0.507	0.504
weighted G-L	0.543	0.519	0.504	0.526	0.505	0.506	0.541
	2011	2010	2009	2008	2007	2004	2000
standard G-L	0.486	0.454	0.437	0.437	0.420	0.380	0.346
weighted G-L	0.510	0.467	0.461	0.481	0.462	0.453	0.361

Source: Authors' own calculations based on the UN Comtrade database and Serbia's Customs Administration.

Note: Standard G-L is Standard Grubel-Lloyd index of intra-industry trade. Weighted G-L is Grubel-Lloyd index weighted with merchandise groups' trade shares.

From the 1990s, in European countries in transition these coefficients were also growing, indicating the positive change of their foreign trade both total and with the EU. For example, Kawecka-Wyrzykowska [14] showed that combined intra-industry trade index (advanced) for CEE 10 countries (which entered the EU in 2004) increased from 0.419 in 2000 to 0.508 in 2007. To be added here, the index was calculated at five-digit SITC classification, which by rule decreased its values. The evolution of trade specialization in these economies has been clearly in one direction, consisting of the increasing role of intra-industry trade. It means that these countries have made a great shift in changing their production structures and making their economies more similar to the EU economies (the so-called catching-up process).

So, it is clear that the intra-industry trade index for Serbia is still relatively low indicating its unfavorable trade structure. This index is significantly lower compared to the same indicator for most CEE countries and it is smaller than the one for CEE 10 (combined). Despite this, an overall insight gives support to some positive expectations. Namely, the traditionally complementary nature of trade has become increasingly competitive. Additionally, volume and structural changes of the Serbian trade relations have been leading to more interdependence, deepening cooperation and developing or joining existing international production chains. As decades-long experience with the rapid growth of intra-industry trade among the developed countries shows, intra-industry trade does not only create more competition but also opens up new areas of cooperation and generates structural transformation.

The process of transformation of the Serbian trade pattern - from inter-industry to intra-industry one - can be seen, which is certainly a positive development leading

Table 2: Grubel-Lloyd index of intra-industry trade of selected CEE countries in 2007 and 2018

	2007	2018	2007	2018
	Standard G-L		Weighted G-L	
Bulgaria	0.440	0.592	0.469	0.597
Hungary	0.725	0.735	0.725	0.742
Romania	0.427	0.614	0.470	0.601
Czechia	0.692	0.732	0.693	0.740
Turkey	0.404	0.442	0.430	0.445
Croatia	0.429	0.611	0.545	0.653

Source: Authors' own calculations based on the UN Comtrade database.

Note: Weighted G-L is Grubel-Lloyd index weighted with merchandise groups' trade shares. In 2011 Czechia: 0.708, and in 2018 B&H: 0.430 (Weighted G-L: 0.402) and North Macedonia: 0.365 (Weighted G-L: 0.306).

to more interdependence. Of course, this process is not comparable with the one seen in CEE 10, especially in the Visegrad Group, but any signs of such development are welcome.

Certainly, intra-industry trade has in some way driven Serbian trade developments in the observed period, which is above all a consequence of strong inflow of FDI (largely from EU), allowing value chains to be formed. Related to this is a modest growth of technological improvement in Serbian exports. Namely, as Serbia imports a very high level of sophisticated products mostly belonging to sector 7, especially from advanced EU markets, every rise of exports of the same products automatically means an increase of intra-industry trade almost by definition (of course, *ceteris paribus*).

Given the strong importance of FDI for Serbia, it is worth to point to the findings of a study by Lyu and Blandford [17] analyzing the relationship between intra-industry investment (III) and intra-industry trade (IIT) for China. Authors suggest that there is a close substitution relationship between III and IIT in most industries in this country. This implies that if there are restrictions on IIT, III will increase, and given the substitution relationship between III and IIT, it also implies that if IIT is constrained

by tariff and non-tariff barriers, this will lead to an increase in the level of III. One of the implications for Serbia, taking for granted wider applicability of above-mentioned conclusions, and having in mind imposed numerous non-tariff barriers especially in Serbia's agro-industrial complex, is that this is the sector where one would expect an increased FDI in years to come.

Trade concentration coefficients

The logic of export specialization was originally developed to explain the underlying reasons for international trade and to predict the trade pattern resulting from changes in factor endowment and technology. Accordingly, free trade would allow countries to gain from increasing specialization in activities where they have a comparative advantage under autarky. In pursuit of this aim, we focus on the following research objectives: to assess the patterns and dynamics and degree of Serbia's export specialization in order to find policy implications which are based on the empirical findings. It should be noted that the concentration of exports on few commodities (e.g., crude oil and natural gas) is usually considered as a potential problem for economies to sustain long-run high export growth, since fluctuations in export commodity prices may also increase volatility in export receipts of a country.

The Herfindahl-Hirschman coefficient is the most commonly used way of measuring export concentration ratio as numerical expression of concentration. The higher the index, the lower the level of diversification it represents. Export concentration reflects the degree to which a country's exports are concentrated on a small number of products. It ranges from 0 to 1, with 0 reflecting the least concentrated export portfolio and 1 the most concentrated [29]. The index has been normalized because the number

of merchandise products is different between countries. The same index is, of course, applied to calculate the import concentration ratio. We used, as usual, a 3-digit Standard International Trade Classification from the UN Comtrade database.

It should be noted here that the decline in export concentration ratios was a trend in almost all countries in the period after World War II. Also, it is natural that smaller (as well as less developed) countries have higher ratios of exports because they can't sufficiently diversify their export offer, while for crude oil exporters this takes the most pronounced forms.

$$C_{xj} = \frac{\sum_{i=1}^n \left(\frac{x_{ij}}{x_{ik}}\right)^2}{1 - \sqrt{\frac{1}{n}}} - \frac{\sqrt{\frac{1}{n}}}{1 - \sqrt{\frac{1}{n}}} \quad (2)$$

Where:

$i = 1 \dots n$

n = number of SITC 3-digit export categories (about 260)

X_{ij} = value of export of sector 'i' from the country 'j' in a given year

X_j = total export volume of the relevant country in the same year

Obtained results

Looking at Table 3, it can be seen that the value and tendency of Herfindahl-Hirschman index concerning Serbia is roughly the same during the whole period. This index practically stagnated over the observed period, especially when imports are concerned (excluding high value in 2000), while when it comes to exports, apart from artificially high value in 2003 connected with airplanes' repairs (which is posted as export and import of the same aircraft), there is also an incidental rise in 2013. But, generally, it is clear that a small change occurred over the observed 20 years.

Table 3: Herfindahl-Hirschman index, Serbia's exports and imports concentration 2000-2018

Years:	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
exports	0.089	0.080	0.078	0.098	0.077	0.101	0.102	0.088	0.087	0.065
imports	0.128	/	/	/	0.067	0.082	0.081	0.069	0.078	0.067
Years:	2010	2011	2012	2013	2014	2015	2016	2017	2018	
exports	0.077	0.075	0.068	0.114	0.106	0.091	0.086	0.081	0.080	
imports	/	0.083	0.078	0.095	0.109	0.084	0.141	0.120	0.101	

Source: Authors' own calculations based on the UN Comtrade database and Serbia's Customs Administration (2000-2006).

On the other side, sudden very high import growth of merchandise groups of 931 (Special transactions and commodities not classified according to kind) in 2016-2017 (to 16.8 and 14.4% of total Serbia's exports) may explain the solid growth of import concentration ratio in these years. However, new rules connected with accessing the EU proposed that increasing part of domestic import be put in this category, differently from practices used before.

Looking at Table 4, this index is higher for Czechia, Romania, and Hungary in 2018, representing relatively new kind of high technology export concentration in these economies. But, analyzing all data from Table 4, there are no conclusive findings (in roughly half of them the coefficient has increased and vice versa). In some, the Herfindahl-Hirschman index practically stagnated for many of those economies, like Slovenia, Turkey, Serbia, and North Macedonia when exports are concerned, and almost for all observed states when it comes to imports. Concerning import concentration, explanatory power of those coefficients is small given the global tendency of their relatively low and falling values, along with rising sophistication of (import) demand all around the world. Hence, small changes in their values between 2007 and 2018 are expected.

Table 4: Export and import concentration ratios (Herfindahl-Hirschman index) for selected CEE countries 2007 and 2018

	2007	2018	2007	2018
	Exports		Imports	
Poland	0.079	0.064	0.065	0.057
Czechia	0.096	0.129	0.071	0.080
Hungary	0.141	0.110	0.109	0.073
Slovakia	0.176	0.218	0.102	0.125
Slovenia	0.120	0.130	0.068	0.078
Turkey	0.089	0.076	0.086	0.103
Romania	0.101	0.115	0.069	0.060
Bulgaria	0.131	0.093	0.103	0.080
Croatia	0.116	0.071	0.079	0.062
Serbia	0.088	0.080	0.069	0.101
North Macedonia	0.208	0.218	/	0.114
Albania	/	0.541	/	/
B&H	/	0.106	/	0.059
Montenegro	0.784	0.339	/	0.216

Source: Authors' own calculations based on the UN Comtrade database.

Note: Data for Montenegro in the 2007 column are for 2011.

Regarding export, in some economies, it is substantially higher, especially given the relatively huge size of these

economies comparing to Serbia, in 2018 than in 2007 (for example Czechia, Romania, even Slovakia) representing relatively new kind of high technology export concentration in these countries. For example, in Slovakia, which has a very high absolute value of this coefficient, this appears to be generated by the fact that only one technologically sophisticated merchandise group accounted for 23.5% of total exports: 781-Motor cars. In Romania, it was caused by the reality that only four technologically refined merchandise groups accounted for about 27% of total exports: 772-Electrical apparatus for switching or protecting electrical circuits (5%), 773-Equipment for distributing electricity (5.9%), 781-Motor cars (6.9%), and 784-Parts and accessories of the motor vehicles (9.6%). A similar situation is in Czechia, where the share of 752-Automatic data-processing machines (6.7%), 764-Telecommunications equipment (5.5%), 781-Motor cars (11.2%), and 784-Parts and accessories of the motor vehicles (7.9%) were around 30% of total exports in 2018, which is certainly a good indicator given a high level of value-added in this kind of product.

In Hungary, a still relatively high level of this index in 2018, after a decrease from its higher level in 2007, was generated by a large portion of the next six merchandise groups associated with high quality of exports: 542-Medicaments (3%), 713-Internal combustion piston engines and parts thereof (6%), 764-Telecommunications equipment (4.6%), 772-Electrical apparatus for switching or protecting electrical circuits (4.4%), 778-Electrical machinery and apparatus (3%), 781-Motor cars (9.2%), and 784-Parts and accessories of the motor vehicles (6.0%), with roughly 36% of total exports. On the other hand, merchandise groups with higher shares in Serbian export belong to less qualitative sort of export products, partly excluding 773 and 716. They are: 625-Rubber tires (3.9%), 673-Flat-rolled products of iron or non-alloy steel (3.9%), 682-Copper (3.2%), 716-Rotating electric plant and parts thereof (3%), 773-Equipment for distributing electricity (6.8%), 821-Furniture and parts thereof (2.9%), which combined accounted for nearly a quarter of total exports.

This index is very high in Montenegro, Albania, and North Macedonia representing poor diversification, which is expected given the small size of those economies.

For example, in Montenegro, very high level of export concentration ratio in 2011 (astonishing 0.784) was caused by the fact that only one merchandise group accounted for 80% of total exports (684-Aluminum), which share fell to still very high 34.2% seven years later simultaneously decreasing this index to 0.339. In North Macedonia, high level of this index in 2007 was caused by a large portion of merchandise group 671 (Pig iron), but in 2018 'the culprit' was another commodity group: 598 (Miscellaneous chemical products) with 21% of total exports. A similar situation is in Albania, where the share of 851 (Footwear) was about one-quarter in 2018, which certainly is not a good indicator given a low level of value-added in this kind of product.

Yet, one can say that Herfindahl-Hirschman level generally represents a poor diversification of Serbia (legacy of the period before the 1990s), and that the overall development suggests that the level of export diversification, led by technology improvement, has not come to significant improvements. But, looking at data, the same can be said for Turkey and Croatia. Both countries had generally low Herfindahl-Hirschman index in 2018, which is also characteristic for almost all advanced countries because of wide export supply (as these economies virtually cannot concentrate their exports).

Certainly, the relatively low value of the coefficients, similar to those of the developed countries, is not a consequence of the broad supply of Serbia's export sector and its favorable structure, but above all, it was caused by the lack of certain competing products. Practically, there are only a few merchandise groups in our export going to the world or the EU market that have a significant share, and these are, as a rule, primary, resource, or labor-intensive products. The same is also the case concerning all Balkan economies, as was shown in a study by Nikolić [23], covering the 2001-2011 period. Findings from this paper showed relatively poor diversification of Balkans economies as well as a lack of significant improvements.

It is not real, nor would it be good, to see a significant increase in the specialization of SEEC economies because, given the domestic factor availability, or production potential, it would practically mean these countries are strongly increasing the shares of certain products

in the lower processing stage, which generally have a low unit values. In the long run, the preferred route is export diversification, basing exports on a large number of products of the multiple phases of finalization, and most preferably export based on new products with high innovative content.

Is there a convergence between the two trade structures?

We will calculate how well the export profile of Serbia matches the import profile of one developed entity - the EU - which this country wants to join and which serves as the structure of aspiration. In an ideal case, home country exports should match the imports of its major trading partners. Namely, economies at a similar level of development typically have similar trade structures, and that similarity between export and import structures is a factor that stimulates trade between them, of course, excluding other factors that may have adverse impacts.

We will compare the absolute level and trend of similarity coefficients of the export structure of Serbia with the import structure of the EU to examine if there is convergence and the level of that convergence since 2007. Potential increases in similarity ("overlap"), i.e., a better match with the merchandise import structures of the EU would indirectly imply the potential for further absolute growth and qualitative improvement of Serbian merchandise exports. A structure, favorable or otherwise, is derived from empirical analysis, which shows that most developed countries have a structure of exports and imports which is predominantly based on products of high stages of finalization (with much higher added-value).

Among other things, in an economic and monetary union, such as that within the euro area, and which Serbia aims to enter, the similarity of the trade structures is important because a higher level of similarity may require smaller industrial relocation, makes monetary policy coordination and the definition of other common policies easier, increases resistance to asymmetric shocks, accelerates the convergence of factor prices and reduces the pressure of migration flows to the EU [9]. In other study, Crespo [4] pointed out that joining the euro area

may result in further convergence of export structure in the region. In accordance with this, Mauro et al. [19] showed that a company is *ceteris paribus* more competitive as a euro area member state than outside the euro area.

Given a very small share of Serbia's exports in EU imports, it is clear that comparing these structures is only relevant as an indicator of the achieved improvement in exports. Namely, once a country where resource (or primary) products dominate exports achieves a certain level of development, it needs to diversify its export supply to include products of greater sophistication or economic growth will slow down. Thanks to a high share of exports to the EU in the country's total exports (about two-thirds), it is to be expected that the EU's import demand itself shapes to a large extent the Serbian export structure. It would implicate that changes that take place in the structure of Serbia's merchandise exports are to a great extent a consequence of the domestic economy's adjustments to the EU import demand.

We used four indicators of similarity: cosine and the Finger-Kreinin similarity coefficient, as well as Bray-Curtis and integrated similarity index. All applied coefficients indicate the probability, i.e., the intensity of expected total bilateral trade. Formulas for these indices were given in studies [25] and [24]. These indices are also applied in numerous papers. For example, Finger and Kreinin [10] used the coefficient (since named after them) to compare the structure of selected countries' exports in certain markets (US, six EU countries, Japan, the rest of Western Europe) in the period from the beginning of the 1960s to the mid-1970s.

Taking into account certain deficiencies of Finger and Kreinin and cosine indices (as well as integrated similarity index, that is, its inversed form), primarily the fact that they do not incorporate weights, i.e., the relative weights of the observed sectors, we will use alternative measures of similarity. This can be done using the so-called similarity matrix. We used normalized Manhattan distance with the Bray-Curtis formula (B-C jk), broadly used in geo-statistics and in biometrics [21]. To add, according to Benedictis and Tajoli [3], there are a number of advantages to the Bray-Curtis index with respect to other alternatives. This index does not require

a normal distribution of observations (it is appropriate in the presence of skewed distributions, unlike correlation), it takes into account the change of weight of sectors (it captures changes due to specific sectors). In addition, this particular index is immune to the double-zero paradox.

So, in this article, we will especially emphasize Bray-Curtis index among others because it is at a three-digit level always identical to Finger and Kreinin coefficient. The value of this indicator ranges from 0 to 1, and if the value of this index is closer to 0, the two structures are closer together.

$$B - C_{jk} = \frac{\sum_i |x_{ij} - x_{ik}|}{\sum_i (x_{ij} + x_{ik})} \quad (3)$$

x_{ij} = part of the section of the country j (in total exports or imports) in the observed year;

x_{ik} = part of the section of the country k (in total exports or imports) in the observed year;

j, k = observed country (or country in different periods).

Obtained results

By comparing merchandise export structures of Serbia and CEE economies (as well as the U.S. export structure as a structure of aspiration) with commodity import sel of SITC (Revision 4), we obtained the similarity coefficients presented in Figure 1 and Figure 2, as well as in tables in Annex. Observed relatively small changes in the similarity coefficients are, in general, the result of slow changes in the structure of exports, since more time is needed for significant economic changes in the real and export sectors consequentially. Additionally, the change of economic structure is the basis for resolving the problem of the foreign trade deficit and consequently wider economic issues.

According to Figure 2 and Table 7 in Annex, it can be seen that, between observed years, there has been a moderate increase in the similarity of the two structures (Serbia-EU) in general. The absolute level of the similarity coefficient is mostly higher than at the beginning of the period.

Yet, these results also show that the Serbian export structure has the lowest similarity of all observed

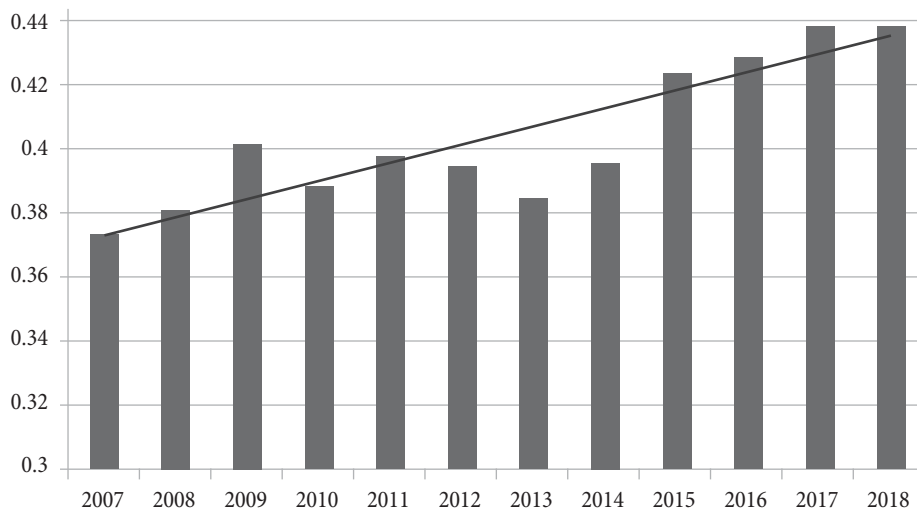
structures in 2018, implying relatively low quality of its exports (Figure 3, and Table 8 in Annex). In spite of this, it has changed in a positive direction, especially after a fall in 2013. The growth since this year correlates with the beginning of strong FDI export-oriented inflows – the arrival of foreign export-oriented companies (largely those producing components for domicile firms) that improved the export offer of the Serbian economy.

According to Figure 3, it can be seen that, between the two observed years, there has been a moderate increase in the similarity of the two structures in all the observed countries, so that the absolute level of the similarity coefficient is always higher than at the beginning of the

period. It is not surprising that the similarity of the U.S. export structure and the EU import structure is the highest, because they come from the two economies with very sophisticated trade. Among CEE countries, the highest similarity is recorded, as expected, for very developed ones: Hungary and Czechia.

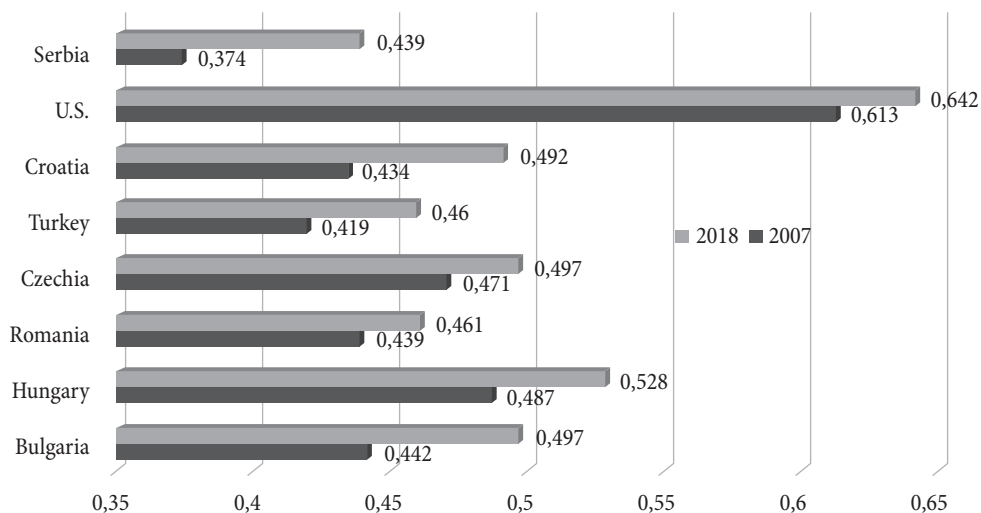
Of course, it is hypothetically possible that the rise in the similarity indices was caused by deterioration in the more advanced EU’s import structure. To address this issue we have analyzed changes in EU imports through the tendencies of high processing products, where a possible strong decrease of it would suggest the mentioned weakening of EU’s import structure – thus explaining structural

Figure 2: The trend of Bray-Curtis indices of similarity between Serbian export structures and import structures of the EU



Source: Ibidem.

Figure 3: Values of Bray-Curtis indices of similarity between export structures of selected countries and import structures of the EU, 2007 and 2018



Source: Ibidem.

improvements in CEE countries' similarity indices. The calculated results are according to expectations: there is a moderate growth in import structure quality seen through the growth of skill-intensive manufactures and medium and high-tech products. Namely, medium and high-tech products portion in total external imports of the EU28 was 40.6% in 2007 and 45% in 2018. The similar, generally mildly rising, tendency is detected when skill-intensive manufactures are concerned (34% in 2007 and 42.4% in 2018). So, evidently, there is a moderate increase in external EU's import demand sophistication, which is a worldwide tendency, especially in developed countries.

Given the high sophistication of the EU's import demand, almost every convergence to the same is almost by definition a sign of achieved progress, because of the growing share of merchandise groups 'matching' EU imports. Observing the level of similarity between U.S. exports and EU import structures - and to a lesser extent between more advanced CEE export and EU import structures - it is evident how far Serbia is from a more advanced export structure and consequently how remote is a higher level of quality of Serbian export sector.

The technological structure and factor intensity of Serbian merchandise trade: A comparative analysis

The question arises as to whether Serbian products are becoming more competitive during almost two decades of EU integration. The best way to answer this issue is to analyze the tendency and trend of Serbian exporting products by proposed classification according to the applied technology and factor intensity, that is, by segregating (medium and) high-tech or high-skill-intensive part of domestic exports.

Given the key role of changing the nature of the skill and technological composition of products to boost economic performance – among others in a country like Serbia – the purpose of this part of the paper is to investigate the quality of domestic exports (and imports) by classifying the exported products in accordance with the applied level of skill and technology. We will use different classifications, those which were applied by

referent international organizations or referent economists. Generally, export databases are decomposed into different categories by their level of skill and technology composition. The export merchandise groups are used to calculate different indicators to indicate how countries are moving out from primary commodities to manufactures-skill and technology content sectors.

UNCTAD [29] methodology was used where we extracted high-skill and technology-intensive manufactures, covering SITC section 5, SITC divisions 75, 76, 87, 88 and SITC merchandise groups 776, 792, 891, 892, 896, 897, and 898. Then, the paper by Munkácsi [22] has been used, where he had classified the exports, according to the technology structure, into four categories relating to the technology level of the products. We first used two categories combined (medium and high-tech), generally encompassing SITC sectors 5 (Chemicals and related products) and 7 (Machinery and transport equipment), precisely encompassing SITC 266, 267, 5 (without 52; 551; 592), 653, 671, 672, 678, 7, 81, 87, and 88. In the next iteration, we extracted just high-tech products covering next merchandise divisions and groups: 54, 712, 716, 718, 75; 761, 764, a larger part of 77, and 792, 871, 874, and 881. Finally, analysis of the share of skill-intensive manufactures given by Mayer and Wood [20] was used encompassing SITC 5 (without 525), 71-74, 75, 76, 77, 781-784, 792, 87-88. All those classifications, with an entire set of merchandise groups belonging to each of them, were given in the study by Nikolić [24], as well as in cited studies.

The same classifications were used in referent papers. Landesmann and Worz observed the export specialization of new CEE member states, and what is especially important for this article, regarding medium and high-tech products, specialization increased (which they explained by unit labor costs). Konstantakopoulou and Skintzi [15] analyzed trends of shares of high-skill technology-intensive manufactures in the euro area. In both observed periods, the pre-crisis (2000-2008) and the recession (2009-2014), high-skill technology-intensive manufactures have the largest share of exports (followed by medium-skill technology-intensive manufactures, labor-intensive manufactures and low-skill technology-intensive manufactures). The authors pointed out that the

economic crisis has not affected the ranking of the shares of the four categories. During the economic crisis, most countries retained their shares of exports of high-skill technology-intensive manufactures.

According to [7], increasing high-tech export share causes higher unit value compared with other countries. In parallel with deeper integration, the export structure also changed markedly in CEE countries – findings very indicative for Serbia. Crespo and Fontoura [4] examined the new member states' exports of products going to the EU15 in time and by cross-section. The export structure of CEE countries changed significantly – largely in Slovakia and Hungary – but the change was even greater in the Baltic economies. The Czech and Hungarian export structure was the most similar to that of old EU member states, with the Hungarian export structure resembling mainly the Austrian and German ones.

Obtained results

Regarding the Serbian export structures, products classified in all four different categories have shown rather similar tendencies in the period under review. Namely, Table 5 shows that the shares of high-tech, high-skill and technology-intensive manufactures, (combined) medium and high-tech products, and skill-intensive manufactures in Serbian exports have moderately increased since 2000. However, there are significantly different trends regarding the first two narrower categories covering more technology and skill-intensive products and the remaining two, which are

more inclusive encompassing practically all merchandise groups from SITC sector 5 and sector 7.

High-tech and high-skill and technology-intensive manufactures achieved a modest increase in their shares, and after 2004, tendency of those products has been stagnant in the best case. Given their strong importance, concerning technological and skill intensity of Serbian exports, it is not an encouraging tendency. Even worse, looking at their trends since 2008, the proportions of these types of products have been even moderately decreasing. True, they generally retained roughly the same portion in domestic exports throughout the observed period. It suggests a relatively low value of products with the largest possibility to be placed in sophisticated markets, as is the one of the EU. When it comes to the second most important classification – high-skill and technology-intensive manufactures – the situation is somewhat better because of a slightly wider coverage.

The trend of the growth of all four analyzed indicators is a worldwide phenomenon, but it seems that Serbia detected solid growth of two more covering indices (medium and high-tech products and skill-intensive manufactures) in a relatively short period, especially after 2012. Of course, obtained structure improvements in 2018 compared to the one in 2000 are moderate and still far from the level achieved by most CEE economies (Table 6) and especially developed countries. It implies an improving but weak domestic export quality in the European context.

According to Table 6, it can be seen that from 2007 to 2018, the majority of observed CEE countries detected a

Table 5: Shares of (medium and) high-tech products, high-skill and technology-intensive manufacture products, and skill-intensive manufactures in Serbia's exports 2000-2018

Years:	2018	2017	2016	2015	2014	2013	2012	2011
High-tech	7.5	8.2	8.7	7.2	6.8	6.6	8.2	6.6
High-skill and technology-intensive	12.8	12.5	12.3	12.1	11.7	12.2	13.0	12.2
Skill-intensive manufactures	36.7	36.6	37.7	36.9	37.6	38.9	29.7	24.2
Medium + High	38.4	38.4	39.4	39.0	40.0	41.2	32.6	26.5
Years:	2010	2009	2008	2007	2006	2005	2004	2000
High-tech	7.2	8.6	8.3	6.4	5.6	/	5.0	6.0
High-skill and technology-intensive	12.9	13.0	14.2	13.5	13.3	/	14.4	11.0
Skill-intensive manufactures	23.9	23.7	25.1	23.4	21.5	/	21.7	21.5
Medium + High	26.1	26.8	28.3	25.4	22.9	/	23.7	23.6

Source: Authors' own calculations based on the UN Comtrade database and Serbia's Customs Administration (2000, 2004, and 2006).

Note: High-skill = high-skill and technology-intensive manufactures; Medium + High = (combined) medium and high-tech products; High-skill tech-intensive = high-skill and technology-intensive manufactures.

moderate share increase in all four categories of products. Hungary has the best results, as expected, with medium and high-tech products accounting for 70.5% of exports in 2018 and with high-tech products achieving even one-fifth of country exports. Czechia has similar results, with medium and high-tech products amounting to 67.6% of its exports in 2018, while high-skill and technology-intensive manufactures were almost 25%. The findings for those two countries, in particular, imply their higher innovation capacity, which was translated into five or seven times higher per capita exports than Serbian one. True, the problem with Hungary is virtually stagnating structure at a high achieved level, while all other observed economies detected solid improvements.

As expected, those countries have a higher share of high processing export products than Serbia, excluding Bulgaria, which has a somewhat worse structure, but a 90% higher absolute level of exports, while Croatian export per capita is higher by one-half, but with modestly better quality (structure).

The Romanian text-book example of success was very indicative. It strongly improved export quality in the period under review, at the same time achieving its strong absolute growth. The structure is improved also in Turkey, but the average growth rate is significantly slower (5.6%) than Serbian one, while export per capita is lower by one-fifth.

In summary, Tables 5 and 6 showed that the share of products at higher levels of processing in almost all observed economies virtually always increased in the observed period. Generally, these are good signs, but it is a small consolation for Serbia, given the worldwide growing trend of this kind of products in world trade, and regarding the higher achieved level of other CEE countries.

In addition, as is expected, CEE countries (like Hungary and Czechia) have a higher share of high processing export products than Serbia and Turkey, for example, despite the fact that in the 2000-2012 period, most Balkan economies saw an increase in medium and high-tech products share in their total exports, but from a low base [24].

When the import share of all four categories of products is regarded, it largely achieved a higher level compared to exports, which is understandable given that the EU, the dominant trading partner of all those countries, exports more this kind of product to less developed countries than it imports from the same (see Annex, Tables 9 and 10). In addition, an increase of the share of all four observed import categories is detected in Serbia, as well as in remaining observed countries during the period under review. Of course, improvement in import structure is associated with the import of necessary equipment for investment (almost exclusively belonging to the sector 7, which, as a rule, affected the improvement of structures) as well as with rise of purchasing power of population in those countries during transition process, including Serbia, which is connected also with facilitation of borrowing both for companies and consumers.

Concluding remarks

To address the issue of the structural changes in exports and imports during the transition process in Serbia, we have calculated several indicators of the Serbian merchandise trade in the period since 2000, and especially from 2007, beginning with its absolute growth expressed in EUR. We have computed several indicators of the Serbian merchandise trade. First, the value of intra-industry trade indices, trade specialization coefficients, as well as similarity indices of

Table 6: Shares of (medium and) high-tech products, high-skill and technology-intensive manufacture products, and skill-intensive manufactures in total exports of selected CEE countries 2007-2018

	2007	2018	2007	2018	2007	2018	2007	2018	2007	2018	2007	2018
	Bulgaria		Hungary		Romania		Czechia		Turkey		Croatia	
High-tech	7.3	10.4	29.3	24.4	6.4	9.1	20.5	22.4	4.5	3.9	10.5	13.3
High-skill tech-int.	10.8	13.8	31.6	27.2	8.7	10.9	22.6	24.9	9.2	8.1	14.6	18.2
Skill-intensive	22.5	30.6	66.8	68.8	35.8	53.2	60.0	65.1	34.0	46.5	29.5	35.1
Medium + High	24.2	33.0	68.3	70.5	40.6	56.0	63.5	67.6	39.6	49.4	42.0	39.4

Source: Authors' own calculations based on the UN Comtrade database.

Note: High-skill = high-skill and technology-intensive manufactures; Skill-intensive = skill-intensive manufactures; Medium + High = (combined) medium and high-tech products, High-skill tech-int. = high-skill and technology-intensive manufactures.

Serbia's export structure and the EU import structure, which was used as a referent structure, were calculated. To detect possible quality improvement of the Serbian trade sector, we analyzed qualitative changes of Serbia's exports (imports), through tendencies of goods at higher levels of processing, using more classifications, whose possible improvement would create important conditions for a sustainable and stronger export growth. All obtained results were compared with those achieved by other CEE economies. The research results as presented in the paper should be viewed with caution due to the limitations of the applied methods, especially similarity indicators.

Serbia detected a very strong export growth since 2000 or 2007, true from a very low base. Since 2000, a solid structural advancement has been achieved, measured through a share of goods at higher processing levels, and then looking at the rise of intra-industry trade and similarity indices (true, with stagnant export specialization coefficients). However, the same results are far better when other CEE countries are concerned, almost in every of the mentioned measurements. It means that Serbia is lagging behind all the economies we are trying to compare with. So, despite strong Serbian exports' growth from 2000 or 2007 and moderate structural improvements, there are no conclusive signs of sufficient convergence to the EU import demand structure or sufficient growth of the share of goods at higher levels of processing in Serbian exports to imply the significant structural improvement of Serbia's trade, compared with CEE countries.

Yet, it may be assumed with great certainty that, with the entry of foreign companies into Serbian markets in recent decades, especially in the last five years, the quality of the merchandise export has substantially improved, especially of those intended for foreign markets. Namely, the country's integration into GVCs is vivid, and improvement in Serbia's industry was proved, among others, in an article by Nikolić [26]. Finally, to be noted here, the tendencies in intra-industry trade, shares of goods at higher levels of processing, as well as the similarity indicators, though all slightly improved in the period under review, often cannot indicate the full extent of these improvements.

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ANNEX

Table 7: Indices of similarity between export structures of Serbia and import structures of the EU

	Bray-Curtis	inverse ISI	Finger-Kreinin	cosines
2007	0.374	0.189	0.374	0.193
2008	0.381	0.163	0.381	0.172
2009	0.402	0.242	0.402	0.257
2010	0.389	0.202	0.389	0.211
2011	0.398	0.199	0.398	0.216
2012	0.395	0.183	0.395	0.210
2013	0.385	0.188	0.385	0.192
2014	0.396	0.226	0.396	0.229
2015	0.424	0.320	0.424	0.320
2016	0.429	0.360	0.429	0.360
2017	0.439	0.344	0.439	0.346
2018	0.439	0.304	0.439	0.308

Source: Authors' own calculations based on the UN Comtrade database.

Table 8: Indices of similarity between export structures of CEE countries and import structures of the EU

Indicators/ Countries	Bray-Curtis	cosine	inverse ISI	Finger-Kreinin	Bray-Curtis	cosines	inverse ISI	Finger-Kreinin
	2007				2018			
Bulgaria	0.442	0.278	0.278	0.442	0.497	0.365	0.364	0.497
Hungary	0.487	0.425	0.423	0.487	0.528	0.437	0.437	0.528
Romania	0.439	0.306	0.304	0.439	0.461	0.354	0.353	0.461
Czechia	0.471	0.328	0.319	0.471	0.497	0.414	0.411	0.497
Turkey	0.419	0.295	0.289	0.419	0.460	0.354	0.348	0.460
Croatia	0.434	0.273	0.273	0.434	0.492	0.414	0.404	0.492
US	0.613	0.452	0.433	0.613	0.642	0.630	0.630	0.642

Source: Authors' own calculations based on the UN Comtrade database.

Table 9: Shares of (medium and) high-tech products, high-skill and technology-intensive manufacture products, and skill-intensive manufactures in Serbian imports 2000-2018

	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	2000
High-tech	11.0	10.1	10.2	10.7	10.7	10.6	11.0	10.6	9.4	9.6	10.5	11.6	7.1
High-skill tech-int.	19.2	19.1	19.4	21.0	21.0	21.0	22.1	20.8	19.2	19.6	21.0	22.3	21.0
Skill-intensive	39.2	37.8	38.4	42.0	38.8	42.6	38.9	37.1	29.9	32.3	40.3	42.3	36.2
Medium + High	40.9	39.5	40.6	44.2	40.6	44.5	41.3	39.3	32.7	35.1	43.3	45.4	38.4

Source: Authors' own calculations based on the UN Comtrade database and Serbia's Customs Administration (2000, 2004, and 2006).

Note: High-skill = high-skill and technology-intensive manufactures; Skill-intensive = skill-intensive manufactures; Medium + High = (combined) medium and high-tech products; High-skill tech-int. = high-skill and technology-intensive manufactures.

Table 10: Shares of (medium and) high-tech products, high-skill and technology-intensive manufacture products, and skill-intensive manufactures in imports of selected CEE countries 2007-2018

	2007	2018	2007	2018	2007	2018	2007	2018	2007	2018	2007	2018
	Bulgaria		Hungary		Romania		Czechia		Turkey		Croatia	
High-tech	10.0	12.1	25.8	22.8	12.4	14.7	21.3	24.6	10.8	11.7	16.0	12.5
High-skill tech-int.	15.5	19.2	24.8	24.1	17.9	20.3	27.0	29.3	20.3	25.2	19.7	21.5
Skill-intensive	36.6	37.9	57.5	59.4	46.6	50.9	53.7	58.6	42.1	57.4	40.1	40.1
Medium + High	40.6	42.3	59.0	61.2	51.5	54.0	56.1	60.7	45.8	60.0	48.8	43.1

Source: Authors' own calculations based on the UN Comtrade database.

Note: High-skill = high-skill and technology-intensive manufactures; Skill-intensive = skill-intensive manufactures; Medium + High = (combined) medium and high-tech products; High-skill tech-int. = high-skill and technology-intensive manufactures.

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CRITICAL FACTORS OF DIGITAL TRANSFORMATION SUCCESS: A LITERATURE REVIEW

Kritični faktori uspešnosti digitalne transformacije – pregled literature

Abstract

Over the last two decades, the digital era and the fourth digital revolution have led to a rapid increase in the influence that digital technologies have on all aspects of life. Rapid development and diffusion of technological innovations altered the business environment, additionally accelerating the dynamics of market changes through permeating globalisation and ever stronger competition. In such digital ecosystem, product life cycles became extremely short, while consumers became more demanding and their behaviour more volatile. Compelled by such business reality, organisations are forced to continuously adapt and digitally transform their business.

The aim of this paper is to identify and systemise critical success factors of attaining purposeful digital transformation by means of a literature review. The paper details the results of the conducted theoretical research, which may serve organisations as guidelines on their challenging paths to digital transformation and assist them in avoiding potential traps and mitigating risks associated with inadequate application of digital technology.

Keywords: *digitalisation, digital transformation, digital transformation strategy, critical success factors.*

Sažetak

Digitalna era, praćena četvrtom industrijskom revolucijom, dovela je do rapidnog širenja uticaja digitalnih tehnologija na sve segmente života u poslednje dve decenije. Brz tempo razvoja i difuzni karakter tehnoloških inovacija doprineo je da kontekst poslovanja savremenih organizacija karakteriše visoka dinamika tržišnih promena, dodatno ubrzana sveprisutnom globalizacijom i sve oštrijim konkurentskim nadmetanjem. Ovakav digitalni ekosistem uticao je i da životni ciklus proizvoda i usluga postane ekstremno kraći, a ponašanje kupaca sve zahtevnije i nepostojanije. Suočene sa opisanom poslovnom realnošću organizacije su prinuđene na kontinuirano prilagođavanje i digitalnu transformaciju svog poslovanja.

Cilj ovoga rada bio je da se uvidom u referentnu literaturu identifikuju i sistematizuju kritični faktori uspešnosti u dostizanju svrsishodne digitalne transformacije. U radu su detaljno opisani rezultati sprovedenog teoretskog istraživanja, koji organizacijama mogu poslužiti kao svojevrsan orijentir na izazovnom putu digitalne transformacije, kako bi predupredile potencijalne zamke i rizike neadekvatne i neefikasne primene digitalnih tehnologija.

Ključne reči: *digitalizacija, digitalna transformacija, strategija digitalne transformacije, kritični faktori uspešnosti.*

Introduction

Digitalisation is a part of the major global trend of the fourth industrial revolution (Industry 4.0), and at the same time, the principal reason why more than half of Fortune 500 companies ceased to exist over the last two decades. On one hand, digitalisation provides great opportunities for transformation and improvement of operations, while on the other, it renders some organisations' entire business models inadequate for the globalised market.

The phenomenon of digital transformation has completely changed the behaviour and expectance of clients in the global market. Clients no longer just expect organisation to respond to their articulated needs, but also to anticipate and address the future needs that they themselves have not yet become aware of. Dissatisfied clients are just a click away from taking their business to a competitor, which is why organisations are forced to redesign their businesses, or even completely alter their business models to survive in the market, attract new, and retain existing customers.

Organisations in all industries are facing the pressure to go digital and are aware that this must be done as promptly as possible — before they fall behind their digitally-oriented competitors or completely new entrants to the market [10].

However, in the Industry 4.0 settings, organisations are directly or indirectly faced with ambivalent effects of technology. On one hand, they are mostly driven by their desire to improve efficiency and customer satisfaction, while on the other hand, are most commonly inhibited by their lack of competences and financial resources [22].

The idea of digital transformation encompasses the transformational effects of SMACIT (social, mobile, analytics, cloud and Internet of Things) technology. Digital transformation can be broadly defined as the use of technology for a radical improvement of an organisation's performance and success.

Ismail, Khater and Zaki [7] provided a more specific definition of digital transformation, designating it as a “process through which companies converge multiple new digital technologies, enhanced with ubiquitous connectivity, with the intention of reaching superior performance and

sustained competitive advantage, by transforming multiple business dimensions, including the business model, the customer experience (comprising digitally enabled products and services) and operations (comprising processes and decision-making), and simultaneously impacting people (including skills talent and culture) and networks (including the entire value system)” [7].

Despite the need for a comprehensive and systematic approach to digital transformation that would encompass all the elements, from prioritisation, through coordination mechanisms, to implementation steps, the academia has not yet proposed a coherent frameworks or a set of guidelines for steering digital transformation [4], [11].

The first step in defining such a framework is to systemise the critical success factors (hereinafter abbreviated CSFs) of successful digital transformation. In line with the described research topic and the identified research problem, we attempted to answer the following research question:

RQ1: What are the critical success factors of digital transformation?

The answer to the research question is provided in the Research results section, through a systematic overview or critical success factors within the 6 identified dimensions. Each critical success factor is described and explained in detail.

Research methodology

The theoretical research was conducted as a review of relevant literature. The literature review process incorporated following phases: planning the review, conducting the review, and reporting the review.

The first stage of the literature review included a set of activities aimed at establishing a protocol for performing the second stage. The defined framework incorporated a document searching strategy, criteria for inclusion and exclusion of research material, as well as a strategy for extracting and synthesising the extracted data.

The search for papers was performed via a service provided by the Serbian Library Consortium for Coordinated Acquisition (Kobson). The following electronic databases were included in the search for the research material: Web

of Science, Scopus, AIS eLibrary. The research strategy involved using the following search terms: “digital business transformation” or “digital transformation” or “digital business agility” or “digital agility”. The primary inclusion criteria were as follows: papers must have been published between 2011 and 2018, published in English, published in a reviewed academic journal and conference proceedings, and containing the defined search terms in the paper title. The final step in defining the framework for the literature review was to define the strategy for data extraction and synthesis of extracted data. The data extraction process involved repeated reading of relevant papers and identification of data relevant for answering the research question.

We analysed the titles and abstracts of all papers referenced in Table 1, and subsequently thoroughly analysed the papers selected in line with the defined protocol. A total of 17 relevant papers remained after the exclusion criteria had been applied. These papers were successively subjected to qualitative analysis by means of text coding [12].

An overview of the total number of matches for each of the queried electronic databases is given in Table 1.

In addition to the search results presented in Table 1, we conducted a search for papers published in Serbian in the Serbian Citation Index database (SCIndeks), using the search string “digital transformation”. Out of 17 matches, only four papers complied with the defined criteria, and were included in the systematic literature review.

The following chapter includes the research results obtained using the described research methodology.

Research results

Results of the theoretical research are presented in Table 2. We identified a set of 35 critical success factors of

digital transformation and divided them into 6 groups – dimensions:

- A Context and contents of digital transformation
- B Vision and strategy
- C Organisational capacities and capabilities
- D Organisational culture
- E Human resources capabilities and competences
- F Technology

The following text contains detailed descriptions of all CSFs of digital transformation within respective dimensions listed in Table 2.

Context and contents of digital transformation

We identified a total of four CSFs within the dimension “Context and contents of digital transformation”. The first CSF was titled “Understanding of the general context of digital transformation (era, economy, industry, individual)” (Table 2). This CSF incorporates several broad aspects of digital transformation (listed in brackets within the CSF title) that directly or indirectly impact organisations. The world is in the era of the fourth industrial revolution (Industry 4.0), which builds on the results of the previous three, but utilises new digital technology to the maximum extent, making generation and dissemination of innovation faster than ever. A new global economy, more dynamic, with more intensive competition, and more customisation, is emerging. The industrial perspective highlights how the disruptive nature of digital technologies caused a revolution in the way whole industries operate, and erased the traditional borders between them. Digital transformation also manifests itself in the concept of “extended persona”, i.e., changes in how individuals present themselves and communicate caused by technological advances. This led to an exponential increase in the volume of digital data, creating a flood of information that bypasses all barriers [7].

Table 1: Total number of matches for each of the selected electronic databases

Source	Number of papers matching search terms	Number of papers included in further analysis
Web of Science	450	29
Scopus	418	23
AIS eLibrary	902	19
Total:	1.777	71

Source: Authors.

Table 2: Critical success factors of digital transformation, grouped into dimensions

	Dimension / Critical success factor (CSF)	Sources
A.	Context and contents of digital transformation	
1.	Understanding of the general context of digital transformation (era, economy, industry, individual)	[7], [9], [11], [13], [16], [17], [23].
2.	Awareness of internal and external drivers of digital transformation	
3.	Understanding of the potential content of digital transformation	
4.	Understanding of the impact of digital technologies on key elements of the business model	
B.	Vision and strategy	
1.	Need for digital transformation recognised in the business strategy	[1], [4], [5], [6], [7], [10], [11], [14], [18], [19], [20].
2.	Defined digital transformation strategy	
3.	Established performance management methodology	
4.	IT strategy aligned/integrated with digital transformation strategy	
C.	Organisational capacities and capabilities	
1.	Digital agility (timely detection and prompt reaction)	[3], [5], [6], [11], [15], [16], [23].
2.	Client-centric approach	
3.	Seamlessly integrated offline (physical) and online (digital) channels	
4.	Digitalisation of products, services and interactions with clients	
5.	Harnessing analytics for adapting products and services	
6.	Optimised business processes and operational excellence	
7.	Data-driven digital process automation	
8.	Multi-level and multi-speed organisation for faster reaction	
9.	Networking and integration with external partners	
10.	Capacity for funding digital transformation initiatives	
D.	Organisational culture	
1.	Openness towards change	[3], [5], [6], [7], [8], [10], [21], [23].
2.	Fostering a digital mindset	
3.	Cooperation and cross-functional efforts	
4.	Stimulating environment that encourages innovation	
5.	Willingness to learn	
6.	Willingness to take risks and tolerance towards failure	
7.	Communication and participation in decision-making	
E.	Human resources capabilities and competences	
1.	Level of digital skills and knowledge	[5], [6], [7], [19].
2.	Ability to recognise potential	
3.	Ability to acquire and retain talent	
4.	CDO (Chief Digital Officer) role	
F.	Technology	
1.	Flexible IT infrastructure	[1], [2], [5], [6], [11], [15], [18].
2.	Digital operational platform	
3.	Digital services platform	
4.	Developed business analytics system	
5.	IT sector's capacity for bimodal operations	
6.	IT security	

Source: Authors.

Digital business transformation is a major challenge for any organisation, which is why the first step in this process should be to answer the question “Why transform?” Digital business transformation can be driven by several factors, which is the reason why the second CSF, “Awareness of internal and external drivers of digital transformation”, was included in Table 2. Ismail et al. [7] divided the drivers of digital transformation into two major groups: internal motivations and external triggers. Internal motives

and external triggers jointly form the context of digital transformation, rendering such a dichotomy conditional, as most internal and external drivers of transformation are convergent.

Internal motivations include finance, operations, employees, differentiation, and innovation. That is, organisations are motivated to transform due to decreased sales and financial pressure on the core business [11]. They are attempting to secure social and economic benefits for all

stakeholders, with particular emphasis on employees, who demand greater interaction and cooperation with clients, improvement of organisational IT capacities, as well as greater flexibility and comfort in their working environment. Operational motivations of digital transformation are associated with achieving greater efficiency and work productivity. Many organisations see application of digital technology as an opportunity to adopt innovations and differentiate from the competition [7].

External motivations and triggers of digital transformation include evolution of technology, the environment, competition, and start-ups. New technologies cause changes in the market that compel organisations to mobilise their entire digital resources and come up with prompt responses. In addition to that, new technologies have improved connectivity, mobility, and allowed for unlimited access to social networks. This caused tech-savvy and networked clients to completely change their behaviour and expectations from organisations [7]. Clients nowadays actively seek better service at lower prices [23].

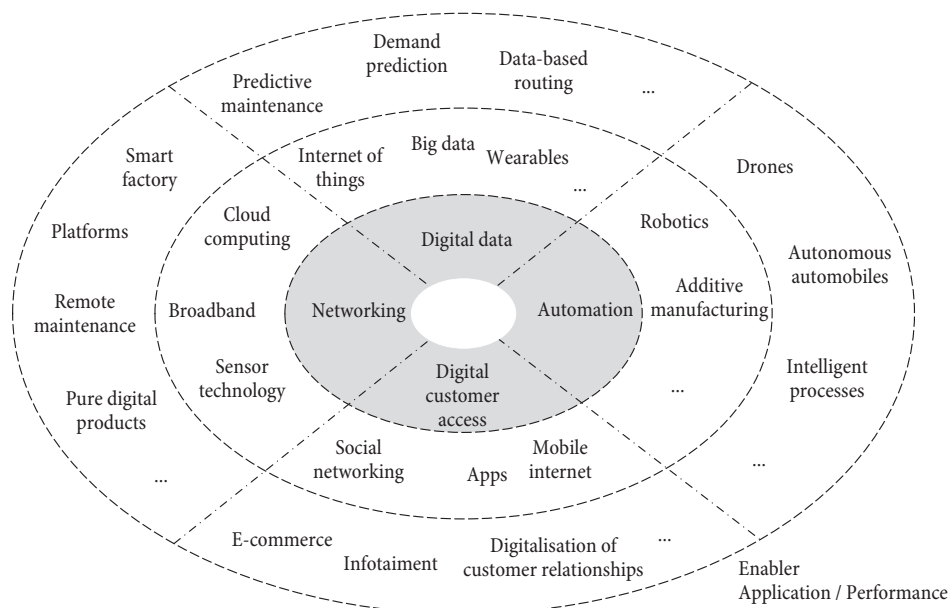
An increasing number of already digitalised competitors in the global market, operating with better business models and offering better value propositions to their clients at lower prices, is also an external trigger for digital transformation [23]. Innovative start-ups are yet another external trigger of digital transformation, since

they are based on entirely novel, digitally agile business models that pose a serious threat to existing business models [7].

The second step organisations must make on their journey towards digital transformation is to answer the question “What should be transformed?”. Organisations must explicitly define the content to be transformed. Therefore, “Understanding of the potential content of digital transformation” is included in Table 2 as the third CSF.

Wade [23] listed seven categories of content that could potentially be digitally transformed: business model (how an organisation makes money), organisational structure, people, processes, IT capability (how information is managed), offerings (products and services offered by the organisation), and the engagement mode (how an organisation engages with its clients and other entities). According to the same author, these elements are the most important in terms of digital transformation. Schallmo and Williams investigated technological aspects of digital transformation and identified specific technologies that facilitate digital transformation. The authors divided digital technologies and their applications into four categories - digital data, automation, digital customer access, and networking — and presented them in a figure illustriously titled “The digital radar” (Figure 1) [17].

Figure 1: The digital radar with technologies and applications



Source: Adapted from [17].

Ismail et al. [7] focused on three business dimensions that can be transformed (Figure 2):

- Operations: can be transformed at different levels, from business process reengineering, through business network redesign, to business scope redefinition.
- Customer experience: involves generating digitalised products and services.
- Business model: can be transformed in different ways, from digitally altering the present model, to devising a completely new digitalised business model.

As Figure 2 depicts, Ismail et al. [7] suggest that the business model is the most challenging area for business transformation, since it involves all elements within the organisational value chain and the entire value system. Because of such significance, “Understanding of the impact of digital technologies on key elements of the business model” is introduced as the fourth CSF in Table 2.

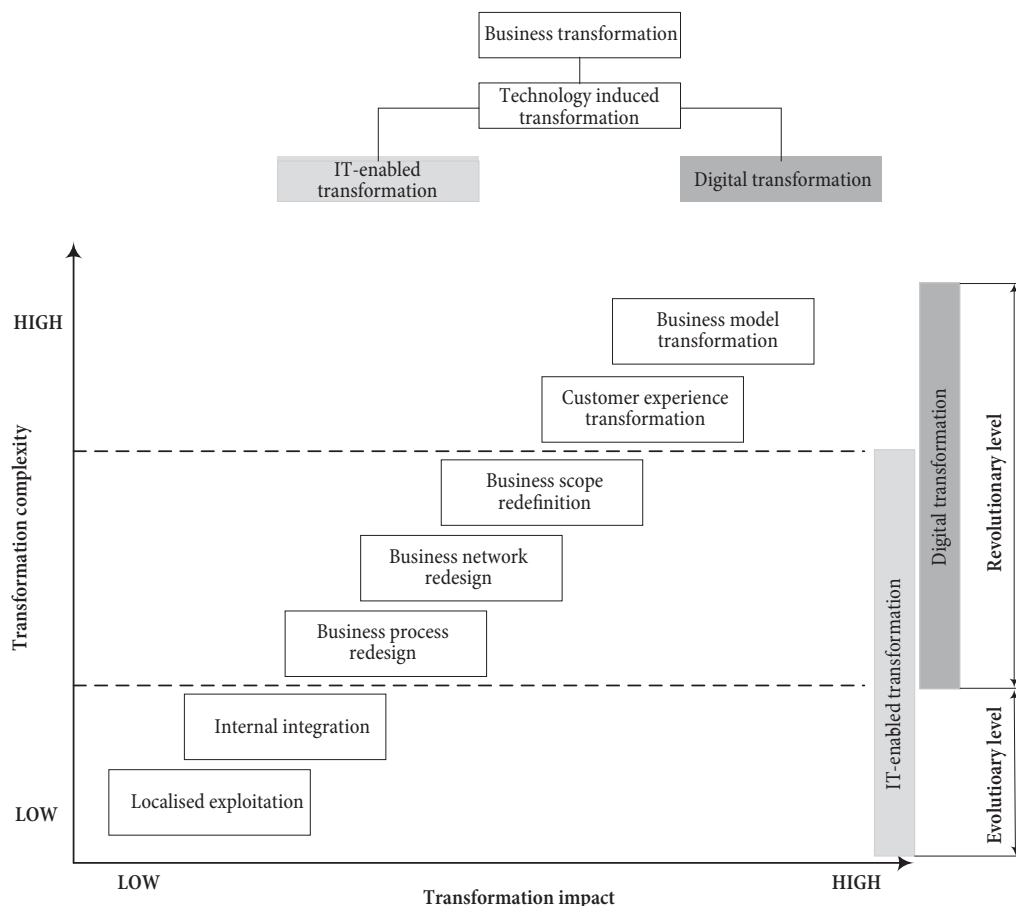
Schallmo and Williams [17] state that the business model is “the basic logic of a company that describes

what benefits are provided to customers and partners”. A business model depicts how an organisation generates its revenue, and how it differentiates from competitors to consolidate customer relations and ensures competitive advantage through created value [17]. According to the same source [17], a business model is composed of the following dimensions and elements:

- The customer dimension — contains the customer segments, customer channels, and customer relationships
- The benefit dimension — includes products, services, and values
- The value-added dimension — includes resources, skills, and processes
- The partners dimension — includes the partner, partner channels
- The financial dimension — includes revenues and expenses.

It is every organisation’s goal to combine the listed business model elements in a way they reinforce each

Figure 2: Positioning digital transformation



Source: [7].

other and act in synergy. Sathananthan et al. [16] define a business model as an abstract representation of an organisation and its operations.

Digital transformation of a business model can be defined as its adjustment to the technological progress and innovation that trigger changes in consumer and social behaviour. In a 2018 paper, Kotarba presents the scope of changes in the morphology of business models in modern organisations that happened over the last decades [9].

Good design and implementation of a business model and diligent strategic analysis are required for technology innovations to become commercially successful. In absence of those, even the most creative organisation will fail [13].

Vision and strategy dimension

As presented in Table 2, we included a total of four CSFs of digital transformation in “Vision and strategy” dimension. The CSFs are described in the following text.

Given that the matter of digital transformation is still in an evolutionary stage, organisations should carefully consider their mission, vision and strategic focus when choosing the model and the framework to follow in the process of digital transformation [14].

Organisations must have a clear vision with future positioning for digital transformation in order to achieve it. The vision must be coupled with an aspiration for improvements, and readiness to learn from interactions with customers, partners, and employees, as well as tight feedback loops that allow the organisation to revise its vision and in turn, update its products and services [5].

Over the last several years, organisations in almost all industries have undertaken numerous initiatives for exploring new digital technologies and instrumenting their advantages. This was, however, followed by a transformation of core business operations, products and processes, as well as organisation structures and management concepts. Organisations need practical guidelines for managing such complex transformations. Above all, an organisation should recognise the need for digital transformation, and subsequently formulate a digital transformation strategy, as a central concept that integrates all the important elements — coordination, integration mechanisms,

and implementation [11], “author”:{“dropping-particle”:"",“family”:“Matt”,“given”:“Christian”,“non-dropping-particle”:"",“parse-names”:false,“suffix”:""},{“dropping-particle”:"",“family”:“Hess”,“given”:“Thomas”,“non-dropping-particle”:"",“parse-names”:false,“suffix”:""},{“dropping-particle”:"",“family”:“Benlian”,“given”:“Alexander”,“non-dropping-particle”:"",“parse-names”:false,“suffix”:""}],“container-title”:“Business and Information Systems Engineering”,“id”:“ITEM-1”,“issue”:“5”,“issued”:{“date-parts”:[["2015"]]},“page”:“339-343”,“publisher”:“Springer Fachmedien Wiesbaden”,“title”:“Digital Transformation Strategies”,“type”:“article-journal”,“volume”:“57”,“uris”:[“http://www.mendeley.com/documents/?uuid=3ce5ebb1-f3b8-4e4b-b6e1-556f15ebdd3d”]},{“id”:“ITEM-2”,“itemData”:{“DOI”:“10.5937/tehnika1702273s”,“ISSN”:“0040-2176”,“abstract”:“Using data from FTSE 350 firms, we examine factors influencing explicit relative performance evaluation (RPE)[20].”}

Sebastian et al. [18] articulate two types of digital transformation strategies that they identified in an empirical research on a sample of 25 large organisations undergoing digital transformation: customer engagement strategy (CSS), and a digital solutions strategy (DSS). Organisations following a customer engagement strategy strive to build customer loyalty and gain their trust by offering superior, innovative, personalised, and integrated customer solutions by harnessing the analytical capabilities applied to customer data, as to better understand and anticipate different customer demands.

A digital solutions strategy is aimed at reshaping the organisation’s value proposition by integrating a combination of products, services and data. This type of digital strategy is driven by research and development efforts that seek to anticipate customer needs, not just respond to present ones. An efficient digital solutions strategy always involves acquisition and utilisation of additional data, often gathered via sensors [18].

Berman [1] concludes that key areas for organisations to confront the challenges of the new digital age include: reconfiguring the customer value proposition (what is being offered) and reshaping the operating model (how it is delivered). So far, most organisations focused on one of these areas through a set of specific initiatives. Products and services, information and customer engagement

can be reshaped using new capabilities for mobility, interactivity and access to information. The operating model can be adapted so that customer preferences and requirements affect each activity in the buying and selling chain. This requires integration and optimisation of all business activities, as well as efficient tracking and managing of data associated with these activities. An organisation's strategic path to transformation will be determined by which of the two fields is emphasised in the transformation process [1].

This points to two CSFs of digital transformation that we defined in Table 2, "Need for digital transformation recognised in the business strategy" and "Defined digital transformation strategy".

The goal of digital transformation is to create added business value. Organisations can improve their prospects of achieving this goal by defining a clear digital transformation strategy to coordinate many independent threads of digital transformation and facilitate identification of optimal goals for their digital transformation [4]. As the authors state, "...a digital agenda has to be aligned with other operational or functional strategies and can act as a unifying concept for integrating all coordination, prioritisation and implementation efforts of a firm's digital transformation efforts" [4].

Establishment of a strong coordination mechanism through rules of communication and cooperation and with efficient management of performance and KPIs (key performance indicators) are of paramount significance to keeping the organisation on track on their path to digital transformation [11]. There is a plethora of strategic planning and strategic management models that can be useful for digitalisation. The balanced scorecard is possibly one of the most recognised models for strategic planning and management. It is used for quick, but comprehensive assessment and monitoring of organisational performance at a strategic level [10].

Emphasis on the need for efficient implementation of a strategy, coordination of activities, prioritisation, and performance measurement points to the necessity of developing a performance management methodology, which we identified as the third CSF within the "Vision and strategy" dimension, as presented in Table 2.

Since technologies drive digitalisation, organisations must continuously harmonise their business operations with new technologies through the consistent implementation of their IT strategies. This requires digitalisation and automation, as well as an IT infrastructure ready to facilitate data integration, process orchestration, and analytics. In addition to that, it is useful to implement holistic methods for measurement and benchmarking, based on data from both internal and external sources, which would facilitate forecasting and timely adaptation [6].

A digital transformation strategy is considered as a comprehensive, company-wide strategy that guides an organisation throughout its entire journey towards digital transformation. As such, it surpasses functional thinking and holistically manages opportunities and risks associated with digital technologies that trigger and facilitate transformation [19].

A distinct feature of digital transformation strategy is that it incorporates all business segments and dimensions of an organisation, as well as at least two coordination mechanisms. First, coordination with the business strategy, and second, coordination with functional strategies in a way that it integrates different strategy levels within an organisation [4], [11].

A digital transformation strategy should [7]:

- Align and harmonise the business strategy and IT strategy
- Translate the digital layer of a business strategy into different functional strategies, acting as a missing link
- Provide appropriate guidelines for transformation in order to reach the desired future state
- Consider wider requirements for organisational restructuring and acquisition
- These characteristics, as well as the mentioned alignment mechanisms, position the digital transformation strategy at the level of a business strategy in an organisation's strategy hierarchy. This allows for better utilisation of vast opportunities offered by the digital environment and readily available digital technologies [18]. Figure 2 illustrates the role of a digital transformation strategy.

From all described above, we identified the fourth CSF within this dimension, "IT strategy aligned/integrated with digital transformation strategy"

Organisational capacities and capabilities dimension

There are vast differences in digital maturity and potential for digital pressure on an organisation among industries. Due to such variances, there is no unique approach for achieving successful digital business transformation. However, regardless of the roadmap and the plan they are attempting to implement, organisations should develop a fundamental capability that Wade [23] describes as “digital business agility”. This ability has three components: hyperawareness, informed decision-making, and fast execution. Hyperawareness component can be defined as an organisation’s ability to timely detect future trends that may impact it. Digital tools, such as social media, connected devices, and analytics can serve as “digital barometers” that constantly monitor the status quo and signify relevant changes. Informed decision-making component is the capability for active analysis of information resulting from practicing hyperawareness. The effects of this activity are manifested as increased capacity for making timely fact-based decisions. The third component, fast execution, includes two sub-elements: speed and implementation. Both elements are essential for accomplishing a successful digital business transformation. Fast execution is the response capability that involves turning decision into action and, according to Wade, fast innovation and high agility are the two most dangerous traits of new digital disruptors (start-ups) [23].

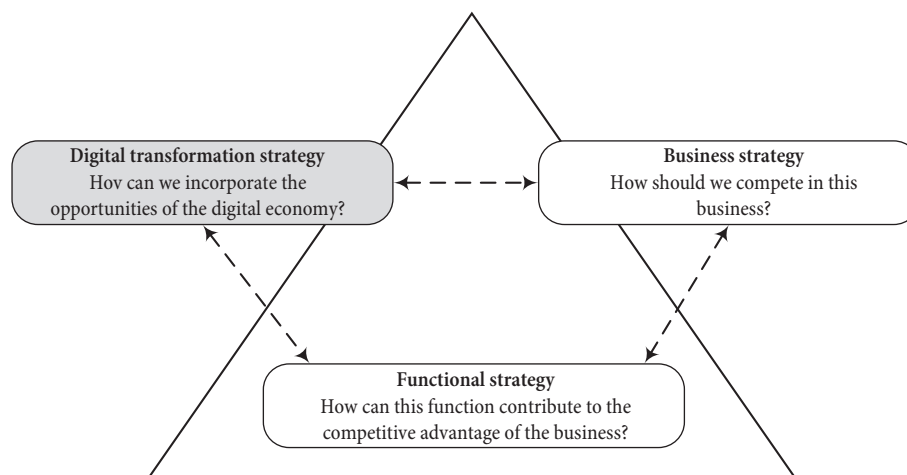
Agility is an integral part, or even the DNA of a business strategy, that compels an organisation to continuously and finely align its organisational structure with ever changing market conditions. A digital business strategy is based on organisational agility to enable rapid adaptation through cooperation and change that surpasses traditional organisational limits. Organisational agility involves transforming business in accordance with changes in customers’ needs, and relies on novel operational and business models, capability for quick scaling and learning. Proper change management prepares employees and sets the organisation on a new course [5].

Other authors [6] also concur that continuously variable market conditions compel an organisation to a degree of flexibility that involves: organisational agility, scalability, and adaptability.

Based on the review of relevant literature, we concluded that “Digital agility” (timely detection and prompt reaction) can be considered the most significant CSF of digital transformation. This CSF was included in the dimension “Organisational capacities and capabilities”, as presented in Table 2.

Modern business is oriented on customers, with a preference for direct contact with them. In such a way, organisations develop more profound relationships with the client through their products. Digitalisation of sales and marketing channels creates opportunities for a more personal approach to customers and customer care. We

Figure 3: Positioning digital transformation strategy



Source: [7].

recognised this as a CSF and included it in Table 2 under the name “Client-centric approach”.

Sathananthan et al. [16] conclude that a client-centric approach is crucial for executing a successful digital transformation within an organisation. More specifically, ideas for new offerings and improving interaction with clients by way of digital technology should be the epicentre of new digital transformation. According to Sahu et al. [15], the customer dimension concerns the entire customer interaction journey with the organisation through digital transformation. The focus is on a two-way interaction between customers and organisations. Two significant aspects should be considered when aiming to improve customer experience through digital transformation: customer touch points, and customer engagement. Likewise, Hartl and Hess [3] particularly highlight customer-centricity as a key factor, interpreting it as organisation’s orientation of all activities to satisfy customer needs (products and processes are designed with a focus on customer needs and are continuously adapted to changes in these needs).

According to Holotiuk and Beimborn [5], seamless customer experience stands out as the most common critical success factor. It focuses on the integration of all offline (physical) and online (digital) channels. Intangible digital experiences around the products are superior to the physical use of the product [5].

“Seamlessly integrated offline (physical) and online (digital) channels” was introduced as the third CSF within the “Organisational capacities and capabilities”, as presented in Table 2.

Augmented reality, customer-focused technology, and digital decision support lead to digitalisation of products and services, as well as interaction with clients, which allows organisations to gain deeper insight into data on clients and their activities. Organisations are compelled to provide permanent access to digitalised products and services via digital channels. Furthermore, business models must allow for each product to be extended with a corresponding digital service. Continuous data analytics can enable an organisation to create customised products and services, as well as individualised messages, tailored to customers’ wishes and preferences [5].

In accordance with the arguments made above, we included “Digitalisation of products, services and interaction with clients” in the “Organisational capacities and capabilities” dimension as the fourth CSF.

In order to help organisations overcome the challenges of digital transformation, Imgrund et al. [6] investigated the possibility of applying business process management (BPM) concepts for creating a management framework for digital transformation. Based on the results of a literature review, they identified characteristic requirements of digital transformation, after which they analysed BPM’s potential for addressing these requirements. The authors argue that organisations can improve the feasibility of digital transformation by achieving a particular level of organisational and process maturity.

Hence, organisations can successfully address the requests of digital transformation by employing the concept of business process management. Therefore, we identified “Optimised business processes and operational excellence” as a CSF and included it in Table 2 as the sixth CSF under “Organisational capacities and capabilities”. Functional business process management can assist in resolving various digitalisation requirements, which may in turn increase the likelihood of a thorough transformation process. This means that organisations may benefit from mechanisms and structures established through the practice of BPM and use them as a starting point on a long journey to becoming digitally transformed.

According to Holotiuk and Beimborn [5], operational excellence is achieved through the development of digitalised, highly automated, data-driven processes. For this reason, we included “Data-driven digital process automation” as the seventh CSF under “Organisational capacities and capabilities”.

This allows supply chains to anticipate customer demand and adapt quickly. Also, automated service management and complete automated client interaction, if introduced to the business model, increase responsiveness and efficiency [5].

Same authors [5] argue that a multi-level and multi-speed organisation is required for a more efficient reaction, which would enable an organisation to simultaneously remodel its core operations and peripheral activities.

Such organisations are capable of rapidly responding to clients' needs, all while balancing internal constraints with a need for a rapid reaction. A “multi-level and multi-speed organisation” was introduced as the eighth CSF under “Organisational capacities and capabilities”, as presented in Table 2.

Organisations should strive to form strong, collaborative partnerships by utilising network effects with open systems integration. In addition, extensive external orientation facilitates learning and innovation. Cooperation surpasses organisational limits and extends to customers, technology vendors, and suppliers. Organisations allow partners to cooperate as specialised experts and use partnerships for specific innovation [5]. “Networking and integration with external partners” was therefore identified as the ninth CSF within “Organisational capacities and capabilities”, as presented in Table 2.

The financial aspect of digital transformation is very significant since it relates to an organisation's capability to finance digital transformation efforts. Financial resources simultaneously serve as a driver and a limiting factor of digital transformation. That is why organisations should recognise the need for transformation in advance and explore the possibility of funding it in a timely manner [11]. Imgrund et al. [6] also stress that the success of digital transformation depends also on securing reliable funding for digital initiatives, since unforeseen contingencies can otherwise jeopardise these initiatives. In line with this, we introduced the tenth CSF within the group “Capacity for funding digital transformation initiatives”.

Organisational culture dimension

In their paper, Hartl and Hess [3] stipulate that, although organisational culture is often considered a strategic resource with the potential for assisting digital transformation, it can also be the source of inertia that inhibits change. Both in research and practice, cultural changes are deemed significant for a successful digital transformation, especially for managing disruptive changes caused by new technologies. As a result of their research endeavour, the authors have isolated several organisational values that are of key significance to the success of digital transformation:

openness towards change, innovation, willingness to learn, risk affinity, tolerance towards failure, communication, and participation. Business experts agree that the success of digital business transformation does not depend solely on the adoption of adequate digital technology, but also radical strategic and cultural changes within the organisation [10]. However, the most significant cultural barrier — one often underestimated and not recognised by organisations at the beginning — may be the reluctance to change and adapt to something as radical as digitalisation.

It is clear that “Openness towards change” is a CSF of digital transformation, which is why we decided to include it as the first CSF within the dimension “Organisational culture”.

Organisations must be aware of the significance of providing active support to employees, so that they may prepare for using new technologies and assume a positive attitude towards change. In addition, organisations must encourage and inspire employees to develop a digital mindset, which vastly differs from the traditional business settings [7].

For this reason, we included “Fostering digital thinking” as the second CSF of digital transformation in the “Organisational culture” dimension (Table 2).

An organisation's focus on promoting innovation is also an important element. Organizations are encouraged to explore the possibilities that new digital technologies provide for upgrading user experience and changes in interaction with clients. This can be achieved by looking into all modes of interaction with the customer and integrating customer interaction across all channels, both physical and digital [1], [8].

A “Stimulating environment that encourages innovation” is undoubtedly an important CSF of digital transformation, which is why we included it in Table 2, as the fourth CSF under “Organisational culture”.

Hartl and Hess [3] emphasise willingness to learn in the context of support to successful digital transformation, defining it as “the organisation's pursuit of continuous advancement through the acquisition of new skills and knowledge.” Pace at which digital initiatives are realised can be directly related to organisational culture, which should encourage experimenting, as well as be tolerant

towards errors and failure. Innovation and experiments, which at times may, naturally, end in failure, necessitate a certain level of propensity to risk, as well as repeated attempts [5], [6], [7], [23].

In the process of literature review, we recognised two additional CSFs, whose significance was described in the previous paragraph: “Willingness to learn” (the fifth CSF under “Organisational culture”) and “Willingness to take risks and tolerance towards failure” (the sixth CSF under “Organisational culture” in Table 2).

Cooperation and cross-functional work encourage the creation of new ideas and propel innovation. Organisations are abandoning silo-thinking [5], [21], which is why we included “Cooperation and cross-functional work” in Table 2 as the third CSF under “Organisational culture”.

In order to fully harness the potential of cooperation, organisations must establish proper coordination and co-creation in decentralised activities [6]. Hartl and Hess [3] emphasise an organisation’s capacity to build internal and external networks for exchanging knowledge and information, as well as support an open non-hierarchical discussion and democratisation of the decision-making process. Therefore, “Communication and participation in decision-making” can be considered yet another CSF of digital transformation within the “Organisational culture” dimension.

Human resources capabilities and competencies dimension

The need for digital skills, knowledge, and talent is on top of nearly all organisations’ lists. In order to devise and execute their digital business strategies, organisations must train their employees in all necessary digital skills, revise their reward systems, and ensure financial resources for developing human capital [5]. Imgrund et al. [6] emphasise the need for IT skills and abilities, especially in data management and data processing technologies. Besides clearly technical IT skills, a digital business strategy requires some non-IT skills as well, such as visioning, collaboration, and organisational change management [5].

In alignment with the attitudes in the reviewed relevant literature, we decided that the “Level of digital

skills and knowledge” must be included as a CSF of digital transformation. As presented in Table 2, we classified it under the dimension “Human resources capabilities and competences”.

Organisations should question the need for developing a collaborative working environment and ensure that the digital transformation project is adequately staffed. Staff structure can be assessed in terms of maturity, through an analysis of their roles, expertise, and abilities. As tasks become increasingly complex, organisations can benefit from greater employee specialisation, but also from relying on knowledge management mechanisms in order to ensure knowledge transfer and cooperation [6]. Similarly, Ismail et al. [7] advise organisations to pay greater attention to the structure of the staff, talents, skills and leadership. Aforementioned authors’ conclusions lead us to include “Ability to recognise potential” as a SCF within the “Human resources capabilities and competences” dimension, as presented in Table 2.

Formulation of a digital transformation strategy should involve decisions on how to acquire individuals with necessary skills and talents, so that organisations may make full use of the digital trends. Ismail et al. [7] recommend that organisations should consider on-demand talent markets as strategic sources, balance full-time and part-time talent, as well as strive to develop such an environment where the best people want to work. New talent is attracted by the opportunity to participate in a digital transformation, by a leader’s digital literacy, and an understanding of the power of digital technologies within a company [5].

“Ability to acquire and retain talent” was hence listed in Table 2 as the second CSF within “Human resources capabilities and competences”.

Until recently, chief information officers (CIO) were responsible for digital innovation. Over the last several years, organisations expect that their CIOs extend their purely technical roles and become business strategists. These new responsibilities are highly complex and exert a great amount of pressure on CIOs. In addition to that, novel digital technologies require a different mindset and a different set of skills compared to previous waves of transformational technology. This may be yet another

reason why CIOs are often not adequately equipped for steering digital transformation. An increasing number of organisations is instituting an additional top-level management position — chief digital officer (CDO) — making it one of the fastest-growing executive positions. Regardless of their formal position in an organisation, a CDO promotes digital transformation in order for it to become an organisation's strategic priority. A CDO's role, therefore, includes supporting top management in formulating and executing a digital transformation strategy. Internally, a CDO encourages cross-functional collaboration and mobilises the entire organisation, at all hierarchical levels. It should also be emphasised that CDOs have a more comprehensive role than heads of individual digital business units: CDOs assume authority and responsibility for digital initiatives at a level above individual business functions and attempt to transform the entire organisation [19].

Together with chief information officers or even chief executive officers, new positions such as CDOs are also emerging as potential candidates for driving the transformation [7].

“CDO (Chief Digital Officer) role” is a CSF of a successful digital transformation, and as such, we included it in Table 2 as the fourth CSF under “Human resources capabilities and competences”.

Technology dimension

Information technology has a strategic role in every organisation's prospective technological ambitions. An organisation must decide whether it wants to become a market leader in the application of technology, with the possibility of developing its own technical standards or wants to rely on already established standards, viewing technology as an instrument for realising its business operation. Opting for a role of a market leader can enable an organisation to gain competitive advantage and make other organisations dependant on its technical standards, but also bears risks and necessitates certain technological competences [11].

In the context of technology, Sahu et al. [15] emphasise adaptability, usability, and integration of digital technologies

and their applications into the present organisational infrastructure.

In line with this, we introduced “Flexible IT infrastructure” as the first CSF within the “Technology” dimension, as shown in Table 2.

In their study on digital transformation in large organisations, Sebastian et al. [18] argue that large organisations must opt for one of the previously mentioned digital transformation strategies: a customer engagement strategy, or a digital solutions strategy. Choice of one of the strategies will outline the priorities for building two technology-enabled infrastructures: operational backbone, and a digital services platform. The authors define the operational backbone as a technology and a business capability that ensures efficiency, scalability, reliability, quality, and predictability of core operations. Operational backbone should ensure the efficiency of transaction processing and decision-making. Ever since the 1990s, organisations have been building their operational backbones by implementing ERP systems and customer relationship management (CRM) systems, aiming for the benefits of standardised and integrated systems and processes. Based on such perspectives in the analysed literature, we conclude that “Digital operational platform” should be introduced as CSF within the “Technology” dimension.

Since the operational backbone is designed for reliability and efficiency, it doesn't offer responsiveness and flexibility organisations need for rapid digital innovation. That is why, in addition to the operational backbone, organisations need a digital service platform, which Sebastian et al. [18] define as a technology and a business capability that facilitates rapid development and implementation of digital innovation. A digital services platform should ensure fast innovation of an organisation's critical digital offering to customers.

Both the operational backbone and the digital services platform rely on technology, but what makes them so powerful is the business capabilities they provide. An operational backbone supports efficiency and operational excellence, while a digital services strategy facilitates business agility and rapid innovation [18]. Ergo, “Digital services platform” was added as the third CSF within “Technology” dimension.

In their paper on critical success factors of digital business strategy, Holotiuk and Beimborn [5] identified information technology as a separate dimension, particularly emphasising the use of data and information. They pointed to the vital significance of big data analytics and making sense of both structured and unstructured data, acquired from both internal and external sources and stored within a central data repository. Analytics are a necessity for making the decision-making process data-driven, enabling it to support rational economic decisions, learning about clients, and turning data into knowledge. Data is a source of competitive advantage since information is the centrepiece of business models in today's digital business environment. According to Berman [1], organisations must be prepared to tightly integrate new data processing technologies into their processes and decision-making. Organisations should be equipped with tools for extracting predictive insights from analytics and use data to optimise their digitalised supply chains and client interaction [1]. We have included "Developed business analytics system" as the fourth CSF under "Technology".

According to the findings of Holotiuk and Beimborn [5], digital transformation fundamentally alters the traditional role of IT in an organisation. In its new role, IT does not only provide support to business, but rather influences the creation of business value through the utilisation of information technology. IT sector's capacity for bimodal operation enables organisations to manage IT at two different speeds, with quick results, short response times, extreme flexibility on the client-side, and a strong internal operational backbone on the inside. This bimodal approach facilitates digitalisation with fast front-end changes, simultaneously meeting the background requests. "IT sector's capacity for bimodal operation" was introduced as the fifth CSF within the "Technology" dimension.

As digitalisation poses a risk to IT and data security, organisations must adapt their compliance rules and respond to IT security threats by formulating guidelines for conduct, risk management systems, and a comprehensive defence strategy [2], [6]. In accordance with this, we identified "IT security" as the sixth CSF within the "Technology" dimension.

Conclusion

Digital business transformation is a *conditio sine qua non* for modern organisations. The final goal of digital business transformation is to create added business value. Introduction of a vast number of digital technologies in an organisation will not by itself provide the expected benefits. Organisations can make this goal more feasible by defining a clear, comprehensive digital transformation strategy, which should emphasise the key digital advantages. A digital transformation strategy must be aligned both with the business strategy and the functional strategies and integrate different strategic levels within an organisation.

Results of the theoretical research were used for systemising the critical success factors within the 6 introduced dimensions. Such systemisation, coupled with a detailed description of individual CSFs, may serve organisations on their journey towards meaningful business transformation.

In addition to that, the research results presented in this paper present a sound basis for future research in the domain of digitalisation and digital business transformation. These topics, even after an entire decade in a limelight, have not yielded many research papers, which indicates an area with various opportunities for further research in which original contributions are yet to be made.

Finally, the obtained research results will serve as a basis for a future empirical research we plan to realise in near future. The empirical research will include entities established in Serbia and the neighbouring countries, with the aim of verifying and eventually modifying the CSFs identified and systemised in the theoretical research in line with the results of interviews with expert practitioners.

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BARRIERS THAT SMES IN THE WESTERN BALKANS ARE FACING IN ACCESSING THE SUPPLY CHAINS: A BINARY LOGISTIC REGRESSION APPROACH*

Prepreke s kojima se mala i srednja preduzeća u regionu Zapadnog Balkana suočavaju u pristupanju lancima dobavljača – pristup zasnovan na binarnoj logističkoj regresiji

Abstract

The inclusion of small and medium-sized enterprises (SMEs) in the supply chains is broadly used to leverage the internationalisation of operations of the companies. SMEs in the Western Balkans make up for a vast majority of the companies and tend to be better integrated into the EU and global market. The supply chains enable SMEs to raise their innovativeness and performance. However, large corporations also find mutual benefits in the integration of SMEs into their supply chains. Large supply chains have recently introduced a new approach towards the inclusion of SMEs as a part of their CSR and sustainability strategy. In this paper, we observe the state of play in accessing the supply chains in three non-EU Western Balkan countries, namely Serbia, Bosnia and Herzegovina and Montenegro, as well as in Croatia as the only EU member state from the observed region. It seems that, regardless of the current status of the EU accession process, the observed SMEs are facing the same challenges in accessing the supply chains. Therefore, our research has two goals: 1) to determine whether and in what way the perception of the importance of different barriers affects inclusion in the supply chains, and 2) to determine whether the different-sized companies perceive differently the importance of individual barriers to inclusion in the supply chains. The results have shown that there are no significant differences in the perception of the importance of barriers to inclusion in the supply chains between companies of different sizes. Also, the length of receivables collection period and inadequate and incomplete information on the requirements for participation negatively affect the inclusion of SMEs in the supply chains.

Keywords: *supply chain, barriers, Western Balkans, SMEs, logistic regression.*

Sažetak

Uključivanje malih i srednjih preduzeća (MSP) u lance dobavljača široko se primenjuje kao instrument za što potpuniju internacionalizaciju poslovnih operacija. MSP u regionu Zapadnog Balkana predstavljaju većinu preduzeća koja teže da se što bolje integrišu u evropsko i globalno tržište. Uključivanje MSP u lanac dobavljača omogućava MSP da podignu inovativnost i da bolje posluju, dok velike kompanije takođe nalaze višestruke koristi u uključivanju MSP u svoje lance dobavljača. Odnedavno, veliki lanci dobavljača su uveli novi koncept integrisanja MSP u svoje sisteme, i to kao deo strategije svog društveno odgovornog poslovanja (DOP) i održivosti. U ovom radu posmatramo aktuelno stanje u pristupu lancima dobavljača od strane MSP u tri zemlje koje nisu članice EU, a to su Srbija, Bosna i Hercegovina i Crna Gora, kao i u Hrvatskoj, za sada jedinoj zemlji regiona koja je članica EU. Čini se da se, bez obzira na aktuelni status u pristupanju EU, MSP u sve četiri zemlje suočavaju sa istim barijerama pri uključivanju u lance dobavljača. Stoga, istraživanje ima dva cilja: 1) utvrditi da li i na koji način percepcija važnosti različitih barijera utiče na uključivanje u lance dobavljača, i 2) utvrditi da li kompanije različite veličine na različit način percipiraju važnost pojedinih barijera za uključivanje u lance dobavljača. Rezultati pokazuju da nema značajnih razlika u percepciji važnosti barijera za uključivanje u lance dobavljača između kompanija različite veličine. Takođe, pokazalo se da dužina u naplati potraživanja i neadekvatne i nepotpune informacije o uslovima učešća negativno utiču na uključivanje MSP u lance dobavljača.

Ključne reči: *lanac dobavljača, barijere, Zapadni Balkan, MSP, logistička regresija.*

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Introduction

SMEs are normally considered to be a booster of national economies, as they play an important role for economic growth and development of any country. SMEs are integral part of the innovation ecosystem which is facing different challenges. However, access to market and the financial aspect prevail. According to the literature, inclusion of SMEs in the global value chains (GVC) is defined as the sum of backward linkages (foreign inputs that are embodied in the exports of the country) and forward linkages (exports of intermediate goods of the country that are embodied in the exports of another country) [6].

Inclusion of SMEs in the supply chain is often considered as part of an innovation strategy, but also as one of the actions that are part of the CSR strategy of the company. Certain authors [2], [13], [25] emphasise in their studies that supply management has a significant role in the innovativeness of a company, and that suppliers greatly contribute in creating innovations. In the IMP³rove innovation assessment questionnaire, suppliers are also considered to be one of the sources in generating new ideas and improvements of the products/services. However, according to available research on this topic in the Serbian market [23], it seems that Serbian companies are not eager to use information gathered from suppliers to develop a new product and service concept. More often, companies cooperate with the suppliers in the early stages of innovation and product development. The ability of the suppliers to provide innovative and sustainable solutions and development of solutions integrated into the supply chains generates value both in terms of sustainability and business success [31]. Teece [27] stated that suppliers could be the drivers of innovations, therefore highlighting the need for feeling out the supply markets and detecting the suppliers' capabilities for innovation. Supplier orientation enables to feel out and seize the supply bases, because if the company has no strategic orientation towards its suppliers, feeling out the supply base and the supply market may not be that efficient, may not be strategically managed, or may not occur early enough. According to Pulles, Veldman and Schiele [24], professionalism, specialisation and collaborative attitude of the suppliers, together with

the characteristics of buyer–supplier relationships (e.g., supplier development programmes and statuses of the buyers as preferred customers), increase innovativeness in the supply base. Research has revealed examples of innovations achieved through collaboration and partnerships [5], as well as how intensive buyer–supplier collaboration promotes inter-firm learning and innovative ideas [25].

Considering the involvement of SMEs in the supply chain as a part of corporate social responsibility is actually a recent concept related to sustainable development and sustainable development goals. The rationale behind it is a better overall supply chain performance. There is not a unique definition of sustainable supply chain management (SSCM), but the one provided by Mentzer et al. [15] might be the best to illustrate the win-win approach. They define SSCM as “the systemic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across businesses within the supply chain, for the purposes of improving the long-term performance of the individual companies and the supply chain as a whole”. A study performed by Gimenez, Sierra and Rodon [7] concluded that supply chain collaboration has a significant positive impact on economic, environmental and social performance of a company. For SMEs, potential benefits of their integration in the global supply chains include technology upgrades, improved technical and managerial skills, and an easier and more penetrating market access [11]. There are also benefits for the multinational companies, given that they could develop innovative concepts through SMEs. This way, a faster development of technologies and penetration into markets that are disruptive could be achieved [16]. Carter and Rogers [3] identified the following four factors as SSCM facilitators:

1. strategy – identifying individual SSCM initiatives that are in line with the company's overall sustainability strategy;
2. risk management, including contingency plans for activities within the supply chain;
3. organisational culture that is clearly defined and generally accepted and one that includes employees, as well as high ethical standards, along with concerns for society as a whole and the ecosystem;

4. transparency in terms of communication with key stakeholders and visibility of supply chain activities in both directions.

Serbian authors have also considered the benefits that SMEs gain through their involvement in the supply chains. Thus, integration in export-oriented value chains is considered to be a leverage to increase the competitiveness of the company that assumes its capability to reduce costs and achieve a higher level of specialisation [20]. According to the OECD [17], the participation of SMEs in GVCs brings them benefits. Some of the key benefits include the following: access to global markets at lower cost, which enables SMEs to expand their business and become sustainable in the long run, flexibility in becoming specialised in meeting the needs of large supply chains while ensuring a favourable position in the market, outsourcing as a common model of the engagement of SMEs by large companies, especially in the ICT sector, could strengthen the capacity of SMEs to be internationalised and, last but not least, involvement in the supply chains improves the efficiency and innovativeness of a small firm [19]. However, an UNCTAD study identifies that the greatest challenge for SMEs in accessing value chains through outsourcing is the globalisation process, which very often represents a threat for the SMEs' sustainability by causing dependence which can jeopardise their sustainability in the long run [28]. In addition to the traditional approach to the supply chains, the concept of a green supply chain has received increasing attention in the recent years. The concept of the green supply chain includes all the elements contained in the traditional supply chain, with the addition of some new elements such as the "two-side product movement from producer to customer thus forming the so-called "closed loop" which also includes some new activities such as green recycling and re-manufacturing, reverse logistics and waste management" [1]. It is believed that this concept brings more benefits to companies compared to a purely traditional approach to the supply chain and these benefits can be divided into three groups: material, non-material and emotional benefits (cited in [1]).

Although all of the abovementioned papers emphasise the mutual benefits for buyers and suppliers, there are still plenty of obstacles which SMEs are facing in accessing the

supply chains, which indicates that corporate sector is still searching for a well-balanced SMEs-friendly supplier policy and procurement. In this paper, we aim to explore the significance of the barriers that SMEs are facing when accessing the supply chains. Different literature elaborates on the barriers that SMEs are facing in accessing both public procurements and supply chains. Loader [10] mentions several barriers, including lack of awareness of procurement opportunities and difficulties in getting approved as a supplier. Peck and Cabras [21] identified bureaucracy and the time-consuming procurement process as key disadvantages in public procurements. Uyarra et al [29] highlighted a lack of feedback and communication, contract size, and the procurement process. Perry [22] singles out lack of knowledge/awareness, capacity issues, and complex procurement processes.

There are many similarities between barriers that SMEs are facing in accessing public procurements, as well as supply chains in the corporate sector. [30] elaborate on the challenges faced by SMEs in accessing the supply chains. The authors singled out five main challenges, namely:

1. lack of coordination & cooperation between parties. SMEs would not get in an unfavourable position if it had been aware of the buyers' needs and the demand that could exceed their capacity to deliver the potentially increased amount or quality;
2. potential risk negligence. Because of their size, SMEs can adopt flexible attitudes towards risks when compared to large organisations. This could force SMEs to face major challenges related to scalability and reaction to unstable demand;
3. limited accessible technology. SMEs have restricted access to innovation, which can prompt a misuse of assets, poor execution, and a value-based centre with poor administration. The majority of SMEs rely on manual work, which makes procedure slow and expensive, and this might influence their cash flow;
4. unrealistic approaches. It is not rare that SMEs adhere to unrealistic approaches and predict future sales by relying on the past sales data. Another impractical assumption abided by SMEs is that the supply chain will fix everything, which is not true;

- locked working capital. Because of having less experience or poor track records, SMEs normally have weak negotiation power. They have to pay in advance or quickly after the shipment to their supplier, and at the same time their clients (normally large organisation) require 30 to 90 days payment terms. This results in locked working capital for SMEs for a long period.

SMEs in the selected Western Balkan countries – Challenges faced in accessing the global value chains

SMEs in the Western Balkans (WB) and Turkey make up for 99% of all firms, generating around 65% of the total business sector value added and accounting for 73% of the total business sector employment [19]. In the six countries of the WB, namely Serbia, Bosnia and Herzegovina, Montenegro, North Macedonia, Albania, and Kosovo*¹, SMEs employ between 60% and 80% of the active population, which is on average higher than in the EU. Between 2013 and 2017, the WB and Turkey economies recorded a GDP growth of 3.1% per year on average. In relative terms, out of all the WB countries, Serbia had the largest number of SMEs per inhabitant in 2017, followed by Montenegro, North Macedonia, Kosovo*, Albania, and Bosnia and Herzegovina. Recent studies have concluded that developing economies can achieve significant growth and productivity gains from engaging in GVC-related exports [4], [6]. Similarly, the experience from countries that joined the European Union in or after 2004 shows that participation in GVCs can help small economies accelerate export and income growth. WB countries are not well integrated into Europe's vibrant GVCs. Trade within the region is also limited – it tends to be bilateral and not cluster-like [6].

When measured as a share of GDP, WB countries are significantly less GVC-linked than the new member states (NMS-7), thus reflecting the limited role of exports in these economies. Among WB countries, Serbia, Montenegro,

and North Macedonia have experienced the largest increases in GVC links since 2000 [6]. The GVC links of WB countries are more concentrated in services and low value manufacturing products. These countries are mostly assembly centres in the GVCs in which they operate. However, in NMS 7, GVC links are mostly concentrated in high value manufacturing products. Compared to NMS-7, WB countries are less linked with Germany, which is the most important GVC hub in Europe. On the other hand, several WB countries have strong GVC links with Italy, which may explain the slow export growth in these countries. Two WB countries, Bosnia and Herzegovina and North Macedonia, also show strong links with NMS-7 countries, which is a possible indication of mature investors in NMS-7 outsourcing some of the low value activities. The potential of WB countries lies in their membership in the Central European Free Trade Agreement (CEFTA), whose members have zero tariff on trade. This advantage seems to be still underexploited by the European investors, able to bring capital and trade to the region [6].

In 2016, no economy in the WB countries had in place the tools to support SMEs involvement in GVC [18]. However, by 2019, all of them have introduced programmes to address this issue, whether by generating support for industrial clusters, industrial zones, and promoting business linkages, or supplier upgrading schemes. Bosnia and Herzegovina and Montenegro continue to implement cluster support programmes, while Kosovo* has established one cluster in the metal industry and the renewable energy sector (KIMERK). Serbia has developed the most robust programmes to assist SMEs in upgrading their positioning in GVC by offering schemes for financial support to upgrade machinery [19].

Considering the broad areas that most economies in the region could develop, it is recommended to enhance integration of SMEs into the GVC by facilitating links between foreign direct investment and SMEs. Integration into the GVC is listed among the instruments which could leverage SMEs internationalisation in the region. However, economic diversification inside the economy remains low, and SMEs have limited links with GVC. The conclusion is that by increasing GVC links, WB countries could raise their GDP levels by 3-10 % [6].

¹ This designation is without prejudice to positions on status and is in line with United Nations Security Council Resolution 1244/99 and the Advisory Opinion of the International Court of Justice on Kosovo's declaration of independence.

In the recent years, digital entrepreneurship has been developing, representing the new emerging economic force in the regional economies and the SMEs sector. The entrepreneurs of the new “digital” generations often access GVC easier, which is an advantage for those SMEs operating in the ICT sector. There are interesting products, innovative technologies and promising teams led by founders with ambitious mind-sets. However, there are only few established intermediaries (investors, incubators, and accelerators) and other support systems, resulting in a limited scope of regional ecosystems. The WB region consequently features very few regional success stories of companies that have successfully grew and scaled up to offer their products to a wider base of consumers, clients, and beneficiaries.

Still, the majority of SMEs are facing the same barriers in accessing GVC, as identified in the literature reviewed in this paper.

Methodology

Sample and variables

Table 1 shows the key characteristics of the sample and the data related to the involvement of SMEs in the supply chains. The sample included in the research consists of 130 SMEs from the WB region. SMEs from Serbia, Bosnia and Herzegovina, Montenegro and Croatia were included in the analysis. The questionnaire was distributed to SMEs through the chambers of commerce in these four countries. The largest number of companies belong to the

category of micro-sized companies, while 14% of the total number are medium-sized companies. Male and female-owned companies are represented in a similar proportion in the sample. Most of the companies in the sample have been operating for 11 to 20 years or more than 20 years. Out of a total of 130 received questionnaires, 105 were fully usable, while 25 could not be used for the purposes of this research.

Table 2 presents the variables used in the study. The dependent variable in the model indicates whether a company is included in a supply chain. Key independent variables in the research model are barriers to the inclusion of a company in the supply chains (the perceptions of the respondents). Respondents were asked to rate the importance of barriers on a scale of 1 to 5, with a score of 1 indicating a low level of importance and the score of 5 indicating a high level of importance of the barrier. To reduce the bias of the results or prevent the growth of

Table 1: Characteristics of the sample

Company size	Frequency (%)
1-9	65 (61.9)
10-49	25 (23.8)
50-249	15 (14.3)
Company age	Frequency (%)
<5	21 (20)
6-10	20 (19)
11-20	31 (29.5)
>20	33 (31.5)
Ownership > 50%	Frequency (%)
Male	55 (52.4)
Female	50 (47.6)
Usable questionnaires	Frequency (%)
Usable	105 (81.5)
Unusable	25 (18.5)

Source: Authors.

Table 2: Variables description

Dependent variable	Type/Measurement
Involvement of SMEs in the supply chain (<i>Involvement</i>)	Dummy variable: 1 = Yes; 0 = No
Independent variables	Type/Measurement
Long period of collecting receivables from the customers (<i>Receivables</i>)	Categorical 1-5: 1 – least important; 5 – most important
High costs of entering the supply chain (<i>Costs</i>)	Categorical 1-5: 1 – least important; 5 – most important
High quality standards required from the suppliers (<i>Quality</i>)	Categorical 1-5: 1 – least important; 5 – most important
Inadequate information on the conditions of participation (<i>Information</i>)	Categorical 1-5: 1 – least important; 5 – most important
Control variables	Type/Measurement
Gender of the majority owner (<i>Gender</i>)	Dummy: 1 = Female; 0 = Male
Number of employees (<i>Size</i>)	Categorical: 0 = 1-9; 1 = 10-49; 2 = 50-249
Number of years the company has been in business (<i>Age</i>)	Categorical: 0 = 1-5; 1 = 6-10; 2 = 11-20; 3 = >20

Note: Abbreviations in parentheses.

In case of the dependent and control variables, 0 denotes a reference category in the study.

a. In social sciences, the scale which is used for independent variables measurement can be also treated as continuous.

Source: Authors.

bias, three company-specific variables are included in the research model as control variables.

Econometric methodology

Kruskal-Wallis test (one-way ANOVA on ranks)

The Kruskal-Wallis test is an extension of the Mann-Whitney test and allows for comparison of three or more groups with respect to the dependent variable. The Kruskal-Wallis test does not require that the assumption of normal data distribution be demonstrated, which is why this test belongs to the category of non-parametric tests and stands as a non-parametric alternative to the parametric one-way fixed effect ANOVA test. Since the normality tests (Appendix I) found that the variables used in this study did not reflect the normal distribution, it was decided to use the Kruskal-Wallis test to compare the differences in perceptions of the importance of barriers to inclusion in the supply chains between different-sized companies.

The Kruskal-Wallis statistics is calculated as follows:

$$KW = \frac{12}{N(N+1)} \sum \frac{R_i^2}{n_i} - 3(N+1)$$

where: N is a total number of observations; n is the number of observations per group - i^{th} group; R_i is the total sum of ranks in the i^{th} group.

Binary logistic regression

Binary logistic regression is used when the dependent variable is binary (two-category outcome), as in this case (1 = Yes; 0 = No), while independent variables can be mixed. This method applies a non-linear log transformation to the predicted odds ratio, so it can handle any type of relationship between the dependent and independent variables. Unlike the linear regression and general linear models that are based on OLS algorithms, binary logistic regression is robust to heteroscedasticity problems and non-normal data distribution, but an important assumption for obtaining unbiased results while using this method is the absence of the multicollinearity problem. In order to select values for the parameters of binary logistic regression, maximum likelihood estimation is used.

Binary logistic regression can be expressed as follows:

$$\begin{aligned} \text{Logit}(\text{Involvement}) &= \text{Ln} \frac{p(\text{Involvement} = 1)}{1 - p(\text{Involvement} = 0)} = \\ &= \beta_0 + \beta_1 (\text{Receivables}) + \beta_2 (\text{Costs}) + \\ &+ \beta_3 (\text{Quality}) + \beta_4 (\text{Information}) + \\ &+ \beta_5 (\text{Gender}) + \beta_6 (\text{Size}) + \beta_7 (\text{Age}) \end{aligned}$$

where:

$$p = \frac{e^{\beta_0 + \beta_1 (\text{Receivables}) + \beta_2 (\text{Costs}) + \beta_3 (\text{Quality}) + \beta_4 (\text{Information}) + \beta_5 (\text{Gender}) + \beta_6 (\text{Size}) + \beta_7 (\text{Age})}}{1 + e^{\beta_0 + \beta_1 (\text{Receivables}) + \beta_2 (\text{Costs}) + \beta_3 (\text{Quality}) + \beta_4 (\text{Information}) + \beta_5 (\text{Gender}) + \beta_6 (\text{Size}) + \beta_7 (\text{Age})}}$$

is the probability of involvement in the supply chain, which is also called Odds; β_0 is constant; β_{1-7} are regression coefficients of the independent variables.

Research questions

The paper deals with barriers that SMEs in the WB region are facing in accessing the supply chains. There are two goals that are to be achieved by this research: to determine whether there are differences in the perception of the importance of barriers to inclusion in the supply chains between different-sized companies and to verify whether and how the perception of barriers to inclusion in the supply chains affects the probability of involvement in the supply chains.

According to the subject and goals of the research, this paper should provide answers to two questions:

RQ1: Do different-sized companies valorise the same barriers to involvement in the supply chains differently?

RQ2: Does the perception of barriers affect the likelihood of involvement of SMEs in the supply chains?

Results

The results of verifying the significance of differences between different-sized companies in terms of barriers to inclusion in the supply chains are shown in Table 3. The Kruskal-Wallis test was used for this purpose. The results of the applied test show that there are no significant differences in the perception of the importance of barriers to inclusion in the supply chains between different-sized companies (asymptotic $p > 0.05$). Regardless of their size, it seems that companies have a very similar perception of strength of these barriers to their inclusion in the supply chains.

In order to provide an answer to RQ2, the maximum likelihood estimation of the binary logistic regression was

Table 3: Differences in the perception of barriers to involvement in the supply chains between different-sized companies

Model	χ^2	Asymptotic p-value
1	0.063	0.969
2	1.285	0.526
3	1.172	0.557
4	0.623	0.732

Note: Dependent variables in models 1, 2, 3, and 4 are receivables, costs, quality, and information, respectively. Multiple comparisons are not performed because the overall test does not show significant differences across samples. Source: Authors.

applied. Before creating the binary logistic regression model, the multicollinearity was verified by determining the degree of correlation between the independent variables (Appendix II). The correlation coefficients for the observed variables are below the lower threshold of 0.8, which means that the multicollinearity problem is not present in the model and that the binary logistic regression method can be applied. *Receivables* are found to be a significant, but also a negative predictor when it comes to predicting Involvement (OR=0.557; CI=0.347, 0.893). This is also the case when it comes to *Information* (OR=0.567; CI=0.337, 0.956). Roughly speaking, the odds of *Involvement* decreased by a factor of 0.56 when the score of *Receivables* increased by one unit. On the other hand, when the score of *Inadequate information on conditions* increased by one unit, the odds of *Involvement in the supply chains* decreased by a factor of 0.57. It is interesting that *Costs* (OR=0.833; CI=0.532, 1.304)

Table 4: Binary logistic regression – The maximum likelihood approach

Variables	β	Wald	p-value	Odds ratio	Odds ratio – 95% CI	
					Lower	Upper
<i>Receivables</i>	-0.585	5.892	0.015	0.557	0.347	0.893
<i>Costs</i>	-0.183	0.640	0.424	0.833	0.532	1.304
<i>Quality</i>	0.081	0.124	0.724	1.084	0.693	1.697
<i>Information</i>	-0.567	4.541	0.033	0.567	0.337	0.956
<i>Age</i>		13.366	0.004			
<i>Age (6-10)</i>	0.442	0.276	0.600	1.556	0.299	8.110
<i>Age (11-20)</i>	2.728	10.073	0.002	15.300	2.839	82.468
<i>Age (>20)</i>	1.606	5.243	0.022	4.985	1.260	19.720
<i>Gender (female)</i>	-0.371	0.391	0.532	0.690	0.216	2.208
<i>Size</i>		4.024	0.134			
<i>Size (10-49)</i>	-1.543	2.979	0.084	0.214	0.037	1.233
<i>Size (50-249)</i>	-0.342	0.150	0.698	0.710	0.126	4.007
Constant	5.031	10.339	0.001	153.012		

Source: Authors.

and *Quality* (OR=1.084; CI=0.693, 1.697) were not found to be significant predictors of *Involvement*. Size of the company is not a significant predictor of *Involvement* in the supply chain (Wald $\chi^2=4.024$; $p=0.134$). This also applies when it comes to the Gender of the majority owner of the company (OR=0.690; CI=0.216, 2.208). On the other hand, Age plays a significant role in a company's *Involvement* in the supply chain (Wald $\chi^2=13.366$; $p<0.05$). Companies with longer business experience have greater odds of getting involved in the supply chains.

In Table 5, different indicators of goodness of the binary logistic model fit are presented. χ^2 from the omnibus test is statistically significant ($p<0.05$), which indicates that somewhere in our model there is at least one explanatory variable that is statistically significant when it comes to predicting *Involvement*. The Hosmer-Lemeshow test indicates that the model is an adequate fit to the data ($p=0.159$). Table 5 also presents the different types of Pseudo R^2 . When it comes to logistic regression, McFaddens R^2 and Nagelkerke R^2 are most often reported in the papers. According to McFadden [14], values of 0.2 to 0.4 for R^2 are an excellent fit. McFaddens R^2 value for our model is 0.28, indicating an excellent fit of the binary logistic regression model. Nagelkerke R^2 is 0.43, which also represents a relatively good model fit. It can be concluded that the model accounts for 43% variability of *Involvement* in the supply chain. Model is correctly classifying the outcome for 77.14% of the cases.

One of the most effective and most often used measures of model quality is the receiver operating characteristic (ROC) curve (Figure 1). It is a visual measure, i.e., a plot of the sensitivity versus 1 – specificity of a diagnostic test.

Table 5: Measure of the goodness of fit test

Indicator	Value
-2log likelihood	101.782
McFadden's R^2	0.28
Efron's R^2	0.35
Nagelkerke R^2	0.43
McKelvey & Zavoina's R^2	0.45
Hosmer-Lemeshow test $\chi^2(p)$	10.569(0.159)
Omnibus test $\chi^2(p)$	40.322(0.000)
Specificity	67.44%
Sensitivity	83.87%
Correctly classified	77.14%

Source: Authors.

Since it is a visual measure, the area under the ROC curve (AUROC) is used more often. The AUROC value ranges from 0 to 1, where the value of 0 indicates a perfectly inaccurate model and the value of 1 stands for a perfectly accurate model [12]. An AUROC of 0.5 suggests no discrimination, 0.7 to 0.8 is considered acceptable, 0.8 to 0.9 is considered excellent, and more than 0.9 is considered outstanding. In this case, ROC curve was determined based on 105 observations. The value of AUROC is 0.834 (CI=0.75404, 0.91401), indicating an excellent discriminating ability of the defined model.

Conclusion

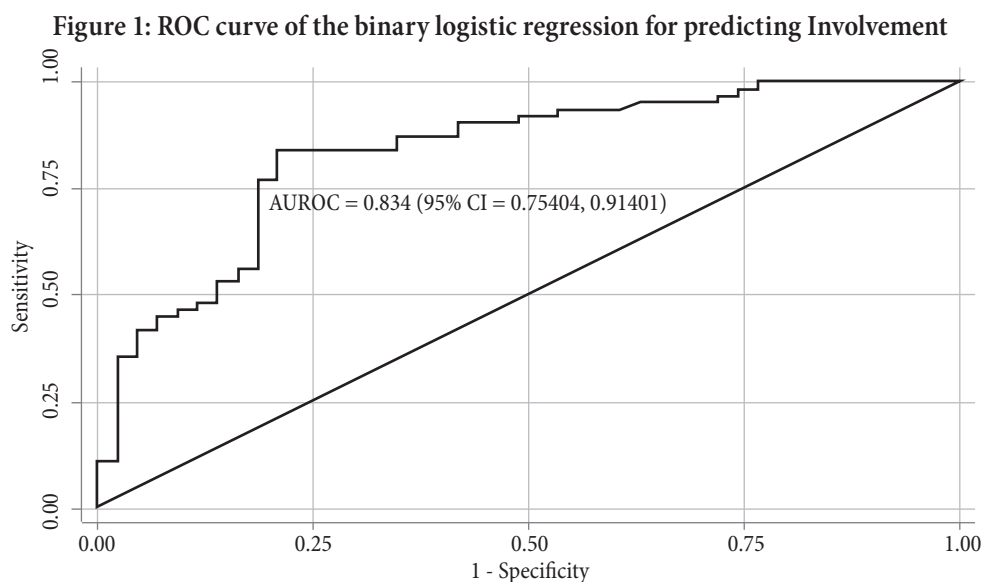
Although many authors in the literature explored and accepted the hypothesis that inclusion of SMEs in the supply chains contributes to the overall better performance of the company through enhanced innovativeness and competitiveness, many SMEs are still unable to enter the supply chains. For various reasons, they are facing difficulties in getting approved as suppliers. The most common barriers are: limited capacity to deliver the potentially increased amount or quality, challenges related to scalability and reaction to unstable demand, SMEs often having restricted access to innovation, which affects the quality of work and deliverables, late payments that cause the bankruptcy of thousands of SMEs each year across Europe. Many SMEs tend to be outsourced by large companies, and that way they ensure

their position in the global market. However, there are no guarantees that they could avoid the risks posed by involvement in the supply chains through other strategies of internationalisation.

SMEs in less developed regions such as the Western Balkans should be even more aware on the risks of involvement in the supply chains, as they are more vulnerable to market distortions. We have considered four common obstacles that SMEs in the WB region are facing, including long periods of collecting receivables from the customers, high costs of entering the supply chains, high quality standards required from the suppliers, and inadequate information on the conditions. Similar potential barriers for SMEs accessing either public procurements or supply chains have been cited in the literature.

Results show that there are no significant differences in the perception of barriers to inclusion in the supply chains between different-sized companies, which would be the answer to RQ1. Thus, companies, regardless of their size, have a similar way of perceiving the relative strength of barriers to inclusion in the supply chains.

By applying binary logistic regression, it was concluded that out of the considered barriers, only the length of receivables collection period and the inadequacy and incompleteness of information on conditions significantly and negatively affect inclusion in the supply chains. The remaining barriers are not essential determinants of the decision to join the supply chain. The above is the answer to RQ2.



Source: Authors.

Such results are somewhat expected, because every company needs to have insight into all the information that is relevant for participating in the supply chain in order to be aware of all the advantages and disadvantages. Also, the length of receivables collection period affects the company's liquidity, which can create certain financial problems. This problem has been noticed even in the practices of companies operating in the European Union, which is why the European Union has adopted a Directive for Late Payment, which regulates the receivables collection period in order to support the sustainability of SMEs. Interestingly, Costs do not affect the inclusion in the supply chains, which can be explained by the fact that either the costs were not perceived as high or that the companies that applied for involvement in the supply chains thought that the initial costs would be significantly lower than the expected benefits. However, it is not clear why Quality is not recognised as significant, since it is crucial to enter the supply chains, especially when it comes to food products. Therefore, this particular barrier should be explored in greater detail in further research.

A company's age has a significant impact on access to the supply chains. It means that companies with longer business experience have greater odds of becoming parts of the supply chains. Company size is not a relevant factor, which is also the case when considering the gender of the majority owner. Different-sized companies, as well as companies with different genders of the majority owner, have similar odds of getting involved in the supply chains.

The biggest limitation of this research relates to the sample size. Taking into account that the analysis included SMEs from four countries, the sample size of 105 observation units seems to be rather small, which is, generally, the greatest challenge for any research based on primary data covering multiple countries. However, since all of the four countries share the same economic and social background of being part of the same country in the recent past, they are still facing similar challenges, especially the three non-EU states. Therefore, this sample of 105 companies could provide at least an indicative insight into the barriers and their impact on SMEs in accessing the supply chains in the WB region.

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APPENDIX I

Normality test

Parameters	Kolmogorov-Smirnov		Shapiro-Wilk	
	Statistic	Sig	Statistic	Sig
Receivables	0.242	0.000	0.839	0.000
Costs	0.196	0.000	0.847	0.000
Quality	0.170	0.000	0.895	0.000
Information	0.187	0.000	0.899	0.000

Source: Authors.

APPENDIX II

Correlation matrix

	Receivables	Costs	Quality	Information	Age (6-10)	Age (11-20)	Age (>20)	Gender (female)	Size (10-49)	Size (50-249)
<i>Receivables</i>	1.000	-0.387	0.182	-0.008	-0.065	-0.194	-0.044	0.058	0.137	-0.005
<i>Costs</i>	-0.387	1.000	-0.037	-0.199	0.113	-0.001	-0.010	-0.134	-0.221	-0.100
<i>Quality</i>	0.182	-0.037	1.000	-0.473	0.115	0.151	0.099	0.112	-0.028	-0.007
<i>Information</i>	-0.008	-0.199	-0.473	1.000	-0.170	-0.288	-0.113	0.248	0.274	0.202
<i>Age (6-10)</i>	-0.065	0.113	0.115	-0.170	1.000	0.457	0.553	0.173	-0.395	-0.079
<i>Age (11-20)</i>	-0.194	-0.001	0.151	-0.288	0.457	1.000	0.473	0.071	-0.326	-0.167
<i>Age (>20)</i>	-0.044	-0.010	0.099	-0.113	0.553	0.473	1.000	0.131	-0.338	-0.072
<i>Gender (female)</i>	0.058	-0.134	0.112	0.248	0.173	0.071	0.131	1.000	0.295	0.139
<i>Size (10-49)</i>	0.137	-0.221	-0.028	0.274	-0.395	-0.326	-0.338	0.295	1.000	0.666
<i>Size (50-249)</i>	-0.005	-0.100	-0.007	0.202	-0.079	-0.167	-0.072	0.139	0.666	1.000

Source: Authors.



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Her professional interests are entrepreneurship, innovation management, association's development, and research & development. She obtained her PhD degree in female entrepreneurship in 2013 from the Faculty of Economics, University of Belgrade. She has been chairing the Woman's Entrepreneurship Sector Group within the Enterprise Europe Network since May 2015. Sanja Popović-Pantić is President of the largest national association of female entrepreneurs in Serbia. She has been running the Association since 1998. During that time, nearly 200 projects have been implemented in the field of strengthening female entrepreneurial initiatives, projects, start-ups and establishing companies. She also has a strong academic background, as she is employed as Scientific Associate at the Science and Technology Policy Research Center of the Institute Mihajlo Pupin. Over the last two years, she has been managing a Danube Transnational Programme project in Serbia aimed to establish innovation laboratories in the municipalities of seven Danube-region countries as the main focal points for the development of the entrepreneurial skills in young people. In the Serbian consortia of the Enterprise Europe Network, she has been managing the project with the Institute Mihajlo Pupin, as one of the partners, since 2016. She is author of two books on entrepreneurship and a number of scientific papers published in national and international journals and proceedings. Her greatest passion is creating a female-friendly business environment with a "can do" attitude. Mrs. Popović-Pantić is the most respectable national consultant on female entrepreneurship, specialised in innovation in the SMEs sector. The US Embassy in Serbia nominated her for the "World of Difference 100 Award", which was presented to Sanja by The International Alliance for Women in 2012. Later in the same year, she received a respectable national award "PLANETA BIZNIS" and a regional one for her contributions to the development and promotion of entrepreneurship in the Western Balkans, titled "Creators for Centuries".



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Užice

ORGANIZATIONAL STRUCTURE AS A PREDICTOR OF THE SUPPLY CHAIN MANAGEMENT EFFICIENCY

Organizaciona struktura kao prediktor efikasnosti
upravljanja lancem snabdevanja

Abstract

The organizational structure elements are an important predictor of developing an efficient supply chain management, which is the subject of analysis in this paper. The empirical study that was conducted included a sample of 51 companies in the territory of Western Serbia. Their business practices identified the existence of a statistically significant and strong correlation between organizational structure and the determinants of supply chain management efficiency. Within the conducted research, specialization and decentralization stand out as the elements with the greatest impact on improving the quality of products/services, shortening delivery times, resolving complaints more efficiently and reducing costs of the supply chain. The results of the study indicate that delegating competencies and responsibilities within a company, along with motivating staff to become more committed to and influence the activities they perform, is a key organizational prerequisite for establishing an efficient supply chain management, which is one of the key qualitative indicators of any company's market and business success.

Keywords: *supply chain management, organizational structure, efficiency, Serbia.*

Sažetak

Elementi organizacione strukture imaju status važnog prediktora generisanja efikasnog upravljanja lancem snabdevanja, što je predmet analize u okviru ovog rada. Sprovedeno empirijsko istraživanje obuhvata uzorak od 51 preduzeća na teritoriji Zapadne Srbije. Njihova poslovna praksa iskristalisala je postojanje statistički značajne i jake korelacije između elemenata organizacione strukture i determinanti efikasnosti upravljanja lancem snabdevanja. U okviru istraživanja sprovedenog u radu, specijalizacija i decentralizacija su se izdvojile kao elementi sa najvećim uticajem na unapređenje kvaliteta proizvoda/usluga, skraćivanje rokova isporuke, efikasnije rešavanje reklamacija i redukciju troškova unutar lanca snabdevanja. Rezultati istraživanja pokazuju da delegiranje nadležnosti i odgovornosti u preduzeću, uz motivaciju kadrova da se više zalažu i utiču na aktivnosti koje obavljaju, predstavlja ključni organizacioni preduslov za uspostavljanje efikasnog upravljanja lancem snabdevanja, kao jednog od ključnih kvalitativnih pokazatelja tržišnog i poslovnog uspeha bilo kog preduzeća.

Ključne reči: *upravljanje lancem snabdevanja, organizaciona struktura, efikasnost, Srbija.*

Introduction

In modern business conditions, organizations are observed as open systems, prepared to respond quickly and effectively to any changes in the environment, which influences their survival and success under the conditions of fierce market competition. The struggle for survival and the advancement of one's competitive position in the market generates the need for extremely efficient, flexible and dynamic organizational structures. A good organizational structure is not a sufficient prerequisite for successful business of a company, but it is a component without which business success is impossible, regardless of how good the managers of a particular company are. Organizational structure elements not only determine the motivation and satisfaction of employees, but also significantly influence customer satisfaction, since only motivated staff will make efforts to achieve customer satisfaction and loyalty and thus establish an efficient supply chain management.

The broader scope of the paper includes an analysis of the influence of organizational structure on the establishment of an efficient supply chain management, which is one of the key indicators of business success of any company. The paper focuses on an empirical study of the correlation between organizational structure elements and supply chain determinants of efficiency, with the aim to identify the element that predominantly determines the success of a company in delivering the right product, at the right place and time, at acceptable costs. The aim of the paper is to determine the impact that organizational structure has on supply chain management efficiency, as one of the key qualitative indicators of the achieved performance of any given company.

The paper consists of four parts. The first part of the paper deals with the theoretical aspect of organizational structure and its key elements. Supply chain management, its general relations and determinants of efficiency are the topic of the analysis in the second part of the paper. The third part of the paper focuses on the presentation of contemporary research results regarding the interdependence of organizational structure and supply chain management efficiency. The fourth and the final part of the paper refers

to the conducted empirical research and presents its results on the interdependence between organizational structure and supply chain management efficiency based on the example of business practices of companies in Western Serbia.

Organizational structure elements

The organizational structure of a company involves the formal organization of its business units and activities, as well as defining the links between these components. It is a system of long-term projected and formally sanctioned company acts and relationships between elements in an organization [6], [8]. "An organizational structure is a set of pre-prepared solutions for emerging business situations," [44, pp. 25-35]. In simple terms, an organizational structure is a tool that enables people in an organization to better understand their roles, to facilitate coordination, control and communication.

The organizational structure model is predominantly dependent on the type and scope of activity of a particular company, where once the model is set, it may not be permanent. Organizational structure is also influenced by the age of the company, technology, ownership, culture, tradition and social environment. The simplest model of organizational structure is adequate for small businesses that produce, by using the same technology, one or two products, and market them by using the same combination of marketing mix elements. With the internationalization of business, the organizational structure becomes more complex.

The following elements of the organizational structure relevant for further empirical research in the paper are identified [6], [31], [42]:

- specialization,
- decentralization,
- departmentalization,
- coordination/control and
- formalization.

The specialization of individuals and narrow organizational units in one company is the result of the division of labor, as the basic activity of the organizational design [2, pp. 455-462]. The division of labor shows how

the entire set of tasks within an organization is divided into a number of smaller tasks. There is a high degree of correlation between the extent of division of labor and the level of specialization. In the case of high-level division of labor, narrow specialization occurs, whereas a low-level one implies a broad specialization. Horizontal and vertical dimensions of specialization can be identified. The horizontal dimension refers to the width of a job and the vertical to the depth.

Decentralization is a manifest form of the delegation of authority as an element of organizational design. Delegating authority is the process of delegating decision-making power from upper-level executives to lower-level executives. In addition to decentralization, an opposite form of this element is centralization. Centralization is actually the control from one center in an organization, while the decentralization of control refers to distributing control into multiple places [33, pp. 106-110]. There are numerous motives for decentralization: increasing information-processing capacity, shortening communication channels, faster response to changes in the environment, encouraging entrepreneurial and innovative efforts and so forth. The main risks of decentralization are: increased complexity of the organization, high coordination costs and difficult implementation of unique tactics in a crisis situation [37], [48].

Departmentalization involves grouping employees according to certain criteria in order to increase the homogeneity and facilitate coordination [3, pp. 30-35]. It refers to the division of the organization into narrow organizational units and defining their size. Jobs can be grouped according to various criteria: job type (functions – production, procurement, sales, etc.), geographical area, type of expertise and level of qualification (e.g. teaching and non-teaching staff at colleges) or clients (e.g. in banks). By grouping organizational units, an image of the organizational structure represented by the organizational chart is formed. The results of relevant research have shown that, unlike other elements of organizational structure, departmentalization does not have a strong influence on the achieved performance [4], [20], [40], [47]. That is why this element is not included as a relevant element for the following empirical research.

Coordination is an organizational design element that shows how organizational parts are connected as a whole and how the top of the organization exercises control over its parts. In simple terms, this element keeps the organization together. Several coordination/control mechanisms can be identified [45, p. 712]:

- Direct control – through a hierarchy of authority;
- Standardization – of inputs (knowledge, abilities and skills), work processes and outputs;
- Direct communication between managers, as well as between managers and employees.

Formalization is an indicator of the extent to which rules and procedures govern the activities of a company [22, pp. 274-287]. Practice has shown that compliance with rules and regulations contributes to tighter control in all stages of the production process, which is especially important with jobs that place emphasis on total low costs and batch production. Formalization contributes, on one hand, to reducing uncertainty and, on the other, to limiting individual reasoning, risk-taking and innovation. In the simplest of terms, it is the extent to which jobs within an organization are standardized and the behavior of employees is in accordance with rules and procedures. Today, each company has put in place defined procedures for each process in accordance with the Quality Management System and the requirements of the ISO 9001 standard. An audit of compliance with the defined procedures is carried out at least once a year by external entities, and it determines whether the entire business and manufactured products will retain the status “in accordance with ISO 9001”.

Supply chain management – General relations and determinants of efficiency

The beginning of the 21st century was marked by the intense globalization of commodity and information flows. The globalization of the world economy and its integrating processes has highlighted the multiple benefits of implementing a unified supply chain. This is why companies are increasingly beginning to understand the importance of developing efficient supply chains and logistics networks. Modern supply chains should be

dynamic, flexible and responsive networks that operate on a “feel and respond” principle versus the traditional “make and sell” principle [13, p. 2]. Effective solutions across all elements of the chain (procurement, production, storage, supply, transport and distribution) are the key factor for the survival and success of companies in a highly competitive environment.

Supply chain management also refers to the implementation of globalization of the world economy in the context of intensive commodity and information exchange [1, p. 86]. It is the integration of all business processes along the supply chain [16, p. 4]. Over the last four decades, supply chain management has received a great deal of attention from the professional public and business practice alike. Being a relatively young business philosophy, its concepts have had a positive impact on the value creation within the chain, which can be achieved by their implementation. The concept of supply chain management, along with logistics management, promotes the idea of “delivering the right product at the right time and place, in an adequate condition and at a reasonable price” [10], [17].

Supply chain management is a phenomenon that influences all areas of business [34, p. 31] and is at the core of the competence of all successful companies [11], [34]. It is most commonly defined as managing relationships between businesses located in front of and/or behind the (parent) company in one supply chain, thus managing the relationships with suppliers and customers to deliver value added, at lower costs, along the entire supply chain. Supply chain management is the organization of a network of interconnected businesses aimed at providing products and services that meet the requirements of end customers (consumers) [19, p. 3]. Authors such as Bowersox, Cavinato, Mentzer, Cooper, Shah and many others offer similar definition determinants.

A particular company is at the center of the network (chain) of suppliers and consumers. It aims to develop and deliver the inputs of the supply chain in the most efficient way possible. The implementation of supply chain activities involves the exchange of information which depend on market fluctuations and production capabilities. In addition, the implementation of the supply chain management system contributes to the reduction of stock prices owing to more

accurate requirements and needs forecasts, as well as better production planning according to those needs. With better production planning, the company incurs lower costs as a result of successful management of material flows throughout its production process. The flow of materials follows the flow of information, and the implementation of the supply chain management system significantly improves communication (flow of information) between suppliers, companies and distributors. For this reason, a product as an out-of-the-box integrated business entity would be more competitive in the market, than a product resulting from business cooperation between off-chain companies. The sum of values is greater and the sum of costs is lesser if the companies operate inside the supply chain, rather than outside it [1, p. 86]. Thus, establishing and developing an efficient supply chain is in fact one of the key goals of each company, and partnerships between the participants in the chain are a key prerequisite for achieving this goal.

Supply chain analysis facilitates company management in terms of planning and controlling all processes that link a particular entity to its partners in one supply chain, with the aim of servicing the needs of end users. At the same time, it contributes to increasing productivity on the supply side, reducing overall business costs and improving competitive position in target markets. Within the structure of the supply chain, it is important to determine precisely which participants, resources, potentials, locations and processes take place within the chain, in which way goods, information and financial flows are effected and so forth [17, pp. 43-70]. An analysis of how the chain is managed is also important. It is necessary to consider who makes the decisions, which management strategies are used and how much influence can be exerted on an individual participant within the chain. Performance evaluation of the chain is the last step that leads to its successful management.

Relationship marketing plays a very important role in supply chain theory and practice. It is defined as “all marketing activities aimed at establishing, developing and maintaining successful relationships” [38, p. 22]. Supplier relationship management (SRM) and customer relationship management (CRM) are broader terms than relationship marketing, and are essential for establishing

an efficient supply chain management. Since managing the supply chain is an integrative philosophy of guiding the total distribution channel flow from supplier to end consumer, it can be concluded that SRM and CRM are very important parts of supply chain management.

Marketing relationships are usually initiated by suppliers. However, there is no reason for buyers (companies) themselves not to be the first to initiate and take responsibility for establishing and maintaining long-term relationships with suppliers [30, pp. 131-154]. Supplier relationship management indicates that honesty, trust, loyalty and interdependence are key determinants of supplier-customer collaboration. A fair treatment of the customer by the supplier, and vice versa, is the first step towards successful and long-lasting cooperation. The mediating role of trust between fairness and loyalty is influenced by the structure of interdependence between the supplier and customer [24], [25], [26].

Suppliers strive to build good reputations with their customers, which will be the basis for attracting new customers, as well as retaining the existing ones. The goal of the supplier is to gain the trust of the existing customers and to make them loyal. The customer's trust is actually the link between the fairness of the supplier and the customer's loyalty to the supplier. A loyal customer is something that is of great value in a market where competition is fierce, and it is one of the main goals of every supplier's business. Suppliers are working intensively to improve their CRM activities as they seek to build long-term partnerships with a particular company, which testifies to the intersection of CRM and the supplier with the customer's SRM [32, pp. 34-55].

CRM is an area of management that focuses on the strategy of developing long-term customer relationships. It is characterized by a detailed analysis of customer relationships and is based on capabilities, methodology and technology that enables a business to function through the advancement of consumer relationships. The main goals of introducing this concept are: striving to establish stronger relationships with customers, reduce costs, increase efficiency, make profits and survive in the market. The listed goals are also some of the key goals of the supply chain management business philosophy. Practice

has shown that the implementation of the CRM concept yields multiple benefits to companies: reducing the cost of attracting new customers, increasing the number of long-term customers, reducing sales costs, increasing customer profitability and increasing customer loyalty. By generating these benefits, the company establishes its supply chain in the most efficient and effective way possible.

It can be stated that the supply chains of the supplier companies and the buyer companies (which are further processed by the procurement entity) are intertwined, and that the supplier CRM is closely linked to the customer SRM, with the common aim of building long-term partnerships. The philosophy of supply chain management emphasizes the importance of partnerships between all participants in the supply chain in order to deliver superior value to end users. That is why SRM and CRM, aimed at establishing long-term partnerships between supplier-company and customer-buyer, have a great influence on the efficiency of the supply chain management in a particular company, and therefore its success in the conditions of fierce competition in the market.

To conclude, supply chain management integrates all business functions along the entire distribution chain, not just in one company. The company is at the center of the distribution chain, i.e., at the heart of the supplier and customer network. Its goal is to develop and implement the supply chain in the most efficient way possible, and this is achieved through detailed planning and control of all the processes that link the company to its partners in order to service the customers' needs. There are four key determinants of supply chain management efficiency identified in relevant literature: product quality, delivery time, complaints resolutions and price [23], [24], [39], [46]. These four determinants are used in the conducted empirical research that is presented in the final part of the paper.

The influence of organizational structure on the establishment of an efficient supply chain management

During the period between the 1960s and 1990s, a large number of authors based their research on analyzing the

impact of organizational structure on the performance of companies. Summarized results have shown that companies with clearly defined strategies and organizational structures, as well as a leadership style focused on employee motivation, were more successful and efficient (Figure 1) [7], [27], [30], [41]. An efficient organizational structure has emerged as one of the key competitive advantages and an important factor in a company’s market success, especially if it is aligned with the company’s mission, its competitive environment and the resources available.

Figure 1: Prerequisites for generating efficient company operations



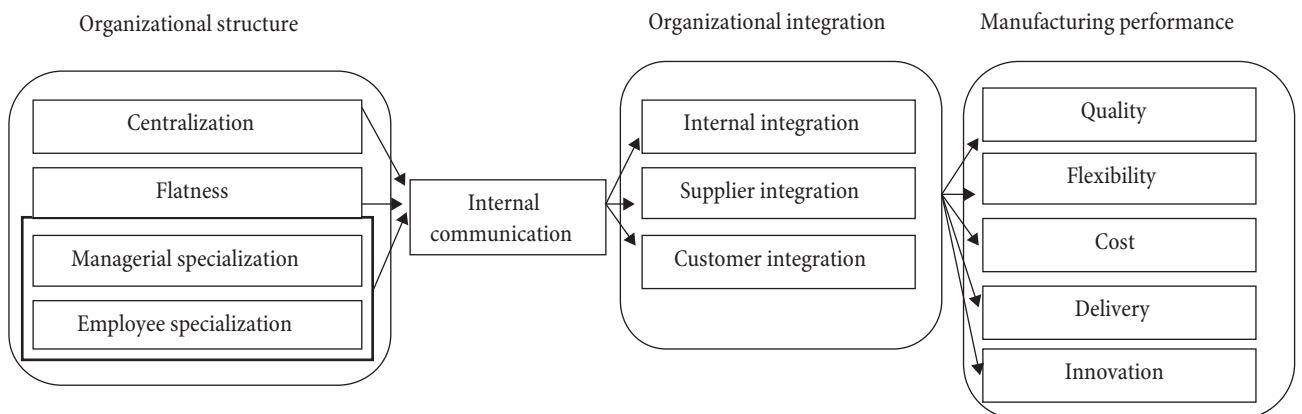
Source: [7], [27], [30], [41].

Various research results have shown that an efficient organizational structure generates higher investments, implementation of more advanced technologies, higher motivation of workers to contribute to the improvement of product quality and higher productivity of work, all

of which directly affects the improvement of business efficiency. Business practices of companies have shown that organizational structure can be a very important factor in achieving profitability, growth and development [36], [41]. In other words, a good organizational structure is a necessary, but not a sufficient prerequisite for the efficient operation of any company. It should always follow a strategy to improve performance. For the implementation of the strategy as a long-term plan of an organization, it is very important that there is an organizational structure that will pave the path for its implementation and performance improvement.

Establishing an efficient supply chain management is a very important indicator of the performance of any business. CRM and SRM, as integral parts of supply chain management, are very important determinants of market success. Many authors have analyzed the influence of organizational structure on the efficiency of the supply chain, observing this variable as one of the qualitative indicators of achieved performance. The research results have shown that the organizational structure of the company, through its impact on the quality of communication within the company, affects the relationship with suppliers and customers, which directly reflects the quality, flexibility, cost, innovation and delivery, and consequently the performance and efficiency of a particular business (Figure 2). Certain authors demonstrated a statistically significant correlation between decision centralization, specialization and organizational performance, mediated by the quality of internal communication significantly conditioned by the authority hierarchy [47, pp. 69-81].

Figure 2: The influence of organizational structure on organizational performance



Source: [47].

Organizational structure, besides being a significant factor in creating an efficient business, has been recognized as a very important factor in establishing an efficient supply chain management, with the primary goal to deliver the right product, at the right place and time, at acceptable costs. Centralization and specialization have emerged as dimensions of organizational structure with the greatest impact on business performance, primarily on cost effectiveness.

A large number of papers have identified organizational structure as an important factor in ensuring an efficient and flexible organization that will be able to respond quickly and effectively to changes in the environment. Business practices have shown that organizational structure elements have a great influence on the relationship of a company with its partners in the supply chain, thereby directly affecting quality, delivery and cost as indicators of efficiency of supply chain management [19], [30], [34], [41], [43], [50]. Research has proven that there is a statistically significant impact of specialization, decentralization, coordination/control and formalization on the level of business performance, observed through the indicators of efficiency of supply chain management.

To continue, the influence of the elements and characteristics of organizational structure on the indicators of efficiency of supply chain management is analyzed through an empirical research based on the conclusions of a previously conducted research concerning this topic. The empirical research was carried out with the goal to investigate the extent to which organizational structure is the determinant of business success and how important it is to redesign it in order to achieve optimum supply chain performance.

Research methodology

In order to identify the elements of organizational structure with the greatest impact on supply chain efficiency indicators, an empirical research was conducted on a sample of 51 companies in the region of Western Serbia (Užice, Požega, Kosjerić, Čajetina, Čačak and Priboj). Statistically observed, this is considered to be a sample of an adequate size, since the respondent entities are companies ($n > 30$)

[12, pp. 426-432]. The sample included manufacturing, trade and service companies that fall under the category of medium and large companies. Throughout the course of the research, it was assumed that the sample was random. The data were collected through a combination of analysis of available company documents and interviews with employees. A simplified starting model for the research is presented in the following Figure 3.

The starting model presented above and the relevant literature were the basis for defining the five starting research hypotheses:

- H1: Organizational structure elements have a statistically significant effect on product quality.
- H2: Organizational structure elements have a statistically significant effect on adherence to the agreed delivery time.
- H3: Organizational structure elements have a statistically significant effect on the efficiency of resolving complaints.
- H4: Organizational structure elements have a statistically significant effect on cost savings, which is reflected in the product cost.
- H5: Organizational structure is a significant factor in developing an efficient supply chain management.

Elements of organizational structure are evaluated on a five-point Likert scale, i.e., grades are assigned from 1 to 5 [49, pp. 126-139]. Grades are assigned on the basis of analysis of official documents of the companies included in the research, in consultation with their employees. For example, for the element “specialization” a score of 5 indicates high specialization, while a score of 1 indicates low specialization. The same principle applies to other elements, as well.

Determinants of supply chain management efficiency are evaluated based on the results of customer/client satisfaction surveys of the companies included in the survey. At the end of the year, each firm conducts a survey of its customers' views on all aspects of the business. From the available questionnaires, the aspects that determine a successful supply chain management are identified, regarding the delivery of the right product to the right place at the right time and at acceptable costs: product quality (evaluation of delivery of the right product), delivery time (delivery

at the right time), resolution of complaints (an indicator of the efficiency of CRM, an essential determinant of supply chain management) and pricing (cost acceptability from a customer's perspective). In all questionnaires, the items listed above are rated 1-5. Questionnaires for 2019 were used to calculate the average score for each of the determinants of supply chain management efficiency following the principle: grade 5 – average score higher than 4.5; grade 4 – average score higher than 3.5; grade 3 – average score higher than 2.5; grade 2 – average score higher than 1.5; grade 1 – average score higher than 1.5.

All variables in the baseline model are defined based on relevant literature. Organizational structure elements are identified as independent variables, while the determinants of supply chain management efficiency are observed as dependent variables. IBM statistical software SPSS was used to analyze the collected data. Firstly, a descriptive statistical analysis was conducted on the entire sample with the aim of observing the variability of data across companies. The second step was a correlation analysis conducted in order to calculate the strength of the relationship between the variables included. Finally, a multiple regression analysis was performed with the aim to identify the elements of organizational structure that have the greatest impact on each of the determinants of supply chain management efficiency.

Statistical analyses

The results of the descriptive statistical analysis are presented in Tables 1 and 2. By implementing the descriptive analysis, calculations were made regarding the mean and standard deviation for each of the variables that determine organizational structure and supply chain management.

The results of the descriptive statistical analysis presented in Table 1 show that the standard deviation values for organizational structure elements range from 0.625 to 0.864, indicating a similar degree of heterogeneity of ratings across companies in Western Serbia (Užice, Požega, Kosjerić, Čajetina, Čačak and Priboj). It is worth noting that most of the companies base their business on the implementation of clearly defined procedures in accordance with quality management standards (QMS)

and the requirements of the standard ISO 9001 (mean 4.04). All companies from the sample exhibit a rather high level of specialization (mean 3.83), where employees are thought to be specialized in performing a relatively narrow set of homogeneous activities, while the impact they have on the jobs they perform is moderate. Coordination and control in a large number of companies surveyed is based on the standardization of results and inputs/outputs, while certain companies combine this mechanism with direct control. Delegation of authority when making business decisions is fairly represented in the surveyed companies (mean 3.56).

Table 1: Results of the descriptive statistical analysis for the organizational structure elements

Variable	Mean	Std. deviation
Specialization	3.83	0.834
Decentralization	3.56	0.850
Standardization-based coordination and control	3.63	0.864
Formalization – procedures according to the QMS	4.04	0.625

Source: Output from SPSS.

Table 2: Results of descriptive statistical analysis for the determinants of supply chain management efficiency

Variable	Mean	Std. deviation
Product quality	3.94	0.639
Delivery time	3.52	0.727
Complaint resolutions	3.58	0.750
Price	3.77	0.703

Source: Output from SPSS.

The results of the descriptive statistical analysis presented in Table 2 show that the standard deviation values range from 0.639 to 0.750, which is an indicator of a similar degree of heterogeneity of grades across companies in Western Serbia. The customers of the surveyed companies are mostly satisfied with the quality of products (mean 3.94) and the product price (mean 3.77). The commitment of the company in resolving complaints (mean 3.58), as well as compliance with the agreed delivery deadlines (mean 3.52) were rated above average.

The consistency of the variables that determine the organizational structure and supply chain management efficiency was verified by using the Cronbach's alpha coefficient [29, pp. 1-188]. The recommendation is that the confidence threshold should not be less than 0.7, which is not

compromised in this study. The Cronbach's alpha coefficient for all the variables that fall under "organizational structure" is 0.904, whereas for all the variables that fall under "supply chain management efficiency" it is 0.896. It was concluded that there was a high degree of reliability of the elements of organizational structure and supply chain management determinants of efficiency, thus creating the basis for the employment of the correlation statistical analysis.

After the descriptive analysis, a linear correlation analysis was performed. The aim of the correlation analysis was to identify the existence of potential relationships and the strength of those relationships between all organizational structure elements and the determinants of supply chain management efficiency. All statistically significant Pearson correlation coefficients (r) are presented in Table 3 and marked with ** (** refers to $p < 0.01$).

Table 3 shows that the correlation coefficients between every two variables included are statistically significant (marked by **), i.e., that there is a statistically significant relationship between all the variables in this study. Following Kohen's recommendation [15, pp. 79-81], it can be concluded that there is a high value of Pearson correlation coefficients (r in the 0.50-1 interval) between all variables except for the Formalization and Delivery time ($r=0.430$), which is largely due to the fact that if the employees follow the defined procedures, that does not guarantee that the particular company will comply with the agreed delivery time. Delivery time may be affected by external factors such as weather, carrier failure, customs delays, traffic jams and so forth. The highest value of the Pearson correlation coefficient was identified between Specialization and Product quality ($r=0.901$), while decentralization was identified as the organizational

structure element with the strongest correlation with the determinants of supply chain management efficiency (Pearson correlation coefficients in the 0.712-0.808 interval).

Following the correlation statistical analysis, a multiple regression analysis was conducted with the aim to identify the organizational structure element with the greatest influence on the determinants of supply chain management efficiency. The goal was to identify what the businesses need to do in order to establish an efficient supply chain management and therefore improve their market position. Four regression analyses were performed, where elements of the organizational structure (specialization, decentralization, coordination/control and formalization) were observed as independent variables, while the dependent variables were the determinants of the efficiency of supply chain management (product quality, delivery time, complaints and price).

The impact of the organizational structure elements on product quality was first examined as a determinant of supply chain management efficiency. Thus, in the first regression, elements of organizational structure were observed as independent variables (specialization, decentralization, coordination/control and formalization), while the quality of the product was the dependent variable. The results are presented in Table 4. The model explains approximately 82.9% of the variance of the dependent variable ($R^2=0.829$). Specialization stood out as an element of organizational structure with the most significant impact on product quality ($p < 0.01$). The explanation is that qualified personnel who perform a relatively narrow set of work tasks can fully focus on product features and details, therefore contributing the most to the production of a high-quality product.

Table 3: Results of the correlation statistical analysis

	Special.	Decentral.	Coord./Cont.	Formaliz.	Quality	Delivery time	Complaint	Price
Specialization	1	0.859**	0.782**	0.540**	0.901**	0.733**	0.727**	0.767**
Decentralization	0.859**	1	0.791**	0.513**	0.783**	0.791**	0.808**	0.712**
Coord./control	0.782**	0.791**	1	0.717**	0.742**	0.745**	0.786**	0.762**
Formalization	0.540**	0.513**	0.717**	1	0.595**	0.430**	0.537**	0.690**
Product quality	0.901**	0.783**	0.742**	0.595**	1	0.656**	0.684**	0.799**
Delivery time	0.733**	0.791**	0.745**	0.430**	0.656**	1	0.806**	0.545**
Complaint	0.727**	0.808**	0.786**	0.537**	0.684**	0.806**	1	0.629**
Price	0.767**	0.712**	0.762**	0.690**	0.799**	0.545**	0.629**	1

Source: Output from SPSS.

**Table 4: Regression coefficients
(product quality as the dependent variable)**

	Unstandardized coefficients		Standardized coefficients	t	Sig.
	B	Std. error	Beta		
(Intercept)	.889	.270		3.289	.002
Specialization	.630	.096	.822	6.588	.000
Decentralization	.014	.096	.018	.141	.889
Coordination/Control	.024	.093	.033	.259	.797
Formalization	.169	.089	.165	1.892	.065

Source: Output from SPSS.

In the next step, a regression analysis was conducted with the delivery time as the dependent variable (Table 5). The model explains approximately 67.8% of the variance of the dependent variable ($R^2=0.678$). The table presenting the regression coefficients shows that decentralization and coordination/control are elements of organizational structure that have a significant influence on the time of delivery ($p<0.01$). The explanation is that delegation of authority and greater involvement of employees in the decision-making process significantly contributes to their motivation and efficiency in performing their work tasks, which results in a timely production and dispatch of products. Coordination/control based on the standardization of knowledge and results further contributes to an efficient and timely production. The delivery itself is also influenced by a number of external factors that are unaffected by businesses, but organizational factors are still a very important part of generating timely delivery.

**Table 5: Regression coefficients
(delivery time as the dependent variable)**

	Unstandardized coefficients		Standardized coefficients	t	Sig.
	B	Std. error	Beta		
(Intercept)	1.262	.422		2.993	.004
Specialization	.087	.149	.100	.582	.563
Decentralization	.388	.150	.453	2.584	.000
Coordination/Control	.356	.146	.423	2.444	.000
Formalization	.186	.139	.159	1.332	.189

Source: Output from SPSS.

Table 6 presents the results of the regression analysis where the resolution of complaints is the dependent variable. The model explains approximately 71.1% of the variance of the dependent variable ($R^2=0.711$). In

this model, decentralization and coordination/control stand out as elements of organizational structure with a significant impact on the efficiency of complaints resolution. The explanation is that the business practices of the companies included in the research have shown that employee involvement in all aspects of the business is the basis for their motivation and greater commitment in performing their work tasks, which also results in their interest in contributing as much as possible to achieving customer satisfaction and gaining their loyalty, therefore responding quickly and efficiently to customer needs and complaints. Standardization-based coordination/control has proven to be a very efficient means of minimizing complaints which, combined with the commitment of employees to resolving them quickly and efficiently, results in achieving customer satisfaction, establishing efficient CRM and thus efficient SCM.

**Table 6: Regression coefficients
(complaints as the dependent variable)**

	Unstandardized coefficients		Standardized coefficients	t	Sig.
	B	Std. error	Beta		
(Intercept)	.783	.412		2.900	.004
Specialization	.027	.146	.030	.182	.856
Decentralization	.457	.147	.518	3.117	.000
Coordination/Control	.344	.142	.397	2.418	.000
Formalization	.004	.136	.003	.030	.976

Source: Output from SPSS.

**Table 7: Regression coefficients
(price as the dependent variable)**

	Unstandardized coefficients		Standardized coefficients	t	Sig.
	B	Std. error	Beta		
(Intercept)	.317	.390		2.813	.002
Specialization	.346	.138	.410	2.504	.006
Decentralization	.061	.139	.074	.441	.662
Coordination/Control	.125	.135	.153	.926	.359
Formalization	.360	.129	.320	2.795	.000

Source: Output from SPSS.

In the last step of the multiple regression analysis, price, as a determinant of supply chain management efficiency, was observed as the dependent variable. The model explains approximately 70.5% of the variance of the dependent variable ($R^2=0.705$), and specialization and formalization stand out as elements of organizational

structure with a significant impact on the efficiency of the company in reducing costs. The explanation is that business practices have shown that companies with high horizontal and vertical specialization, which follow QMS rules and procedures, are significantly more successful in achieving customer satisfaction with the price of products/services. Qualification of the staff in performing the relatively narrow set of work tasks that they can influence has a significant impact on their motivation to engage more in reducing the costs and therefore the final price of the products/services. Performing work tasks in accordance with processes and procedures significantly reduces production wastes and production downtime, which also contributes to cost reductions.

Discussion of the obtained research results

The previously conducted statistical analyses have identified the relationships between organizational structure elements and the determinants of supply chain management efficiency. The results of the correlation analysis have shown that there are statistically significant correlations between all variables included in the research, i.e., between all the elements of organizational structure and the determinants of supply chain management efficiency. The existence of this interdependence is the best indicator that each of the two variables listed above affects the other, thus proving, i.e., unequivocally confirming all the research hypotheses put forward in this paper. Therefore, the results of the correlation analysis confirmed the following hypotheses:

- H_1 : Organizational structure elements have a statistically significant effect on product quality – confirmed. The results of the correlation analysis have shown that each of the organizational structure elements (specialization, decentralization, coordination/control and formalization) has a statistically significant relationship with product quality as a determinant of supply chain management efficiency; all correlation coefficients indicate strong correlations ($r > 0.5$). The results of the regression analysis identified specialization as an element of organizational structure with a significant impact on product quality. Thus, high horizontal and vertical specialization is a key

organizational predictor of generating greater staff motivation to contribute to the production of a high-quality product.

- H_2 : Organizational structure elements have a statistically significant effect on adherence to the agreed delivery time – confirmed. The results of the correlation analysis identified a statistically significant influence of each of the organizational structure elements on compliance with the agreed delivery time. All correlation coefficients proved to be of high value ($r > 0.5$), with the exception of the effect of formalization on compliance with the delivery time. That is due to the fact that compliance with the QMS procedures and requirements of ISO 9001 does not guarantee that the goods will reach the customer on time, since delivery is also affected by a number of factors that are not connected to a particular undertaking, e.g. traffic jams, vehicle breakdowns, customs delays and so forth. The results of the regression analysis identified decentralization and coordination/control as elements of organizational structure that have a significant influence on delivery time.
- H_3 : Organizational structure elements have a statistically significant effect on the efficiency of resolving complaints – confirmed. There is a proven statistically strong correlation between all variables, with the strongest correlation being between decentralization and efficient complaint resolution ($r = 0.808$). The results of the regression analysis highlighted that decentralization and coordination/control stand out as elements of the organizational structure with a significant impact on the efficiency of complaints resolution.
- H_4 : Organizational structure elements have a statistically significant effect on cost savings, which is reflected in the product cost – confirmed. There is a proven statistically strong correlation between all variables, with specialization and coordination/control being the organizational structure elements with the greatest impact on cost reduction, and hence customer satisfaction regarding price. The results of the regression analysis showed that specialization and formalization stand out as elements of organizational

structure with the most significant impact on the efficiency of a company in reducing costs. Business practices have shown that companies with a high horizontal and vertical specialization, which follows QMS rules and procedures, are significantly more successful in achieving customer satisfaction with the price of products/services.

- H_3 : Organizational structure is a significant factor in developing an efficient supply chain management – confirmed. A correlation between all the variables that fall under “organizational structure” or “supply chain management” has been proven, with the results of the regression statistical analysis identifying specialization as the organizational structure element that has the most significant influence on establishing an efficient supply chain management among companies included in the survey.

The results of the correlation analysis identified the elements of organizational structure as important factors for establishing an efficient supply chain management. According to the results of the correlation analysis, specialization and decentralization are the variables that form the strongest relationship with the determinants of supply chain management efficiency. Higher degree of specialization, both on a horizontal and vertical level, brings a greater satisfaction of customers/clients with product quality, delivery times, method of resolving complaints and prices. Decentralization, according to the correlation analysis, stands out as the element that has the strongest relationship with product quality, compliance with agreed delivery times, efficiency of resolving complaints and price. Delegating authority from the upper to lower levels within the organizational structure leads to greater initiative in problem solving, shortening the communication channels, greater innovation and quicker response to changes in the environment, including changes in customer/client requirements and needs.

The results of the regression analysis have identified which element of the organizational structure has the most significant effect on each of the determinants of supply chain management efficiency. High horizontal and vertical specialization stood out as an important predictor of generating high-quality products and, along

with formalization, reducing production costs (final product prices). Decentralization in decision-making, greater employee involvement in all aspects of business and coordination/control based on standardization of knowledge and results have proven to be key predictors of meeting the agreed delivery times and resolving complaints efficiently. Therefore, each of the elements of organizational structure has a statistically significant influence on one of the determinants of the efficiency of supply chain management.

It can be concluded that organizational structure is a significant predictor of attaining the efficiency of supply chain management. High horizontal and vertical specialization and performance of work in accordance with regulations and procedures are key predictors of generating high-quality products at reasonable costs, i.e., delivering the right product at an acceptable cost. Decentralization in decision-making, greater involvement of employees in company activities and a coordination/control mechanism based on standardization of inputs and outputs were singled out as the most important factors concerning delivery time and minimizing customer complaints, i.e., delivering the right product at the right time and in the right place. In short, a good organizational structure by itself is not sufficient to establish an effective and efficient supply chain management and the business success of the company, but it is a very important factor in achieving these business goals.

Theoretical/practical implications, research limitations and further lines of research

The scientific contribution of this paper includes a better understanding of the interdependence of organizational structure and supply chain management as one of the qualitative indicators of the achieved company performance. The research results form the basis for making relevant theoretical and practical conclusions about the impact of organizational structure dimensions on the determinants of supply chain management efficiency, while providing guidance to company management by suggesting which organizational structure elements to focus on in order to develop an efficient supply chain management. The

essential scientific contribution of this paper is to create empirically supported evidence that organizational structure dimensions are significant determinants of supply chain management efficiency.

One of the limitations of this research is the fact that it implies that organizational structure and its elements do not change, i.e., that they remain stable. Another limitation is the fact that conclusions about the elements of the organizational structure were made on the basis of discussions with higher ranked employees in the surveyed companies, while there was no input from the employees performing operational tasks. An extenuating circumstance is the fact that the results of the descriptive statistical analysis showed that the respondents' attitudes regarding the organizational structure elements were relatively homogeneous and therefore representative of the way in which the respondents of the surveyed companies indicated the influence of organizational structure elements on the supply chain management determinants of efficiency.

The element that could significantly improve the research regarding the interdependence of organizational structure and supply chain management would be to monitor the evolution of organizational structure elements, accompanied by an analysis of how this evolution reflects on the determinants of supply chain management efficiency. This would empirically prove whether a change in any of the organizational structure elements positively or negatively affected the supply chain management dimensions. Future research should follow this line of thought, with the aim of exploring more deeply the interdependence of organizational structure and supply chain management and forming a stronger link between qualitative and quantitative research concerning this topic.

Conclusion

Organizational structure plays a very important role in ensuring an efficient and flexible organization that is able to respond quickly and effectively to changes in the environment. It is considered to be very important for the growth of profitability and development of the company. For the implementation of a strategy as a long-term plan of any organization, it is very important that there is an

organizational structure that will pave the way for its implementation and performance improvement. An efficient organizational structure generates greater investment, implementation of more advanced technologies, greater employee motivation and higher productivity, which directly affects the efficiency of supply chain management, which is one of the key qualitative indicators of business performance.

Business practices of companies in the territory of Western Serbia have shown that there is a very strong and statistically significant correlation between the elements of organizational structure and the determinants of supply chain management. High horizontal and vertical specialization stood out as an important predictor of generating high-quality products and, along with formalization, reducing production costs (final product prices). Decentralization in decision-making, greater employee involvement in all aspects of business and coordination/control based on standardization of knowledge and results have proven to be the key predictors of meeting the agreed delivery times and resolving complaints efficiently. In simple terms, organizational structure is an important predictor of developing an efficient supply chain management, and therefore market success of any company.

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CHALLENGES IN TOURIST DESTINATION BRANDING IN SERBIA: THE CASE OF PROLOM BANJA

Izazovi brendiranja turističke destinacije u Srbiji – primer
Prolom banje

Abstract

Competition among tourist destinations is becoming more prevalent as many destinations offer the same or similar attractions, which is why destination branding is becoming one of the primary goals of destination management and marketing. A brand has also become an important factor because it gives added value and commits to providing potential tourists with experience of something special in a specific destination. Therefore, it is important to create a perception of distinctiveness of a destination in the minds of tourists. Branding allows a tourist destination to achieve numerous economic effects, primarily reflected in the increase in the number of tourists, development of business, as well as in attracting new investments. Previous research conducted in our country has not sufficiently addressed tourist destination branding, which directed this research paper toward the challenges of branding tourist destinations in Serbia, with special reference to Prolom Banja – one of the destinations specializing in health tourism. This research aims to determine tourist perception of Prolom Banja, as well as to identify key elements that can influence the branding of Prolom Banja as a destination specializing in health tourism. The study was conducted in February 2019 using the survey method – questionnaire technique. The study sample consisted of 195 respondents. Using optimal statistical methods, the collected data were analyzed and the results of the research were presented. The findings show that tourists have a positive perception of Prolom Banja, while the healing Prolom water, employees, undisturbed natural beauty, wellness, and treatment center offer have been identified as significant elements that can influence the branding of Prolom Banja. Implications, research limitations and suggestions for future research were also presented.

Keywords: *brand, tourist destinations, destination branding, recognition, Prolom Banja.*

Sažetak

Konkurencija između turističkih destinacija je sve prisutnija jer mnoge destinacije nude iste ili slične sadržaje, te stoga brendiranje destinacije postaje jedan od primarnih ciljeva destinacijskog menadžmenta i marketinga. Upravo iz tog razloga brend postaje važan faktor jer daje dodatnu vrednost i obećanje potencijalnim turistima da će u destinaciji doživjeti nešto posebno. Zbog toga je važno da se u svesti turista kreira percepcija o posebnosti destinacije. Brendiranjem turistička destinacija ostvaruje brojne privredne efekte koji se pre svega ogledaju u povećanju broja turista, zaposlenosti, kao i privlačenju novih investicija. Dosadašnja istraživanja kod nas nisu se u dovoljnoj meri bavila brendiranjem turističkih destinacija, što je usmerilo predmet istraživanja u ovom radu prema izazovima brendiranja turističkih destinacija u Srbiji, sa posebnim osvrtom na Prolom banju, koja je jedna od destinacija zdravstvenog turizma. Cilj ovog istraživanja je da se utvrdi kakva je percepcija Prolom banje u svesti turista, kao i da se identifikuju ključni elementi koji mogu uticati na brendiranje Prolom banje kao destinacije zdravstvenog turizma. Istraživanje je sprovedeno tokom februara meseca 2019. godine upotrebom metode ispitivanja, tehnikom upitnika, na uzorku od 195 ispitanika. Na osnovu prikupljenih podataka, primenom optimalnih statističkih metoda, izvršena je analiza i prezentovani su rezultati istraživanja. Nalazi istraživanja ukazuju na pozitivnu percepciju koju Prolom banja ima u svesti turista, a lekovita Prolom voda, zaposleni, netaknute prirodne lepote, *wellness* i lečilišna ponuda su identifikovani kao značajni elementi koji mogu uticati na brendiranje Prolom banje. Predočene su implikacije, ograničenja istraživanja i predlozi za buduća istraživanja.

Ključne reči: *brend, turističke destinacije, brendiranje destinacija, prepoznatljivost, Prolom banja.*

Introduction

Competition among tourist destinations is rapidly increasing, and tourist destination branding is one of the key challenges in the struggle to gain competitive advantage in the tourism market. Tourist destination branding is a concept that started developing at the end of the 20th century. It integrates all the characteristics of a specific destination into a single unit, which conveys a unique identity and makes the destination stand out from its competitors [74]. In other words, the goal of destination branding is to create the perception of uniqueness and distinctiveness of a destination in the minds of tourists [40]. There are many scientific papers addressing the general issue of destination branding [8], [22], [20], [29], [58], [73]. In contrast, the number of research papers on health tourism branding is very small/limited [9].

According to the World Tourism Organization and the European Travel Commission, health tourism is an important segment of tourism in which the fundamental motive for traveling is the desire to improve one's well-being and beauty, as well as to prevent diseases [78]. Accordingly, many researchers use the term health tourism as an umbrella term for all health-related tourism activities [24], [23], [36], [47]. Therefore, health tourism consists of two subcategories: wellness and medical tourism [62], [78]. As a type of tourism activity, wellness tourism aims to contribute to disease prevention, general health promotion, holistic access to health, healthy nutrition, and mental and spiritual balance [71]; in other words, in most cases wellness denotes a healthy balance between mind and body leading to the generally improved state of well-being [47], [61]. Medical tourism refers to traveling to a foreign country to undergo specialized medical treatments, involving more affordable prices, better access to and quality of care [80]. The issue of branding tourist destinations in Serbia is an insufficiently researched topic/area, which directed this research paper toward the importance of branding tourist destinations, with special reference to Prolom Banja, a health tourism destination in Serbia. It started developing in the 1970s, and today, in terms of tourist traffic, it is the most visited tourist destination in the Toplica District [21].

The aim of this paper is to study and determine tourist perception of Prolom Banja, as well as to identify the key elements that can influence Prolom Banja's branding as a destination specializing in health tourism. Accordingly, the overall objective was accomplished through the following specific objectives: to explore the perception of Prolom Banja in the minds of tourists; to analyze the impact of different elements (image, quality, loyalty and recognition) on destination branding and to examine whether there are any differences in the attitudes of respondents who visited Prolom Banja only once compared to those who visited it several times.

In accordance with the subject of research and its objectives, the literature review in the field of branding and destination branding was conducted and the methodology and results of the research were presented. The paper ends with conclusions and implications, followed by research limitations and suggestions for future research.

Literature review

Branding and destination branding

In the current tourism market, destination brand development has become a strategic instrument used worldwide due to the increasing competitiveness among tourist destinations [20]. That is why destination branding has garnered a lot of attention, both among researchers and destination marketing managers. It is now more important than ever for tourism destinations to create a unique identity in order to differentiate themselves from the competition [41]. This is closely linked to destination branding. Accordingly, one way for healthcare destinations to achieve diversity and uniqueness in the tourism market is to offer high-quality services and create a strong wellness brand [6]. Destination branding can be defined as choosing to use consistent elements or their combination (name, symbol, logo, slogan, design, where the name is the most important part) to identify a destination and make it stand out by building a positive image [10], while a destination brand is defined as a set of perceptions a tourist has about a place that influences their attitudes toward the destination [10], [33]. Moreover, a destination brand can assist tourists in enhancing their perception of the destination after

they gain travel experience [74]. All the while, it should be kept in mind that in addition to experience-based perceptions, perceptions can also be based on rumors or prejudices. Tourists perceive these elements as a unique combination of functional and psychological components of the destination brand. Konecnik and Gartner [35] distinguish recognizability, image, quality and loyalty as four key components that affect destination branding. These components will be addressed below.

Destination brand recognition refers to what tourists know or think they know about a certain destination [35], that is, it refers to tourists' ability to think of and recognize the destination and its power in their minds [22]. Therefore, one of the key goals in building a destination brand is destination recognition [75]. Furthermore, brand recognition does not only include tourists hearing about the destination, but also means that the destination is more likely to be on their shortlist of places to visit [15]. A recognizable destination brand in the market is most easily identified and differentiated from competing brands through the use of attractive destination attributes and visual elements of brand identity [58].

The image as an element of a tourist destination represents one of the most important factors influencing potential tourists when choosing a destination. Destination image is a complex phenomenon and several authors have said that it is often rather vaguely defined when it comes to tourist destinations [17], [53], [75]. Destination image can be defined as a concept of attitudes that include a set of beliefs, ideas and impressions that tourists have about a particular tourist destination [4], [73]. Numerous studies confirm that destination image plays a key role in shaping tourists' preferences when it comes to specific tourist destinations [8], [39]. Destination marketing managers use this element to make their brand stand out from competing destinations [74]. The importance of image for destination marketing is reflected in the fact that the overall destination image is an essential element in destination loyalty and in encouraging tourists to visit the destination again [13], [58].

The brand must have a certain quality used to positively promote a tourist destination. Destination quality refers to the perception of tourists and the ability of the

destination to meet their expectations [18]. Bigović [7] explains that the first dimension of quality encompasses personal interaction (friendship, efficiency, reliability, etc.), the second refers to the characteristics of the processes themselves (ambient conditions, equipment, etc.), while the third dimension includes the results arising from the related processes (accommodation, food and drink, recreation, etc.). Accordingly, in the overall assessment of the quality of the destination, tourists rate products, services, ambiance and their own experiences. Chen and Tsai [11] explain that quality, as a standard assessment element of the service process, is an important factor in tourist satisfaction, which further influences their loyalty. According to the research conducted in Thailand by Han et al., the quality of the health/wellness destination is largely dependent on the overall satisfaction of international tourists, as well as on their desire and intention to visit the destination again. [25].

Brand loyalty is believed to be a major dimension of the brand's market value; however, it has not been investigated enough from the tourist's aspect and the aspect of their loyalty to the destination [2], [48]. Loyalty can be defined as a degree of consumer's devotion to a particular brand [52]. Brand loyalty represents the likelihood that consumers will use a particular type of brand in the future, regardless of the market opportunities and efforts of competitors offering the same or similar products [75]. Numerous studies link tourist satisfaction with service and loyalty to a destination [13], [19], [28], [43], [70], [79], as well as their intentions to visit it again [1], [51], [54] and positive word-of-mouth communication [25], [31], [55], [72], [77]. According to Pike [51], the highest level of destination loyalty is manifested through tourist's intention to visit the destination, repeat the visit, and recommend that their friends visit it. Destination image and quality represent essential elements influencing tourist loyalty and intention to repeat their visit, which numerous previous studies have confirmed [7], [11], [29].

Health tourism in Serbia

Over the past decades, health tourism, or wellness as its integral part, has been an important segment of the

growing tourism industry that has emerged in response to tourists' needs and desires to improve their overall well-being and health [14], [38]. According to predictions, the average growth rate of wellness tourism will rise above 9%, which is almost 50% higher than the average growth rate of international tourism. Therefore, we can say that it is the fastest-growing segment in the entire tourism industry [27], [26].

With over 50 spas and 1,000 springs, about 500 of which are cold and hot mineral water springs, as well as natural mineral gases and medicinal mud, Serbia has enormous potential in health/wellness tourism [76]. Serbia's health tourism is characterized by traditional forms, such as patient treatment and care and rehabilitation, implemented in specialized hospitals located in spas which also offer other forms for regaining and maintaining good health and psychophysical ability with the help of thermal mineral water, air and medicinal mud [44], [45], [49]. In order to compete in the market, spas in Serbia must take into account the experiences of other countries and current tendencies in the development of health tourism. Many destinations around the world have recognized the opportunity to develop health tourism. To meet the demands of modern tourists, health tourism destinations today offer a variety of services that can meet different tourist needs and expectations. Slovenia is a great example because it has extremely developed health tourism. Terme Olimia in Podčetrtek is one of the most visited Slovenian health destinations where investors and owners (mainly state-owned companies and funds) have invested a lot of money to turn a small thermal source into a modern wellness center [60]. Health tourism is, in fact, the most important segment of Slovenian tourism, since it generates on average a quarter of the annual tourism revenue [56].

In Serbia, health tourism accounts for 17% of total tourist turnover [66]. The number of domestic and international tourists is increasing with each passing year. The increase in tourist traffic is related to the beginning of modernization of our traditional spas which, in addition to their basic function of healing, introduce wellness programs in their offer. Thus, they are slowly turning into destinations for not only treatment and rehabilitation, but also for rest and relaxation [28]. However, despite considerable potential for

the development of health tourism, Serbia is still one of the underdeveloped destinations. Continued transformation of Serbia's spas from traditional spas to modern centers of wellness tourism is of crucial importance for future improvement of this type of tourism [5].

Prolom Banja

Prolom Banja is a health tourism destination in Serbia, located in the municipality of Kuršumlja. Its development began in the 1970s. It is known for its healing Prolom water, which is one of the most famous mineral water brands in Serbia. In addition to the traditional forms of maintaining good health and psychophysical ability, Prolom Banja offers mineral water, clean air and healing mud, a rich wellness program since 2007 and a new wellness center opened in the middle of 2017, spanning over 2,100 square feet. In recent years, wellness tourism has increasingly been developing in spas in Serbia, Vrnjačka Banja taking the lead in this field, followed by Prolom, Lukovska Banja, Sokobanja and others [44].

Accommodation facilities in Prolom Banja meet the needs of increasingly demanding tourists. In addition to a small number of private accommodation facilities which are not categorized and operate in a gray area, hotel accommodation is most frequently used, which can be seen in the following table.

Table 1: Accommodation facilities in Prolom Banja

ACCOMMODATION FACILITIES	Number of rooms	Number of beds	Category
Radan Hotel	212	386	3-star
Gareto Konak Hotel	37	84	-

Source: [21].

In this destination, tourists stay in two hotels, which have a maximum capacity of 249 rooms and 470 beds – private accommodation not included. The Radan Hotel has 212 rooms situated in 3 buildings, two of which are connected to the medical and wellness center. The old Radan Hotel (containing 28 beds) was built in 1968, while the lower annex (60 rooms and 128 beds) with a spa was built in 1976. In 1977, Prolom Banja was declared a natural health resort [21]. The upper annex (135 rooms, 270 beds) and a modern bathroom were built in 1989 [21]. All rooms

in the hotel have healing water, which is also used for heating. The entire hotel complex was renovated in the last few years, combining accommodation, modern medical and wellness treatments and amenities for recreation and entertainment. It is now categorized as a three-star hotel. The hotel and the whole spa complex are managed by the joint-stock company Planinka from Kuršumljia – a strategic tourism developer in the municipality of Kuršumljia. The second hotel in Prolom Banja, the Garetov Konak Hotel, founded in 1963, now includes 3 suites and 34 rooms with 84 beds [21].

Health tourism in Serbia is characterized by the predominance of domestic tourists, with international tourists accounting for only 18% of the total number [49]. This trend is also evident in Prolom Banja, as illustrated by the following table.

Analysis of the data from the previous table reveals the trend of growth in the number of domestic and international tourists in the observed period. A significant increase in the number of tourists has been observed in the last two years, as a positive effect of opening a new wellness center and applying the concept of individual approach to each guest, in which employees represent the pillar and the most important link. High degree of

seasonal concentration and the longest stays are two most significant characteristics of health destinations in Serbia [49]. However, Prolom Banja does not have a distinct high season, bearing in mind that tourist traffic is almost uniform throughout the year, except in December when there are fewest visitors, as opposed to July and August when the number of visits and overnight stays is the biggest. The average length of tourist stay in Prolom Banja in the observed period was 5.24 days, with domestic tourists staying 5.76 days and international ones 3.06 days. These data support the statement on the length of stay in health destinations [49], given that the average length of stay in Serbia in 2018 was 2.72 days [46].

The following table shows the structure of foreign tourist arrivals by country of origin.

Observing the structure of international tourists, it can be concluded that the overall structure mainly includes tourists from Southeastern Europe, namely North Macedonia, Bulgaria, Bosnia and Herzegovina and Montenegro. They are followed by the tourists from the Russian Federation, Croatia, Slovenia, Austria, and Switzerland. The other countries shown in the previous table do not have a significant impact on the structure of foreign tourists. Also, 60% of Prolom Banja's foreign

Table 2: Tourist arrivals and overnight stays in Prolom Banja (2014-2018)

	TOURIST ARRIVALS			TOURIST OVERNIGHT STAYS			AVERAGE NUMBER OF TOURIST NIGHTS		
	Total	Domestic	Foreign	Total	Domestic	Foreign	Total	Domestic	Foreign
2014	11731	9552	2179	58756	51998	6758	5	5.4	3.1
2015	14363	11284	3079	73609	64921	8668	5.1	5.8	2.8
2016	14078	11725	2353	78164	70616	7548	5.5	6	3.2
2017	15862	12742	3120	87378	77509	9689	5.6	6.1	3.2
2018	17718	14234	3484	88662	78079	10593	5	5.5	3

Source: Authors' calculations based on the Statistical Release [67], [68], [69], [70], [71].

Table 3: Tourist arrivals in Prolom Banja by country of origin (2018)

COUNTRY OF ORIGIN	Arrivals	COUNTRY OF ORIGIN	Arrivals	COUNTRY OF ORIGIN	Arrivals
North Macedonia	1259	USA	29	United Kingdom	10
Bulgaria	938	Netherlands	28	Albania	9
BIH	160	Other European countries	27	Denmark	6
Montenegro	130	Australia	27	Ukraine	6
Russian Federation	110	Italy	24	Belgium	6
Croatia	62	Other non-European countries	21	Norway	6
Germany	46	Poland	20	Czech Republic	3
Slovenia	43	Canada	19	Spain	2
Austria	42	France	19	Slovakia	2
Switzerland	41	Romania	15	Hungary	1

Source: Authors' calculations based on the recapitulation obtained from the Radan Hotel [30].

tourists make reservations directly or through bookings, while the rest come through travel agencies and other organizations [30].

Methodology

This research aims to determine the manner in which tourists perceive Prolom Banja, as well as to identify the key elements that can influence the branding of Prolom Banja as a destination specializing in spa tourism. The primary data were obtained using the survey method – questionnaire technique, used to systematically collect data or personal opinion from a group of respondents.

The main hypothesis underlying this research reads as follows: Prolom Banja is known as a destination for treatment, recreation and rest. From the main hypothesis, the following secondary hypotheses were drawn:

- H1: Prolom water influences the overall image of Prolom Banja as a destination specializing in spa tourism.
- H2: Respondents' views on the quality of Prolom Banja as a destination specializing in spa tourism vary significantly depending on the number of times they visited the spa.
- H3: The level of loyalty respondents show towards Prolom Banja as a destination specializing in spa tourism varies significantly depending on the number of times they visited the spa.
- H4: There is positive correlation between the image and recognition of Prolom Banja as a destination specializing in spa tourism.
- H5: There is positive correlation between the image of and respondents' loyalty to Prolom Banja as a destination specializing in spa tourism.

For the purpose of the research, a literature-review-based questionnaire was created [32], [34], [74], taking into account the specificities of Prolom Banja. The questionnaire contains 16 open-ended and closed-ended questions, divided into three segments. The first segment refers to the sociodemographic characteristics of respondents, such as gender, age, and education, the residence also being one of the important parameters in the research. The second segment involves questions related to the information about the destination itself, such as

the number of visits and overnight stays in Prolom Banja, reasons for visiting the spa, sources of information that led to the trip, escort on the trip, number of visits to the destination, accommodation, as well as transportation to the destination. The third segment refers to the degree of agreement/disagreement with the claims about the varied image of the destination, quality, loyalty and recognition of Prolom Banja as a tourist destination. Responses were measured using a five-point Likert scale (1=strongly disagree; 2=disagree; 3=neutral; 4=agree; 5=strongly agree).

The study was conducted in February 2019 on a sample of 195 respondents, through an online questionnaire, distributed through the official Facebook profile of Prolom Banja, as well as through field research – with the assistance of the marketing service of the Radan Hotel. Respondents were told that participation in the research was anonymous and voluntary and that the results would be used solely for scientific and research purposes.

The following statistical techniques and methods were applied in the statistical data processing and testing of hypotheses:

- descriptive statistical measures – frequencies and percentages were used to describe the research sample;
- measures of variability – arithmetic mean (M) and standard deviation (SD) were used to show the scores for the questionnaires;
- Pearson's correlation coefficient was used to test the association between variables;
- Student's t-test was used to show the significance of differences between scores for individual variables.

Statistical analyses were conducted using the SPSS 20.0 statistical package (Statistical Package for the Social Sciences for Windows 20.0).

Analysis and discussion of results

Statistical data processing included a sample of 195 respondents. All completed questionnaires were valid. The sociodemographic characteristics of respondents are shown in the following table.

In the total number of respondents, there are more female (63.6%) than male respondents (34.4%). In terms

Table 4: The sociodemographic characteristics of respondents

VARIABLES	Frequency	Percentage
GENDER		
Male	71	36.4
Female	124	63.6
EDUCATION		
Primary school	-	-
Secondary school	59	30.3
College/Higher education	103	52.8
Master's degree/Ph.D.	33	16.9
AGE		
Up to 19	-	-
19 – 24	23	11.8
25 – 34	50	25.6
35 – 44	76	38.9
45 – 59	36	18.5
Over 60	10	5.2
COUNTRY OF ORIGIN		
Serbia	178	91.3
North Macedonia	10	5.13
BIH	3	1.54
Switzerland	1	0.5
Austria	1	0.5
Italy	1	0.5
USA	1	0.5

Source: Authors' calculations based on SPSS 20.0.

of education, they are generally highly educated, given that the majority of respondents (52.8%) belong to the higher education or college category, followed by the high school category (30.3%), while only 16.9% of respondents have a master's degree or a Ph.D. When it comes to their age, most respondents are between 35 to 44 years of age (38.9%), while those aged 25 to 34 occupy the second place (25.6%). The fewest respondents are older than 60 – only 5.1% of them, which is understandable given the age and willingness of this category of visitors to participate in the research. Participants in the study came from the Republic of Serbia, North Macedonia, Bosnia and Herzegovina, Italy, Switzerland and the USA. The majority of respondents come from all parts of the Republic of Serbia (91.3%). However, there were also 8.7% of foreign respondents, predominantly from the former Yugoslav republics, who participated in the study. Therefore, we can conclude that the sample is representative and varied, bearing in mind that the field survey was conducted in February when there are fewer visitors than in the summer tourist season.

Using the obtained results, a description of the characteristics of respondents based on their visits to Prolom Banja is presented below.

Table 5: Respondents' characteristics based on the number of visits to the destination

VARIABLES	Frequency	Percentage
NUMBER OF VISITS		
Once	49	25.1
Twice	44	22.6
Three and more times	102	52.3
SOURCES OF INFORMATION		
Travel agency	1	0.5
Tourist fairs	3	1.5
Media	13	6.7
Internet/social networks	56	28.7
Friend's recommendation	62	31.8
Personal experience	59	30.3
Other	1	0.5
MOTIVE FOR VISITING		
Rest and relaxation	130	66.7
Healing power of Prolom water	40	20.5
Maintaining good health	23	11.8
Other	1	0.5
TRAVELED WITH		
Alone	10	5.1
Partner	62	31.8
Family	82	42.1
Friends	41	21
MEANS OF TRAVEL TO THE DESTINATION		
Car	171	87.7
Bus	24	12.3
NUMBER OF OVERNIGHT STAYS		
1 – 3	90	46.2
4 – 7	61	31.3
8 – 14	36	18.5
15 – 21	8	4.1
Over 22	-	-
TYPE OF ACCOMMODATION		
Hotel accommodation	161	82.6
Private accommodation	31	15.9
Other	2	1

Source: Authors' calculations based on SPSS 20.0.

The majority of respondents visited Prolom Banja three or more times (52.3%), while the number of respondents who visited the spa once and twice was almost identical (25.1% and 22.6%, respectively). Speaking of the number of overnight stays, the majority of respondents stayed between one and three days (46.1%) and four and seven days (31.3%). The 8-to-14-day-long stays occupy the third place with 16.9%, while very few visitors stayed in the spa for more than 15 days – only 2.5% of the respondents. The number and duration of visits were studied jointly, leading to the conclusion that visitors usually stay for a short time and are happy to come back to this destination.

Respondents (67.1%) single out rest and relaxation as the most important motive behind their visit to Prolom Banja, while the healing power of Prolom water takes the

second place (20.5%), immediately followed by staying healthy (11.8%). This can be closely linked to the second motive, which is why these two can be studied jointly.

While researching the source of information which led the visitors to choose Prolom Banja, friends' recommendations (31.8%), personal experience (30.3%) and the internet and social networks (28.7%) proved to have had the greatest influence on visitors. Additionally, information obtained through the media (6.7%), from travel agencies (0.5%) and tourist fairs (1%) also have an interesting role in attracting visitors.

Visitors usually come to Prolom Banja either with their families (42%) or with their partners (31.8%). Visiting the spa with friends or acquaintances takes the third place, while in only 5.1% do visitors come to the spa alone. This is supported by the observation that in most cases (87.7%) visitors travel to the destination by car, while only a small number of them (12.3%) take the bus.

Speaking about the type of accommodation that the visitors prefer, the study shows that 82.6% of visitors stay at the Radan Hotel, which is a good indicator of the quality and comfort provided by this hotel – an example and embodiment of Prolom Banja's beauty. Only 15.9% of respondents stay in private accommodation.

The analysis of the results begins with determining the reliability and consistency of the claims about the dimensions of image, quality, loyalty and recognition of Prolom Banja as a destination specializing in spa tourism. The reliability and consistency of the claims are calculated using the Cronbach's alpha coefficient. Its values range from 0 to 1, where values greater than 0.7 indicate adequate reliability and consistency of the claims.

Table 6: Cronbach's alpha coefficient values

VARIABLES	Number of statements	Cronbach's alpha
Destination image	5	.896
Destination quality	8	.929
Destination loyalty	4	.860
Destination recognition	9	.928

Source: Authors' calculations based on SPSS 20.0.

Cronbach's alpha coefficient values in this study ranged from 0.86 (loyalty) to 0.929 (destination quality). For claims describing the destination image, Cronbach's alpha stands at 0.896, while for the ones describing Prolom

Banja's recognition relative to other destinations, it amounts to 0.928. The values obtained indicate adequate reliability and internal consistency of the claims.

A summary of the descriptive statistical analysis of attitudes and claims regarding image, quality, loyalty, and recognition is shown below. The results of the descriptive statistical analysis on the image of Prolom Banja as a tourist destination will be presented first.

Table 7: Descriptive statistical analysis of destination image

DESTINATION IMAGE	M	SD
Prolom Banja is known/unique for its healing spring water	4.63	.791
Prolom Banja is surrounded by natural beauty	4.48	.839
Prolom Banja has a high level of safety	4.31	.879
The local population of Prolom Banja is welcoming	4.25	.916
Prolom Banja has excellent conditions for recreation (sports facilities, indoor and outdoor pools, hiking trails, etc.)	4.34	.918

Source: Authors' calculations based on SPSS 20.0.

Based on this table, it can be concluded that all the claims in the destination image variable have a high score of over 4. Therefore, according to visitors, all claims have a high influence on creating a positive image of Prolom Banja as a tourist destination. The healing Prolom water has the highest score and influence when it comes to creating a positive image of Prolom Banja (4.63). The obtained result implies that Prolom water influences the overall image of Prolom Banja as a tourist destination, thus confirming the first hypothesis (H1). Another significant finding relates to the fact that respondents highly scored the following statement: "Prolom Banja is surrounded by natural beauty" (4.48), which positively affects the image of Prolom Banja. The hospitality of the local population in Prolom Banja, however, obtained the lowest score (4.25). Nevertheless, this result is not negative and does not have a bad connotation with regard to image building. The obtained results indicate that, according to all the observed elements in the variable, respondents, i.e. tourists, have a positive image of Prolom Banja.

The results of the descriptive statistical analysis of the quality of Prolom Banja will be shown next.

The findings of the descriptive statistical analysis on the quality of Prolom Banja as a tourist destination indicate that the respondents rate staff service (4.55) and

Table 8: Descriptive statistical analysis of destination quality

DESTINATION QUALITY	M	SD
Prolom Banja has high-quality accommodation	4.14	1.008
Prolom Banja has a high-quality gastronomic offer	4.15	1.037
Prolom Banja has high-quality wellness services	4.46	.845
Prolom Banja employees provide a high level of service	4.55	.754
Prolom Banja has high-quality infrastructure	3.72	1.101
The safety of Prolom Banja tourists is high	4.24	.919
The level of cleanliness in Prolom Banja is high	4.31	.896
The price/quality ratio in Prolom Banja is at a high level	3.93	1.060

Source: Authors' calculations based on SPSS 20.0.

wellness services (4.46) as the most important quality indicators, taking into account that in recent years Prolom Banja has made significant investments in the modernization of the wellness complex, which is part of the Radan Hotel. Respondents also highly rate the level of cleanliness (4.31) and safety (4.24), while the quality of accommodation (4.14) and gastronomic offer (4.15) received almost identical scores. They are least satisfied with the quality of the infrastructure (3.72) and the price/quality ratio (3.93).

The following table shows the results of the descriptive statistical analysis of the extent of respondents' loyalty to Prolom Banja.

Table 9: Descriptive statistical analysis of destination loyalty

DESTINATION LOYALTY	M	SD
I will visit Prolom Banja again	4.47	.869
I will gladly recommend Prolom Banja to my friends	4.53	.827
Prolom Banja offers more services than other similar destinations	3.77	1.127
I will visit Prolom Banja again even if the prices of services increase	3.38	1.297

Source: Authors' calculations based on SPSS 20.0.

Based on the obtained results, a high level of respondents' loyalty to Prolom Banja is observed, i.e. high scores indicate that they will visit Prolom Banja again (4.47) and that they will gladly recommend this destination to their friends (4.53). This means that the respondents were satisfied with the services provided in the destination and that Prolom Banja met their expectations. On the other hand, when it comes to assessing whether Prolom Banja offers more services than other similar destinations and

whether tourists would visit it even if prices of services increase, the results were not so good (3.77 and 3.38, respectively). The findings indicate the need for Prolom Banja to continue to work on its authenticity and enhance its offer in order to be more competitive when compared to other destinations in Serbia. The increase in the number of loyal tourists is unquestionably a key factor for the success of a tourist destination [25].

The summary of the results of the descriptive statistical analysis of the recognition of Prolom Banja in relation to other destinations specializing in health tourism is presented below.

Table 10: Descriptive statistical analysis of destination recognition

DESTINATION RECOGNITION	M	SD
Accommodation quality	3.87	1.074
Medical offer	4.32	.875
Healing power of Prolom water	4.65	.775
Wellness offer	4.39	.921
Gastronomic offer	3.99	1.043
Hospitality of the local population	4.14	.925
Hospitality of the employees	4.57	.824
Intact natural beauty	4.44	.885
Price/quality ratio	3.83	1.120

Source: Authors' calculations based on SPSS 20.0.

The descriptive statistical analysis of Prolom Banja's recognition indicates that the main asset of its recognizability and uniqueness is the healing power of Prolom water (4.65), which is a separate brand and the main element of its tourism offer. It is a very important factor in the building of image and brand of Prolom Banja as a destination specializing in spa tourism. As regards recognition, bearing in mind that people are one of key dimensions of a tourist destination, the employees occupy the second place with a score of 4.57. Intact natural beauty (4.44) is a very important recognition factor. Due to the construction of a brand-new modern wellness center and the changes to the existing one, the wellness offer (4.39) occupies an equally important place in the recognition of this destination. First and foremost, Prolom Banja is distinguished by its recognizable healing Prolom water, followed by the hospitality of its employees, intact natural beauty, wellness and medical offer. On the other hand, quality of accommodation (3.87) and price/quality ratio (3.83) have somewhat lower scores.

Further analysis of the results obtained by a t-test shows the differences between the arithmetic means of scores given by the respondents who visited Prolom Banja once and those who visited it three or more times. The quality, loyalty and recognition variables of Prolom Banja in relation to competing spa destinations were analyzed.

Based on the obtained results, it can be concluded that all the quality indicators observed by the respondents who visited Prolom Banja three or more times have higher scores compared to the ones given by the respondents who visited the destination only once. The reason for this result lies in the difference between the delivered and perceived quality of the destination. The obtained results are in line with the results of the previous research, which confirmed that the level of satisfaction with quality significantly differs between tourists who are visiting the destination for the first time and those who have visited it more than once [3], [50]. The respondents identified employees as the indicator of quality of Prolom Banja; and this is also in line with the results of the previous research which identified employees and their communication with tourists as a key indicator of quality [16], [57]. Research

results show that there are statistical differences among the quality of accommodation ($t = -2.311, p = .022$), quality of infrastructure ($t = -2.727, p = .007$), cleanliness ($t = -1.993, p = .048$) and price/quality ratio ($t = -2.712, p = .007$). All of these destination quality indicators were rated lower by the respondents who visited the destination only once compared to those who visited it three or more times. The obtained results confirm the second (H2) hypothesis.

The results from the previous table indicate that the respondents with more considerable prior experience have significantly different opinions from those who are visiting the destination for the first time. Speaking of the statistically significant differences, the results show that there are differences in the respondents' intention to visit Prolom Banja again ($t = -2.338, p = .021$), their intention to recommend the destination to their friends ($t = -1.196, p = .029$) and to visit Prolom Banja even if prices of services increase ($t = -4.161, p = .000$). Furthermore, it can be concluded that respondents show a high degree of loyalty to Prolom Banja. In this regard, the obtained results are in agreement with the findings of Kozak's study [37], which explored the British tourists' previous

Table 11: Differences in arithmetic means of destination quality scores depending on the number of visits of respondents

DESTINATION QUALITY	Number of visits		t-test	Sig.
	Once	Three or more times		
	M	M		
Prolom Banja has high-quality accommodation	3.91	4.30	-2.311	.022**
Prolom Banja has a high-quality gastronomic offer	3.95	4.29	-1.930	.056
Prolom Banja has high-quality wellness services	4.27	4.53	-1.742	.084
Prolom Banja employees provide a high level of service	4.52	4.53	-.048	.962
Prolom Banja has high-quality infrastructure	3.34	3.88	-2.727	.007**
The safety of Prolom Banja tourists is high	4.18	4.35	-1.049	.296
The level of cleanliness in Prolom Banja is high	4.11	4.44	-1.993	.048**
The price/quality ratio in Prolom Banja is at a high level	3.59	4.09	-2.712	.007**

Source: Authors' calculations based on SPSS 20.0.

** Statistical significance at the level of 0.05.

Table 12: Differences in arithmetic means of destination loyalty scores depending on the number of visits of respondents

DESTINATION LOYALTY	Number of visits		t-test	Sig.
	Once	Three or more times		
	M	M		
I will visit Prolom Banja again	4.27	4.61	-2.338	.021**
I will gladly recommend Prolom Banja to my friends	4.39	4.67	-1.196	.029**
Prolom Banja offers more services than other similar destinations	3.69	3.98	-1.438	.154
I will visit Prolom Banja again even if the prices of services increase	2.90	3.80	-4.161	.000**

Source: Authors' calculations based on SPSS 20.0.

** Statistical significance at the level of 0.05.

experiences and future intentions to visit Majorca and Turkey again. Kozak attained an identical result – tourists who visited the destination for the first time showed a lower likelihood of repeating the visit than tourists with more previous experience. Chi [12] conducted a study to analyze the difference in destination loyalty between first-time tourists and repeat visitors. Study findings indicate a higher degree of loyalty among tourists with previous experience than among the first-time tourists. Similar research was conducted by Shavanddasht and Allan [59], who investigated the previous experiences and future intentions of tourists in the field of health tourism; the results of this research correspond with the results of the abovementioned studies. Specifically, the hypothesis that tourists with more prior experience differ significantly from first-time tourists, including by their degree of loyalty, has been confirmed. According to the obtained results, it can be said that the loyalty of respondents to Prolom Banja differs significantly depending on their previous experience, thus confirming the third hypothesis (H3).

The findings from the previous table indicate a similar situation as with the destination quality variable. Namely, the respondents who visited Prolom Banja three or more times attached greater significance and importance to all the elements of Prolom Banja's recognition, while the results of respondents who visited the destination only once showed much lower scores. Most recognition elements have statistically significant differences, except for the wellness offer and employee hospitality.

Table 13: Differences in arithmetic means of destination recognition scores depending on the number of visits of respondents

DESTINATION RECOGNITION	Number of visits		t-test	Sig.
	Once	Three or more times		
	M	M		
Accommodation quality	3.52	4.10	-3.282	.001**
Medical offer	4.14	4.47	-2.286	.024**
Healing power of Prolom water	4.50	4.68	-1.271	.026**
Wellness offer	4.20	4.50	-1.903	.059
Gastronomic offer	3.75	4.17	-2.409	.017**
Hospitality of the local population	3.89	4.33	-2.847	.005**
Hospitality of the employees	4.55	4.66	0.092	.927
Intact natural beauty	4.23	4.54	-1.987	.049**
Price/quality ratio	3.50	3.99	-2.487	.014**

Source: Authors' calculations based on SPSS 20.0.

** Statistical significance at the level of 0.05.

Based on the results presented in table 10, taking into account respondents' views and their repeated visits to the destination, the following elements were identified as the ones that influence the recognition and building of Prolom Banja's brand and image as a spa tourism destination: the healing powers of Prolom water, employees, intact natural beauty, wellness and spa offer. By these elements Prolom Banja can most easily be distinguished from the competing health destinations.

To test the fourth and fifth hypotheses, the strength of association between the image, quality, loyalty, and recognition variables was measured. The following table shows the correlations between the observed variables.

Table 14: Pearson's correlation coefficient between the observed variables

VARIABLES	Image	Quality	Loyalty	Recognition
Image	1	.738**	.499**	.712**
Quality	.738**	1	.732**	.857**
Loyalty	.499**	.732**	1	.715**
Recognition	.712**	.857**	.715**	1

Source: Authors' calculations based on SPSS 20.0.

** Correlation is statistically significant at the 0.01 level.

Coefficient above 0.6 indicates a high degree of correlation between the variables, a score between 0.4 and 0.6 shows moderate correlation, and a score below 0.4 indicates weak correlation. The findings of the correlation analysis presented in the previous table show the statistically significant values of the Pearson's coefficient. There is a statistically significant high degree of correlation among the observed variables, except between the image and loyalty variables, which show moderate correlation. The

results of the correlation analysis revealed a high degree of correlation between the quality and recognition of Prolom Banja as a tourist destination compared to the competition (0.857), as well as between the quality and image of Prolom Banja (0.738). There is also a high degree of correlation between recognizability and loyalty (0.715) and between image and recognition (0.712), which confirms the fourth (H4) hypothesis. Moderate correlation is present only between the image of and loyalty to Prolom Banja as a tourist destination (0.499). In this case, because of moderate correlation, the fifth (H5) hypothesis can be conditionally verified.

Conclusion

The need for destination branding is becoming more noticeable as many destinations offer quality content and services, but might not have market recognition. In this sense, destinations can be similar, and this is where the brand becomes an important factor because it gives added value and commits to providing potential tourists with experience of something special in a certain destination that will make it worth visiting. Therefore, it is important to create a perception of distinctiveness of the destination in the minds of tourists. Destinations which have a recognizable image and are positively perceived by tourists are more likely to be found on their shortlist [42].

Research findings indicate that tourists perceive Prolom Banja positively. Respondents singled out rest and relaxation as the main motives for visiting Prolom Banja, followed by the healing powers of Prolom water and maintaining good health. They believe that the healing Prolom water, natural beauty and hospitality of the local population have a high influence on creating a positive image of Prolom Banja as a destination specializing in spa tourism. Accordingly, it can be concluded that respondents have a positive image of Prolom Banja. This conclusion is in line with numerous studies that have confirmed that destination image plays a crucial role in shaping tourists' preferences [8], [22], [63], [81].

Respondents ranked employees as the first indicator of the quality of Prolom Banja, followed by wellness services, cleanliness and quality of accommodation. A very

important factor with regard to the quality of service is communication and attitude of employees towards tourists because tourists require service that enables easy use of the offered content, from the first contact to using various tourist facilities later on. Based on the conducted research, and taking into account respondents' views, it is concluded that the healing Prolom water, employees, intact natural beauty, wellness and medical offer are all elements that are identified as significant and recognizable. Prolom water occupies the first place, as it is a major contributor to the tourist offer. On the one hand, it is an integral part of the brand of Prolom Banja, while, on the other, it has its own, separate brand that creates additional value for tourists.

This research may also have implications for other destinations, given that the key components influencing destination branding have been identified and tested and can be used as such by destination management and marketing to create better destination recognition, leading to increased tourist traffic, employment of local population and capital investment. Bearing in mind the fact that Serbia has great potential for the development of health tourism, it is of the utmost importance that the health/wellness destinations conduct the same or similar research in order to implement an adequate branding strategy. Also, practical implications may be useful, first and foremost, for the marketing of Prolom Banja, i.e. the company (Planinka from Kuršumlija) which runs all the main activities in Prolom Banja. The use of the existing brand of Prolom water and integration of the elements identified in this research are of crucial importance for the successful creation of the brand of Prolom Banja as a tourist destination. Branding, as a marketing and management process, has to fulfill all tourists' expectations regarding the quality of products and services offered by Prolom Banja as a tourist destination.

It is also necessary to point out certain limitations of this research, such as the fact that it was conducted on a modest sample, bearing in mind that the survey was carried out in February when there are much fewer tourists. Another limitation refers to the research scope, which only included Prolom Banja. Therefore, one of the recommendations for further research may be to widen the scope of the research, both in terms of sample size

and health destinations, and to explore the possibility of branding Serbia as a health and wellness destination, particularly taking into account its significant potential.

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