UNIVERSITY OF NIŠ

ISSN 0354-4699 (Print)
ISSN 2406-050X (Online)
COBISS.SR-ID 87230727

FACTA UNIVERSITATIS

Series
ECONOMICS AND ORGANIZATION
Vol. 14, N° 3, 2017

Scientific Journal **FACTA UNIVERSITATIS**
UNIVERSITY OF NIŠ
Univerzitetski trg 2, 18000 Niš, Republic of Serbia
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The cover image design: **M. Ž. Ranđelović**
Publication frequency – one volume, four issues per year.

Published by the University of Niš, Republic of Serbia

Financial support: Ministry of Education, Science and Technological Development of the Republic of Serbia

Printed by "UNIGRAF-X-COPY" – Niš, Republic of Serbia

ISSN 0354 – 4699 (Print)
ISSN 2406 – 050X (Online)
COBISS.SR-ID 87230727

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FACTA UNIVERSITATIS
Series: **Economics and Organization** Vol. 14, N° 3, 2017, pp. 189 - 202
https://doi.org/10.22190/FUEO1703189R

Review Paper

THE MICROECONOMIC PERSPECTIVES OF INTELLECTUAL CAPITAL MEASUREMENT

UDC 330.101.542:005.336.4

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Abstract. *Intellectual capital has become a widely studied issue among researchers in the knowledge economy. This is due to the fact that intellectual resources are the main driver of growth and competitiveness in the globalized environment. However, measuring intellectual capital, as an intangible resource, is not an easy task. Researchers have been trying for decades to put in place a measurement system that can provide useful information for managers. Definitely, there are numerous measuring methodologies available, but the list is non-exclusive. Appropriate usage of intellectual capital measuring methodologies enables adequate management of intellectual capital and thus leads to the creation of competitive advantage and value for enterprises and wealth for nations. Therefore, the aim of the paper is to examine various microeconomic measurement methodologies of intellectual capital focusing on the level of organization. The authors critically evaluate numerous noteworthy methods of the intellectual capital appraisal, as well as the indicators used in order to capture the performances of intellectual capital, thus contributing to the improved management of invisible, valuable non-material resources in the process of value creation for various stakeholders and enhancing competitiveness of an enterprise.*

Key words: *intellectual capital, intangible assets, knowledge, knowledge economy, measurement methodologies, competitiveness*

JEL Classification: D83, L25, O34

Received May 11, 2017 / Accepted July 05, 2017
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INTRODUCTION

Knowledge, as the most important intellectual resource, is the principal factor which drives the competitiveness of an economy and results in higher living standards for its citizens. Knowledge became the most important factor of economic growth and competitiveness with the process of globalization. Globalization has altered the way in which companies and economies mutually interact, but also the resources which drive growth. Therefore, companies, cities, regions, nations have become aware of the possibility to succeed in the international market by employing and developing a new and unlimited resource – knowledge.

Instead of the simple usage of production factors which a country has in its possession, in the time of the globalized economy, it is of extreme importance how enterprises and countries improve the quality of production factors, increase the productivity of their usage and create new factors. Comparative advantage, which is based on costs of production factors, cannot serve as the base for development strategy in an economy in the long run, since this kind of advantage is threatened by the possibility of appearance in the world market economies with even lower costs of production factors or willingness of governments to subsidies such development strategies (Ivanić & Paunović, 2010, p. 10). Therefore, the competitive advantage must be based on new knowledge and innovations.

The concept of intellectual capital has become a widely studied issue among researchers since the beginning of the 1990s. This concept incorporates three different components at the micro level: human capital, relational capital and structural capital. Once the importance of the concept has been determined at the level of firms, researchers have expanded their research to the level of national economies, especially in investigating the role intellectual capital has in creating and sustaining high positions in the international market. Therefore, the focus has been put on measuring methodologies for valuing this unlimited resource. However, the consensus has not been reached yet due to the immaterial nature of intellectual capital, and this creates a room for further investigation of the issue. In this regard, this study focuses on determining advantages and disadvantages of various measurement methodologies for the purpose of enhancing the intellectual capital management in an enterprise.

The paper is organized in the following manner. The subsequent part focuses on the explanation of knowledge and its use in enhancing economic growth and competitiveness. Afterwards the role of intellectual capital as a source of value creation in the knowledge economy will be elaborated, followed by the motivation for measuring intellectual capital. Subsequently, the methodologies for measuring intellectual capital at micro level will be critically assessed. Finally, the conclusion will summarize the main findings of the paper.

1. KNOWLEDGE AS THE FACTOR OF ECONOMIC GROWTH AND COMPETITIVENESS

In contemporary circumstances, knowledge is spreading increasingly fast. Due to the development of information and communication technologies, information is widely available to everyone, and hence it is hard to be different and unique in the knowledge market economy. Thus, it is of great importance to organize and manage resources in an innovative manner.

All modern companies and countries compete in knowledge. This is because they understand that the only way to reach high positions in the international market is to base production on the intellectual capital and search for new innovative ways of production.

"An economy becomes a knowledge economy by putting knowledge at the centre of the process of economic development" (Krstić & Stanišić, 2013, p. 153).

In the past, the competitiveness of firms and nations was based on comparative advantages they possess. This was in line with Ricardo's theory of comparative advantage. However, globalization of competition and technology has put classical theory in industrial developed countries aside (Rakić & Rađenović, 2016a). Today, the competitiveness of firms and nations is based on competitive advantages they create. This is in line with Porter's view of national competitiveness and his diamond theory. According to Porter (1990), it is necessary to connect and strengthen forces in the diamond to achieve competitive advantage by promoting innovation and progress. This Porter's view is in line with endogenous growth theories in which knowledge represents a key factor of productivity and economic growth.

Knowledge, innovations and networking have become three basic elements of new infrastructure needed for the prosperity in the new knowledge economy (Krstić & Vukadinović, 2009, p. 460). Knowledge, as a factor of production, compensates to some extent for land, labour and other resources. The main characteristic of economic prosperity in the global economy is competitiveness based on knowledge and innovation. This has been well recognised by the OECD, as this organisation considers innovation capacity and marketable innovations to be the crucial determinants of the national competitiveness (2007, p. 3).

After the industrialization era, the knowledge era has taken the throne, and hence the basic source of competitive advantage of a country is knowledge. In contemporary circumstances the wealth of nations, regions, and cities depends on the level of knowledge and its effective and efficient usage (Krstić & Vukadinović, 2009, p. 460). Trends of globalisation and liberalisation of economic and financial flows, as well as constant technological changes have led to the transformation of industrial economies to the knowledge economies (Laroche et al., 1999, p. 88), i.e. shifting focus from natural resources to knowledge and innovation. Knowledge economies are those in which intellectual capital represents a fundamental production factor (Bedford, 2013, p. 278). Production and services based on intellectual capabilities can lead to the accelerated pace of technological and scientific progress (Powell & Snellman, 2004, p. 199).

However, these new technological advances do not have notable value for those countries which do not have educated and trained labour force to use those advances, pointing to the fact that economic growth to a great extent depends on the synergy between new knowledge and human capital (Rakić & Rađenović, 2016b, p. 96). Only those countries in which main technological advances were followed by increased trends of education and training have reached significant economic growth (Becker, 2008).

2. Intellectual Capital as a Source of Value Creation in the Knowledge Economy

The notion of intellectual capital can be traced back to the beginning of the XX century and Taylor's "The Principles of Scientific Management" in 1911 (Kolaković, 2003, p. 927). Although the research on the importance of knowledge can be extended even further in the past, this can be viewed as the first attempt to set scientific explanation of knowledge, experience and skills of employees. Further progress in the economic theory was made by Schumpeter (1934), who emphasised the recombination of knowledge as a necessary precondition for the appearance of new innovative products.

The traditional neoclassical growth model (Solow, 1957) does not explain the major determinants of productivity growth (Viedma Marti & Cabrita, 2012, p. 18). Namely, the huge amount of growth is explained by Solow's residual, the part of output growth that cannot be accounted for by growth in the primary production factors, i.e. capital and labour. This residual capture other exogenous factors that have an influence on growth and is often attributed to technological progress. Hence, in the Solow's growth model technological progress is set as exogenous, and based on the critics of this model new theories have emerged. These new theories observed these other factors as endogenous. The main position is given to human capital in form of accumulated knowledge, education and innovation (Romer, 1986; 1990; Lucas, 1988).

Romer (1986) recognised accumulation of knowledge at all levels as a fundamental driver of economic growth. According to Romer only people can create new ideas that result in the recombination of things and their new usages and thus lead to economic prosperity. In order to support economic growth and development governments in both developed and developing countries have to create the macroeconomic policies that encourage investments in the research and development of new ideas as well as to subsidize the accumulation of total human capital (Romer, 1990, p. S99).

By linking all available analyses and theories of human capital with the ideas and innovations which human capital produces, Romer is perceived as the founder of the new area of research – the concept of intellectual capital (Kolaković, 2003, p. 930). The concept of intellectual capital is firmly based on a modern competitiveness theory.

Although it would be expected to discover the fundamentals of the intellectual capital theory in the managerial and organizational theories, this theory draws its roots from all the above mentioned macroeconomic theories. The intellectual capital theory can be viewed as one of the endogenous theories which is based on premises that the value of an enterprise is generated from human capital, structural capital and relational capital, i.e. when one form of capital is transformed into another form (Kolaković, 2003, p. 925). For example, the value is created when individuals' capabilities (human capital) create new organisational processes (structural capital) resulting in better services for customers and increased loyalty (relational capital).

The first attempt to investigate the growth process in firms can, most likely, be ascribed to Penrose's (1959) effort to visualise the firm's growth as a collective endogenous process in which its participants accumulate valuable knowledge, through a dynamic learning process embedded in the interactions between firm's productive resources and market opportunities. The resource-based theory of the firm (Penrose, 1959; Wernerfelt, 1984; Barney, 1991) views a firm as a unique set of the different resources and capabilities, thus pointing to the fact that the diversity between firms originates from its internal characteristics, i.e. the heterogeneous resources and capabilities it accumulates, improves and uses in the process of value creation.

Apart from the resource-based view, the competitiveness theory involves two other segments: the dynamic capabilities theory and the knowledge-based theory. The dynamic capabilities theory points to the fact that the resources of a firm and their efficient utilization are not enough to achieve sustainable competitive advantage, but specific capabilities of a firm are also required (Krstić, 2007). Teece et al. (1997) observe the dynamic capabilities of a firm as its capacity to integrate, develop and recreate the internal and external competencies to effectively respond to the fast changing environment.

The knowledge-based theory puts emphasis on the knowledge, as an imperfectly imitable resource, which differentiates and provides a competitive advantage (Leonard-Barton, 1992). The proponent of the knowledge-based theory Grant (1996) points to the fact that "the critical input in production and primary source of value is knowledge" (p. 112). This lead to a conclusion that in the constantly changing surroundings, the most successful firms are those which produce original knowledge, spread it within the organization and quickly turn into innovative products.

3. Reasons for Measuring Intellectual Capital

It is due to its immaterial nature, that intellectual capital is hard to define and even harder to measure. Usually, intellectual capital is observed as the "knowledge that creates value" (Viedma Marti & Cabrita, 2012, p. 69), or "any valuable intangible resource gained through experience and learning that can be used in the production of further wealth" (Marr & Moustaghfir, 2005, p. 1116). Intellectual capital determines the future growth and development perspectives of an enterprise.

Modern knowledge enterprises, with high business performances, have beforehand acknowledged the importance of intellectual capital for their growth and development, and as a result they emphasise the following priority activities (Krstić, 2014, p. 11):

- Identifying and increasing visibility of intellectual resources in the reports of business success and competitiveness;
- Guiding improvement and increase of intellectual capital of an enterprise through professional development, continuous training and education, research and development, cooperation, effective application of information technology and the concept of knowledge management;
- Creating and adding value to products and enterprises by the process of renewing and disseminating knowledge;
- Identifying key intellectual resources of an enterprise for the value increase and with the highest influence on its strategic position, growth and development.

There are several reasons why it is essential for the enterprises in the globalized economy and intensive development of information and communication technologies, to measure the performances of intellectual resources and their intellectual capital, as well as to report on its performances and value. One of the reason is the change in the resource structure of the modern enterprise from tangible resources toward intangible intellectual resources (Krstić, 2014, p. 67). Namely, in the knowledge-based economy the managers of the knowledge enterprises, as well as stakeholders and investors are not content with the traditional measurement and reporting system of intellectual capital, since this system does not offer necessary information for the decision making process.

The traditional measurement and reporting system concentrates on the financial information from official financial reports thus covering only one part of the intellectual resources such as intellectual property identified in the balance sheet of an enterprise. Such a system does not provide room for the monitoring and valuing of the non-financial performances of intellectual resources. However, this does not mean that these intellectual resources do not exist in an enterprise. Contrarily, these resources have to be efficiently managed due to their significance in the process of value creation, and hence in order to

be manageable, these resources have to be monitored, measured and reported about their performances to the internal and external stakeholders.

In the knowledge economy it is evident that the traditional financial reports are far from exact reporting of the real value of a firm, and hence are inadequate starting point for the projections of its future possible business performances and value, especially as knowledge has taken the central place in the process of value creation.

According to Marr et al. (2003) modern enterprises are measuring their intellectual capital because of the following reasons (p. 443):

- Assisting enterprises in the formulation of their strategies;
- Supervising and assessing the implementation of the formulated strategies;
- Facilitating the strategic decision regarding diversification, expansion, integration and development;
- Helping in determining compensation benefits for employees and managers;
- Conveying activities and business performances to the external stakeholders.

The problem of measuring performances of the intellectual capital and its segments comes from the intangible nature of the intellectual resources, but also because the economic outcomes are generated by the interactions and common utilization of diverse resources. Therefore, it is hard to measure value and other performances of any partial component of intellectual capital, but instead it is usually measured as a single aggregate measure (Krstić, 2014).

4. MEASUREMENT METHODOLOGIES AT MICRO LEVEL

There are several different methodologies for measuring unreported, invisible intellectual capital of enterprises. Some are based on the financial approach tending to express the value of intellectual capital or financial value of some of its segments: human, structural or relational, (financial evaluation methodologies), while others do not apt to financially express and quantify the value of intellectual capital, but include various process measures more suitable for the immaterial nature of intellectual capital (non-financial evaluation methodologies) (Krstić, 2014, p. 86). Within these two broad sets of intellectual capital valuation methodologies, further diversification can be found in the literature (Jurczak, 2008; Sveiby, 2010; Pike & Roos, 2004; 2011; Viedma Marti & Cabrita, 2012): Direct Intellectual Capital (*DIC*) methods, Market Capitalisation (*MC*) methods, Return on Assets (*ROA*) methods, Scorecard (*SC*) methods, Proper Measurement Systems (*MS*) and other (see Table 1).

4.1. Direct Intellectual Capital Methods

DIC methods estimate monetary value of intangible resources by identifying and valuing their different constitutive elements, either separately or as one aggregate coefficient. The main representatives of this group of methods are Brooking's *"Technology Broker Intellectual Capital Audit"* (Brooking, 1996), as well as Sullivan's *"Intellectual Asset Valuation"* (Sullivan, 2000). These methods offer a wide range of details and have proved to be very useful for measuring intellectual capital at any level of the organisation (Pike & Roos, 2004). Also, DIC methods are very useful for the non-government organisations, organisational units, government organisations and bodies, as well as, for the ecological, societal and public objectives (Jurczak, 2008). However, the problem with this group of indicators is the concern of comprehensiveness, since even when they tend "to include as

many of the resources as possible, this only addresses the area of intrinsic value leaving the area of resource use or instrumental value unaddressed" (Pike & Roos, 2004, p. 10).

Brooking's *"Intellectual Capital Audit"* differentiates between four components of IC (1996, pp. 13-16):

- Market assets refer to the market-related intangibles such as: brands, consumers, loyalty, distribution channels, licensing, franchise, etc.;
- Human-centred assets involve employee's competences, capabilities, expertise, skills, etc.;
- Intellectual property assets comprise know-how, trade secrets, copyrights, patents, marks, etc.; and
- Infrastructure assets encompass the corporate culture, communication systems, financial structure and other technologies and processes that enables the organisation functioning.

According to this model, the value of intellectual capital is assessed from the analysis of the enterprise's responses to the questionnaire comprising of 20 questions about these four main components of intellectual capital (Komnenić, 2013). This value of intellectual capital is calculated as a monetary value by means of "traditional valuation approaches (market, income or cost) to each category" (Viedma Marti & Cabrita, 2012, p. 152).

Table 1 Methods for Measuring Intellectual Capital

Direct Intellectual Capital Methods	Scorecard Methods
▪ EVVICAETM ▪ Dynamic Monetary Model ▪ The Value ExplorerTM ▪ Intellectual Asset Valuation ▪ Total Value Creation (TVCTM) ▪ Accounting for the Future (AFTF) ▪ Technology Broker (IC Audit) ▪ Citation-Weighted Patents ▪ HR Statement ▪ Human Resource Costing & Accounting (HRCA) ▪ Financial Method of Intangible Assets Measuring (FiMIAM)	▪ ICU Report ▪ Intellectual Asset-based Management (IAbM) ▪ SICAP ▪ Topplinjen/Business IQ ▪ Public Sector IC ▪ Danish Guidelines ▪ Dynamic Valuation of Intellectual Capital (IC-dVAL™) ▪ Intellectus Model ▪ IC Rating™ ▪ Value Chain Scoreboard™ ▪ Meritum Guidelines ▪ Intangible Assets Statement ▪ Knowledge Audit Cycle ▪ Value Creation Index (VCI) ▪ IC Index™ ▪ Holistic Accounts ▪ Skandia Navigator™ ▪ Intangible Asset Monitor (IAM) ▪ Balanced Scorecard ▪ German Guideline – ICS Made in Germany ▪ Intellectual Capital Benchmarking Systems (ICBS) ▪ Measuring and Accounting IC (MAGIC) ▪ InCaS
Market Capitalisation Methods	
▪ The Invisible Balance Sheet ▪ Market-to-Book Value ▪ Investor Assigned Market Value (IAMVTM) ▪ Tobin's Q ▪ Calculated Intangible Value	
Return on Assets Methods	**Proper Measurement Systems**
• Economic Value Added (EVA™) • Calculated Intangible Value (CIV) • Knowledge Capital Earnings • Value Added Intellectual Coefficient (VAIC™) • EIC method	• Holistic Value Approach (HVA) • Inclusive Value Management (IVM™)

Source: Adapted from Viedma Marti and Cabrita (2012, p. 132)

Sullivan's *"Intellectual Asset Valuation"* measures the market value of the firm as the sum of the values of the tangible assets and intellectual capital, where "the discounted value of the cash flow generated by intellectual capital equals the value of intellectual capital" (Andriessen, 2004, p. 355). According to Sullivan (2000, p. 119) "market capitalization reflects the market's view of two things. First, it reflects the market's understanding of the value of the firm's fixed assets, those found on the company's balance sheet. Second, it reflects the market's intuition or perception of both the amounts of (a company's) Intellectual Capital as well as its ability to leverage that Intellectual Capital in its market place". The Sullivan's method differentiates three earnings streams from: intellectual capital, complementary business assets and structural capital, but without detailed explanation how to isolate and estimate these earnings (Andriessen, 2004).

4.2. Market Capitalisation Methods

MC methods determine the value of intellectual capital as the difference between the market capitalisation value and shareholders' equity value of a company. The robustness of these methods comes from the fact that they rely on financial figures which are, if not ideal, at least auditable and are proven to be useful for the rough comparison of companies from the same industry, although without many details (Jurczak, 2008, p. 41). But, the main weakness of these models comes from the fact that they are trying to link the financial figures with the market share prices that are changing constantly (Pike & Roos, 2004).

The most noticeable method within this group is Market-to-Book Value which evaluates the value of off-balance sheet intellectual capital by calculating the difference between the market value of the shareholders' equity and book value of the firm's net assets (Krstić, 2014, p. 87). This method is easy to implement and enables comparison over time and with other entities. However, this method only evaluates the value of the intellectual capital of the firm, but without determining the value of some of the intellectual capital components. Besides, this method is not reliable due to the daily fluctuations of the share prices (An, 2015).

4.3. Return on Assets Methods

ROA methods are commonly applied for comparison of the ROA between various companies. Return on assets is calculated when the earnings before taxes of an enterprise for a given period is divided by the average value of the total tangible assets reported in the balance sheet (Viedma Marti & Cabrita, 2012, p. 133). The ROA indicator calculated in this manner is then compared with the average ROA of the industry to which that enterprise belongs. In case when the ROA of the enterprise is above the average ROA for the given industry, then the enterprise has generated the extra value that is attributable to the intellectual capital (Krstić, 2014). The opposite is also possible, meaning that when the enterprise's ROA is below the average ROA of a given industry, then the value of intellectual capital does not exist, i.e. it is equal to zero. The difference between the enterprise's ROA and the industry ROA is multiplied with the average value of the tangible assets reported in the balance sheet, in order to determine the part of the earnings that represent the contribution of the intangible assets not reported in the balance sheet, that is the contribution of intellectual capital (Krstić, 2014). The estimated value of the intellectual capital is determined by dividing this part of the earnings with the cost of capital or an interest rate (Jurczak, 2008).

ROA methods provide information based on the financial data and therefore, similar to MC methods, serve as a solid base for the comparison of firms in the same industry. However, these methods are very sensitive to the interest rate assumption and opposite to DIC methods are of no value for the non-profit organisations and government agencies (Roos et al., 2005). For example, the Steward's *"Calculated Intangible Value"* belongs to this group of methods.

The *"Calculated Intangible Value"* method draws its roots from the assumption that the premium on an enterprise value results from its intangible assets (Andriessen, 2004). Steward (1997) illustrates this method through the seven step procedure:

1. Determine the average before tax earnings for a three-year period;
2. Determine the average value of tangible assets over the same period;
3. Compute the ROA;
4. Determine the average industry ROA for the same period;
5. Determine the above-average return of a firm (premium) by multiplying the average industry ROA with the value of the firm's intangible assets and subtracting the result from the before tax earnings;
6. Determine the net premium by multiplying the excess return with the average tax rate;
7. Determine the present value of the net premium by discounting it with a proper discount rate.

This method is a sophisticated method which uses publicly obtainable information to determine the intellectual capital premium, but this calculated intangible value does not reflect the value of all intangible resources, since the earnings from the reported intangibles are not encompassed (Andriessen, 2004).

In the group of ROA methods an interesting methodological framework is developed by Krstić and Bonić (2016) for measuring the efficiency of the total intellectual capital of an enterprise (EIC) by calculating the partial efficiency measures of the intellectual capital components. EIC method combines the financial accounting valuation with the market valuation by determining the value of the intellectual capital from two parts: the intellectual capital disclosed on the balance sheet of a firm and the undisclosed intellectual capital (Krstić & Bonić, 2016). This method is easy to apply especially to the companies listed on the stock exchanges since it is based on the publicly available information, but experience limitations with the companies that are not listed on the market and requires other solutions for the calculation of the market value.

4.4. Scorecard Methods

SC methods include various methods for measuring and reporting on intellectual capital performances, which identify different groups of intellectual resources and offer indicators for their measurement. These methods are to some extent identical to the DIC methods with a difference that they do not make financial valuation and do not provide the aggregate composite index of intellectual capital, but rather a set of partial indicators for each category of intellectual capital according to the basic classification (Krstić, 2014). At the same time these methods are used for the reporting on the performances of intellectual capital, such as the *"Balanced Scorecard"* developed by Kaplan and Norton (1996) and Sveiby's *"Intangible Asset Monitor"* (1997).

These methods provide more information than other methods, can be easily implemented to any organisational level, use a bottom up approach in measuring intellectual resources and are

very useful for non-profit organisations, government bodies and various business units (Roos et al., 2005). However, these methods provide contextual indicators that cannot be compared between organisations and cannot be easily aligned with the financial results (Pike & Roos, 2004).

The *"Balanced Scorecard"* method is a very popular and widely used model that evolved from performance measurement through strategy implementation and management to a management framework for the readiness of intangibles (Kaplan & Norton, 1992; 1996; 2001; 2004). The Balanced Scorecard model interprets the firm's mission and strategy through the broad set of performance measures thus providing the basis for the strategic system of measurement and management (Viedma Marti & Cabrita, 2012). This method "encourages companies to monitor their performance not only from the financial but also from the non-financial perspective, comprising the customer, the internal business process, and the learning and growth perspective" (An, 2015, p. 26). By combining all these perspectives into a comprehensible system, this model facilitates the decision making process of top management by providing powerful analysis of the firm's performances. An efficient Balanced Scorecard model translates the four fundamental components: mission, values, vision and strategy of a firm, "into objectives and key performance indicators based on four different perspectives" (Roos et al., 2005, p. 304).

However, this model has been criticized for the rigidness since it concentrates only on four perspectives, thus some key success factors may be unnoticed (Andriessen, 2004). Further, the model only takes care of some stakeholders such as consumers and shareholders, while excluding employees, providers, associates and the community (Roos et al., 2005).

The Sveiby's *"Intangible Asset Monitor"* also belongs to the group of SC methods. The conceptual framework of the model comprises of three-by-three matrix (An, 2015). In this matrix the first "three" refers to the three components of the intellectual capital: the external structure, the internal structure and competence, while the second "three" refers to three groups of indicators for each intellectual capital component: indicators of growth/renewal, indicators of efficiency and indicators of stability (Sveiby, 1997, p. 78). The indicators are selected based on the firm's strategy and for each intangible asset only a limited number of the measurement indicators should be included "with the most important areas needing to be covered those of growth and renewal, efficiency and stability" (Bontis, 2001, p. 52). It is very simple to use.

4.5. Proper Measurement Systems

MS methods take everything of value inside or outside the company and break them down into measurable attributes which are then organized into a measurement system, valued by using the real data and combined with financial data to deliver value for money and related outputs (Pike & Roos, 2004). This approach aims at all-inclusiveness and consistency with a clear handling of all aspects of intangible value, and hence if done properly offers the possibility of reliable measurement as well as an adequate combination of intellectual capital resources and financial resources (Roos et al., 2005). The representative model in this group is the *"Holistic Value Approach"* developed by Pike and Roos (2000).

The HVA is the third generation of the intellectual capital practice (Chatzkel, 2002), that resolves the difficulty of creating one overall measure from numerous measures of different units. Opposite to other intellectual capital models in which the combination of diverse

measures did not fulfil the obligatory requirements and validity conditions as defined by measurement theory, the HVA does satisfy these requirements, since it merges the elements of the Intellectual Capital Index™ developed by Roos et al. (1997) and the Inclusive Value Methodology™ developed by M'Pherson and Pike (2001). This model makes a difference between the value created within the organisation, and the value created externally with various sources this value comes from (Pike & Roos, 2000). These internal and external, financial and non-financial values, are grouped "within the definition of Inclusive Value" (Viedma Marti & Cabrita, 2012, p. 154). Value is generated through the various value creation paths which represent the business model of a company (Chatzkel, 2002). These value creation paths are displayed in one picture – "navigator that visualizes how value is really created in the organization" (Viedma Marti & Cabrita, 2012, p. 154).

The starting point in the model is to identify the key stakeholders and outline the strategic objectives of the organization, its activities and values. This model starts with the premise that value is subjective, i.e. "value, like beauty, is in the eye of the beholder" (Chatzkel, 2002, p. 115), meaning that the same indicator can have different value through the lens of different observers/stakeholders. However, the axiology states that "value is measurable if the preferences of the beholder are well defined" (Andriessen, 2004, p. 301), that is, if the hierarchy of value exists for each stakeholder involved in value measurement (Pike et al., 2002). The HVA is based on the assumption that all stakeholders will generally have a similar set of objectives, however the hierarchy of the objectives will be different among them due to the relative importance of each objective (Pike & Roos, 2000). Therefore, each objective will be assigned appropriate weights relative to its importance to the stakeholder.

The following stage in the model refers to the translation of the objectives into measurable attributes. The described process of identification and ranking of objectives and the measurement of attributes can be accomplished only by operating personnel that perform daily business operations. The determined relations between the measurable attributes identifies the business value-creating pathways (Viedma Marti & Cabrita, 2012). In a navigator picture each main resource is denoted by a circle whose size depends on the relative importance of the key resource, while the linking arrows symbolise the change of one resource into another and the arrows' thickness reveals the importance of change (Andriessen, 2004). The result is a model of the business as a value generator (Pike & Roos, 2000).

The HVA model is a very useful tool for making trade-off decisions, especially in circumstances where the interests of several stakeholders have to be addressed and thus could play a significant role in the straightforward communication with particular stakeholder groups (Andriessen, 2004). However, from the above described process it is evident that this method is somewhat complex to implement without the expert support.

CONCLUSION

The trends of globalization, deregulation and remarkable technological developments, especially concerning the information and communication technologies, have formed a new era that has redesigned the global socioeconomic settings. The rapid development of information and communication technologies brings substantial benefits which are used to intensify the dynamics of economic development of countries and regions, thus leading to the effective transformation of knowledge, skills, talents and know-how of individuals in profit and non-profit organisations and enterprises. These processes are altering the

competitive market structure. In this new conditions, the knowledge has become the crucial production factor, and driver of the firm's value creation, sustainable competitive advantage and national prosperity. The long-term economic growth and development are at the same time driven and constrained by the knowledge creation, dissemination and use.

The importance of intellectual resources in the knowledge-based economy has given rise to the development of numerous measurement methods with the aim to satisfy the requirements of various stakeholders and to enable the management of these invisible resources. One of the reasons for measuring and reporting on intangibles is the changed structure of resources in the modern knowledge enterprises from tangible resources toward intangible intellectual resources. Managers, shareholders and other stakeholders acknowledge the importance of proper measurement and reporting of these valuable resources. Additionally, these knowledge enterprises have appreciated that the proper management, especially of non-financial performances of intellectual capital, can enhance the strategic decision making processes in the organization, enable better determination of the compensation benefits for workers, and improve the communication of firm's performances to the external stakeholders.

However, in order to properly manage intangibles, it is necessary to develop and implement a sound measurement methodology that will address the requirements of all interested parties. Hence, the most significant methods for the intellectual capital measurement at microeconomic level have been elaborated in this paper, since the list of the measurement methodologies is non-exhaustive. The authors have highlighted the advantages and disadvantages of the given models, so that the managers can choose the appropriate model for their organization, based on the outcomes they want to achieve. Certainly, the most comprehensive measurement system is the holistic value approach which captures the financial and non-financial value of intellectual capital.

From all the above mentioned, it is clear that intellectual capital is the most important driver for creating value and competitive advantage, and therefore its significance must be communicated to all stakeholders through a sound measurement system.

Acknowledgement: *The paper is a part of the research done within the project 179066 funded by the Ministry of Education, Science and Technological Development of the Republic of Serbia.*

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MIKROEKONOMSKE PERSPEKTIVE MERENJA INTELEKTUALNOG KAPITALA

Intelektualni kapital je izuzetno proučavan koncept među istraživačima u ekonomiji znanja. Ovo iz razloga što su intelektualni resursi ključni pokretači rasta i konkurentnosti u globalizovanom okruženju. Međutim, merenje intelektualnog kapitala, kao nematerijalnog resursa, nije jednostavan zadatak. Istraživači već nekoliko decenija pokušavaju da postave sistem merenja koji će omogućiti korisne upravljačke informacije menadžerima. Postoje brojne metodologije merenja, ali lista nije konačna. Adekvatna upotreba metodologija merenja intelektualnog kapitala omogućava adekvatno upravljanje intelektualnim kapitalom i time vodi do stvaranja konkurentske prednosti i uvećanja vrednosti za preduzeća i bogatstva nacije. Zbog toga, cilj rada je da analizira različite mikroekonomske metodologije merenja intelektualnog kapitala koje se fokusiraju na nivo organizacije. Autori kritički analiziraju brojne zapažene metode vrednovanja intelektualnog kapitala, kao i indikatore koji se koriste kako bi se obuhvatile performanse intelektualnog kapitala, doprinoseći time unapređenju procesa upravljanja nevidljivim, vrednim nematerijalnim resursima u cilju stvaranja vrednosti za različite stejkholdere i unapređenja konkurentnosti preduzeća.

Ključne reči: *intelektualni kapital, nematerijalna aktiva, znanje, ekonomija znanja, metodologije merenja, konkurentnost*

FACTA UNIVERSITATIS
Series: **Economics and Organization** Vol. 14, N° 3, 2017, pp. 203 - 216
https://doi.org/10.22190/FUEO1703203A

Original Scientific Paper

DESCRIPTIVE ANALYSIS OF COMPETITION AND THE ADOPTION OF GAME THEORY IN BUSINESS GAME AMONG SMALL SCALE CAFETERIAS IN NIGERIA

UDC 005.311.7:725.712(669)

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Abstract. *This study focused on the competitive situation and business game among small scale cafeterias in Nigeria. Thus, the study investigated factors influencing the competitive situation among small scale cafeteria businesses in Nigeria, and the adoption of game theory in the business game and its effect on the overall performance of small scale cafeterias in Nigeria. The study was conducted on the selected cafeteria businesses from ten areas in Ogun State, Nigeria. This study analyzed the data collected in table with descriptive method and applied Chi-square and ANOVA statistical method. Findings show that price, service quality and customer's value influence the competitive situation among small scale cafeterias, and that the adoption of game theory in business game has an effect on the overall performance of small scale cafeterias in Nigeria. Though, the empirical result proves the effect to be insignificant. The study concluded that factors (such as price, service quality and customer's value) account for the outlook of competitive situation among small scale cafeterias in Nigeria, and that cafeteria owners can grow competitive advantage by applying the assumption of game theory. This study therefore recommends that cafeteria owner-managers should pay close attention to prices; service quality and customer's value to enable them to enhance a viable competitive position in the business game.*

Key words: *Game theory, Competitive situation, Players, Payoff, Small Scale Cafeteria*

JEL Classification: M19, D21, C70

Received February 26, 2017 / Revised March 18, 2017 / Revised May 17, 2017 / Accepted June 20, 2017
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INTRODUCTION

In the contemporary business world of today, competition is observed to be increasingly tough with a concomitant effect on business firms irrespective of sizes. Competition is systematically avoided by many small business owners in Nigeria based on the perception of threat, with little or no attention on opportunities resulting from rivalry. However, Wikipedia (2014) viewed competition as the rivalry among sellers trying to achieve such goals as increasing profits, market share, and sales volume by varying the elements of the marketing mix: price, product, distribution, and promotion. It is evident that competition also has potential positive payoff (which are many business firms' desires) such as increasing profits, market share and sales volume. Jhingan (2006) added that true competition consists of the life of constant struggle and rival against rival in pursuit of this payoff. Factually, this means that business competition is not just fierce, but opportunity-filled, development oriented and beneficial to players. One obvious fact about competition is that it involves a game that reveals a firm's strength and weaknesses; poses threats and exposes opportunities.

In the past when business issues were addressed using the old-rule-of-thumb in Nigeria, competition was viewed by business owners as an act of enmity. This 21st century marks a period of change when few cafeteria owners in Nigeria engaged themselves in a rethink against the conventional application of spiritual forces in competition. They saw the need for cooperation and competition rather than the existing mode of spiritual warfare in the business environment. This implies that cafeteria businesses in Nigeria are obviously in the game of conflict and cooperation. This is in line with the basic division of games by Backović, Popović and Stamenković (2016) in accordance with game theory as separation on both cooperative and non-cooperative games. Firescu (2012) quoting Franklin D. Roosevelt expressed that *'competition has been shown to be useful up to a certain point and no further, but cooperation, which is the thing we must strive for today, begins where competition leaves off.'* However, the assumption of game theory provides an insight into the problem of how to survive under a tough competitive situation posed by the rational and conservative behaviour of cafeteria owners in Nigeria. Backović *et al.* (2016) is of the position that a rational individual aspires to the best possible outcome (maximizing utility) in accordance with pre-defined rules.

In times of uncertainty, according to Lindstädt and Müller (2009)**,** the assumptions are that game theory is highly critical to success, for it offers perspectives on how players might act under various circumstances, as well as other kinds of valuable information for making decisions. Therefore, game theory is considered as a guide that gives a format on how to compete effectively in the business game without losing everything.

The main objective of this study is to examine the competitive situation and business game among small scale cafeterias in Nigeria. The specific objectives of the study are:

i. To investigate factors influencing the competitive situation among small scale cafeteria businesses in Nigeria; and
ii. To investigate the effect of the adoption of game theory on the overall performance of small scale cafeterias in the business game in Nigeria.

1. REVIEW OF RELEVANT LITERATURE

1.1. Concept of business game

Every business environment possesses the attributes of the real business game (competition). Thus, all business firms existing in this environment must engage in a strategic task not only to cope with the game, but to possess the necessary payoff. For a situation to be considered a game there must be at least two rational players who take into account one another's actions when formulating their own strategies (quickmba.com). This makes the business game increasingly fierce among players; as each player adopts tiger-like strategy to either outwit others or to survive the turbulence. The target among players is one payoff which is favourable and achievable by adopting all available techniques and strategies.

Figure 1 below shows that cafeteria business owners pursue the same goal, and undertake virtually the same course of actions to get this goal achieved. This informs that no cafeteria will attain maturity without constant struggle as a result of conflicting interests. Bergen (1962) posited that the theory of games is to analyze situations of conflicting interests. Bergen also expressed that in some cases the theory will enable us to find a solution without resorting to arbitrary rules. The understanding of the nature of the business game gives elegant knowledge that is crucial to effective competitiveness and comparative advantage of one cafeteria over other competitors in the same business environment. This will prevent the business from being bitten hard or extinguished by the so-called industrial tigers.

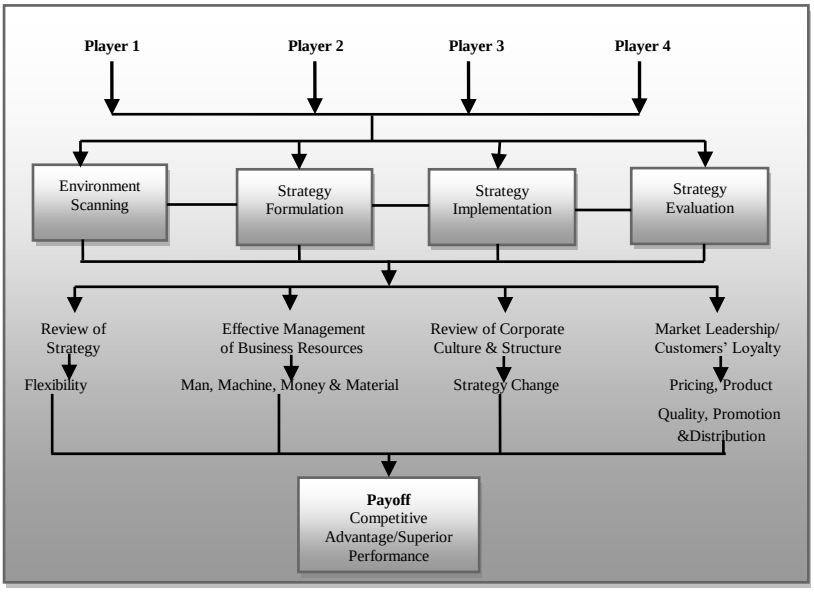

Fig. 1 The nature of a business game

In a game situation, each player spends time on the draw board to map out an edge-giving strategy against the opponents. Thus, it becomes imperative for these players to engage in the strategic management process as depicted in figure one. Consequently, these players will inevitably engage in a number of activities. Some of which are:

i. Reviewing strategy (to enhance its flexibility),
ii. Managing resources effectively (such as man, machine, money and material),
iii. Reviewing corporate culture and structure (in alignment with strategy changes),
iv. Re-engineering the operation process (to enhance effective pricing strategy, product quality, promotion and distribution).

The rationale behind these activities is that each of the players is aware of the payoff at the sharp end of the business game. A player has to win to possess a positive payoff and the other must lose with a negative payoff.

1.2. Categories of games

This paper divides games into two categories:

i. Games that involve the application of strategy (*Game of Strategy*); which requires a high level of distinctive prowess, roadmap and strength of a player to compete effectively.
ii. Games that involve luck (*Game of Luck*); which requires the awareness of uncontrollable outcome. Playing this game involves the application of one's whole mind and not a skill.

Apart from the categories of games highlighted above and that of Backović *et al.* (2016), Crossman (n.d) also identified different kinds of games that are studied using game theory as follows:

i. *Zero-sum game:* Where the interest of the players are in direct conflict with one another. The winning player gets +1 (positive payoff) and the losing player gets -1 (negative payoff). Therefore, +1-1=0.
ii. *Non-zero sum game*: Where there is cooperation between the players and their interest are not conflicting directly in such a way that each player benefits from the game.
iii. *Simultaneous move games:* This involves putting the opponent in one's shoes. That is, believing that the opponent is doing exactly the same thing one is doing (Performing similar actions).
iv. *Sequential move games:* This involves following a sequential line of actions to compete effectively. Here, players select course of actions in orderly manner.
v. *One-shot game:* Crossman expressed that the players are likely not to know much about each other and gave an example, such as tipping a waiter on your vacation.
vi. *Repeated games:* Here, the same players have to compete repeatedly with one another.

1.3. Game theory and its relevance to business game

According to Nik and Nik (2008), the game theory has developed its application mainly in mathematics since its inception in 1944 by John von Neumann and Oskar Morgenstern. In a step further, Goluch (2012) elaborated that game theory is a study with the main purpose of finding an answer to the question: how to react in both conflict and cooperation situations, as well as combined ones. It is on this note that Backović *et al.* (2016) may have considered the basic division of game theory on cooperative games and non-cooperative games.

In game theory, a 'game' is a complete specification of the strategies each 'player' has, the order in which players choose strategies, the information players have, and how

players value possible outcomes ('utilities') that result from strategy choices (Camerer, 2003). Game theory assumes that one has opponents, who are adjusting their strategies according to what they believe everybody else is doing (QuickMBA.com). Backović *et al.* (2016) also closely observed and posited that it is strategy oriented, and that it explores the expected outcomes, or how the outcomes are reached among actions undertaken by the players. In addition, Crossman (n.d.) stated clearly that the assumptions of game theorists are that:

i. The payoffs are known and fixed
ii. All players behave rationally
iii. The rules of the game are common knowledge.

It is no doubt that Game theory is a solution tool for the problem of competitive situation. This fact is also supported by the relevance of game theory compiled from Pinkasovitch (2014) as shown below:

i. That from optimal marketing campaign strategies, ideal auction tactics and voting styles, game theory provides a hypothetical framework with material implications.
ii. That Game theory provides the base for rational decision making.

This paper outlines other benefits that are accruable to the application of game theory as follows:

i. Game theory enables business owners or managers to be more proactive rather than being reactive in the business game, and also provides a reaction plan where necessary.
ii. It offers business owners an understanding of the business game and a befitting strategy for such situations.
iii. It is a solution tool for competitive situation considering the assumption that each player behaves rationally and conservatively.
iv. Through the adoption of Game theory, a player is able to maximize gain and minimize loss.

1.4. Factors influencing competitive situation among small scale cafeterias in Nigeria

A business firm as an entity has a long life cycle, separate from that of human's life expectancy. It is not anticipated to cease in its operation except in a situation where there is necessity for its termination. Igben (2007) rightly observed that a business is a going concern if it is capable of earning a reasonable net income (positive payoff) and there is no intention or threat from any source to curtail significantly its line of business in the foreseeable future.

Some cafeterias in Nigeria have noticeably faced consequential entropy; while some others are at the verge of collapse. It is the consequence of the fierce business game that is ignorantly given little concern. The competitive situation must exist in the market. A competitive situation exists when two or more cafeteria owners are aware independently of a certain goal which may be expressed in specific terms; and they rival against one another to achieve it. It is observed that many factors (price variation of similar customer's order among cafeterias, distinguished customers' value, quality of service delivery and strategic location of business) are attributable to the competitive situation of cafeterias in the business game in Nigeria. Though, Porter (1985) argued that five forces determine the intensity of the business game. These forces are captured in Figure 2 below:

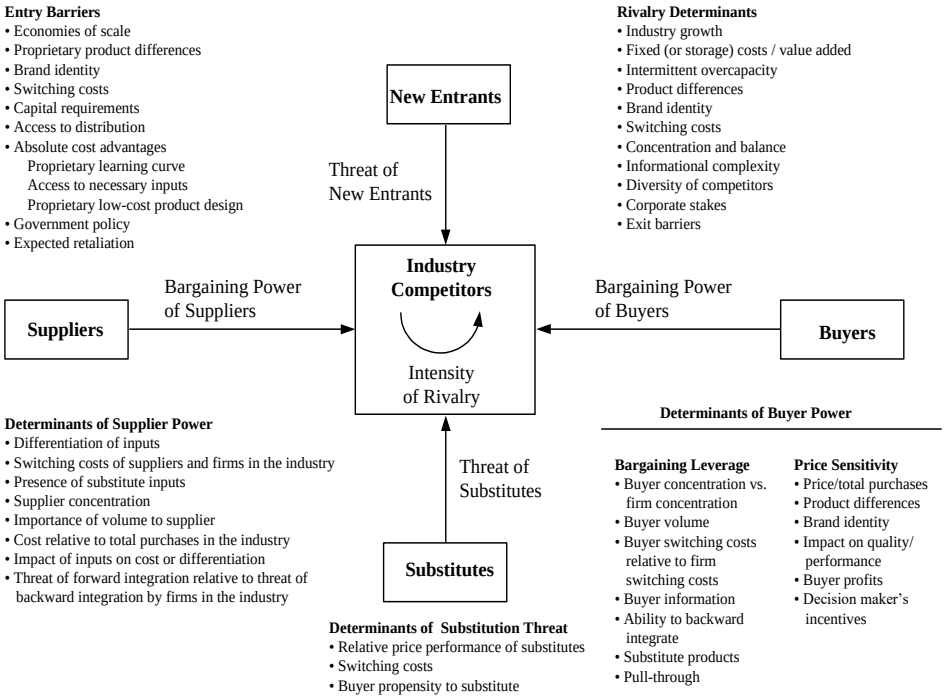

Fig. 2 Porter's five forces
Source: Porter, M. (*1985*). *Competitive Advantage, New York: The Free Press.*

Porter's five forces may not perfectly match with the survey intent of this study, due to the nature of the target population and the scope of the study.

Firstly, variation in prices of similar customers' orders is incredibly observed as determinants of the competitive situation among cafeterias in Nigeria. It is believed that no single player has total control over prices in the market of many competitors. The observed rationale behind variation in prices of similar orders is that some cafeteria owners try to build new competitive advantages in order to get others off the track. They might have engaged in pricing strategy to outwit others in the business game.

Secondly, the quest for value addition and good customer experience has become topical in the scheme of things. Customer's value is a subject of competition that is eminent in every business game. According to Zeithaml (1988), the term may mean low prices, receiving what is desired, receiving quality for what is paid, or receiving something in return for what is given. Entrepreneurial firms focus their scarce resources on the dimensions of value (e.g., cost, use value, emotional value, social value) (Smith and Colgate, 2007) that matter to customers the most and market their capabilities in terms that their customers can associate with and are known to value. Customers want benefit from the payment on the order they make; and they make preference of the cafeterias that can provide them with this. Delivering value to customers is a central aspect of cafeteria business that owners must ensure. This is equally the reason Shanker (2012) asserted that delivering customer value is not a one-off event, and firms must continuously strive to better understand and anticipate what their customers will value and then

keep delivering it. To develop compelling customer's value propositions according to Shanker (2012), business owners need to keep in mind the following:

i. There are two stages at which customers assess value; before and after they purchase a product or service.
ii. Value is perceived at various levels; therefore, value needs to be delivered at various levels.
iii. Understanding what customer's value is; the first step in delivering customer value.

Thirdly, location is the strategy of geographical situation of a business firm in any business game. It would be agreed that location of the business is a strategic choice that must be made from varying alternatives. This strategic choice of location is costly, but has a long-run implication on the performance and survival of the business. It may be right to say that many cafeterias would have witnessed entropy in Nigeria within five years of start-up as a result of making the wrong decision about business location. Gerdeman (2012) posited that the strategic value of business location depends on three things. He quoted Juan Alcácer saying these things are:

i. The strength of available resources, such as nearby supporting industries;
ii. The company's ability to seek and retrieve knowledge in this setting; and
iii. Its capability to do something better than competitors.

Finally, relative standing (competitive advantage) has become an issue of concern to service based outputs the world over. Surpassing customer's expectation in service delivery and offerings takes the front burner. Every customer desires quality service delivery at any cafeteria. For instance; well packaged food, convenience and delicious food in a clean setting are attributes of quality service. Personalized service, good return policies, good relation-communication and ability to listen to customers' complaints also make up effective quality service delivery. These must have been considered by Bitner (1990) in his definition of service quality as the consumer's overall impression of the relative inferiority, superiority of the organization and its services. Amoako (2012) elaborated that, service quality is the key of survival to all servicing companies. In different view, Parasuraman, Zeithmal and Berry (1985) see services quality as a function of the differences between expectation and performance along the quality dimensions. However, the desired service expectation for customer's order usually involves employees' commitment and the competence of the cafeteria owner-managers. In essence, desired service expectations seem to be the same for service providers within industry categories or subcategories that are viewed as similar by customers (Amoako, 2012). In addition, the advent of smart phones poses a big threat to the survival of eateries because of increased awareness and exchange of valuable information via social media on improved service delivery and quality. The swing in consumers' taste as a result of preference for African delicacies has heightened the patronage of cafeterias in Nigeria.

This study observed that cafeteria owners' focus on the application of old-rule-of-thumb in lieu of result-driven strategies may not be efficient in addressing the competitive situation. A successful corporate strategy should modify these competitive forces in a way that improves the position of the organization (Porter, 1985).

2. RESEARCH METHODOLOGY

The study used survey method. The study gathered its data and information through primary and secondary sources. The study was conducted on selected cafeteria businesses from ten areas in Ogun State, Nigeria. The population of the study was 124 (Sango – 14, Ifo – 27, Ijoko – 12, Owode – 11, Ijako – 8, Abeokuta – 21, Imeko Afon – 7, Badagri – 9, Ago iwoye – 10, Ilepa – 5). The Taro Yamane sampling method was used for sample size determination, and Bowler's proportional allocation formula was used to enhance fair allocation of samples to the study universe. The study adopted cluster sampling techniques, and further used simple random sampling to select the required sample size. This study analyzed the data collected in table with the descriptive method, and applied the Chi-square and ANOVA statistical method.

Taro Yamane formula:

$$n = \frac{N}{1 + N(e)^2}$$

Where n = sample size; N = Population of the study (124); Error estimate at 5% (0.05); 1 = Constant.

$$\frac{124}{1+124(0.05)^2} = \frac{124}{1+124(0.0025)} = \frac{124}{1+0.31} = \frac{124}{1.31} = 94.656 = 95$$

Bowler's Proportional Allocation formula

$$n1 = \frac{n(n1)}{N}$$

Where n = Overall sample size; $n1$ = Population of metropolis; N = The total population

$n_1 = \frac{95(14)}{124} = 11$ $n_2 = \frac{95(27)}{124} = 21$ $n_3 = \frac{95(12)}{124} = 9$ $n_4 = \frac{95(11)}{124} = 8$ $n_5 = \frac{95(8)}{124} = 6$

$n_6 = \frac{95(21)}{124} = 16$ $n_7 = \frac{95(7)}{124} = 5$ $n_8 = \frac{95(9)}{124} = 7$ $n_9 = \frac{95(10)}{124} = 8$ $n_{10} = \frac{95(5)}{124} = 4$

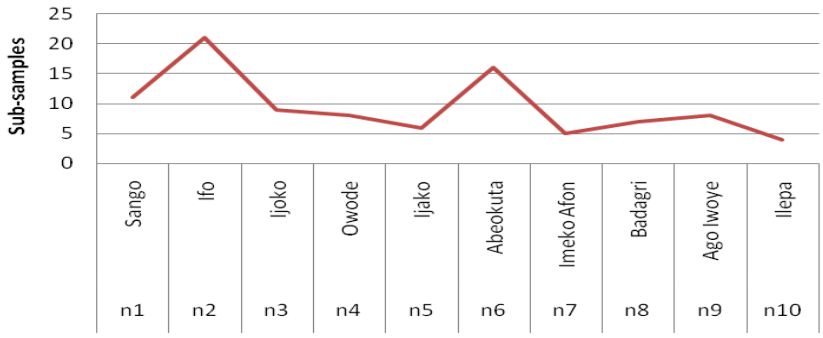

Fig. 3 Proportional allocation of sample size
Source: Field Survey, 2016

The role of the researchers at the study area

This study takes the period of almost two years. In the course of the study, the researchers lured the respondents into releasing facts by promising them confidentiality, and also a copy of the results of the survey. Having observed the erroneous interpretation given to competition by most cafeteria business owners, the researchers intensified effort towards enlightening the respondents concerning the subject matter. This was done by way of exposing them to the fact that games are going on among cafeteria business owners unknowingly and that there is a need for them to comprehend the efficacy of game theory and its applicability.

The researchers adopted the test and retest process to establish the reliability of the instrument. The researchers were then convinced that the instrument was reliable where the results were similar.

4. Data Presentation and Analysis

Table 1 Showing the demographic characteristics of respondents

Demography	Responses	Percentage (%)
Gender		
Female	79	83.2
Male	16	16.8
Total	95	100
Academic Qualification		
Primary school Certificate	48	50.5
Secondary school/ND Certificate	32	33.7
HND/Bsc & Above	15	15.8
Total	95	100
Years of Business Existence		
Up to 1 year	15	15.8
1-5 years	27	28.4
6-10 years	29	30.5
More than 10 years	24	25.3
Total	95	100

Source: Field Survey, 2016

Table 1 shows that 79 respondents (83.2%) were female; and 16 respondents (16.8%) were male. The implication of this is that female gender forms the major decision makers (players) and the majority in the ownership structure in this line of business when compared with their male counterpart.

The table depicts that 48 respondents (50.5%) held Primary school certificates; 32 respondents (33.7%) held Secondary school/ND certificates; and 15 respondents (15.8%) held HND/BSc certificate and above. The implication of this is that 50.5% have little knowledge and skills regarding the tools or approaches to handling competitive issues in their business environment. Though, the 49.5% of respondents appear to have deep knowledge about the subject matter.

15 respondents (15.8%) expressed that their businesses are up to 1 year old; 27 respondents (28.4%) expressed that their businesses are within 1-5 years old; 29 respondents (30.5%) expressed that their businesses are within 6-10 years old; 24 respondents (25.3%) expressed that their businesses are more than 10 years old. The calculated average is 5.142, and this

implies that the majority of the respondents have at least 5 years of business experience that is helpful to this present study.

Table 2 Describing factors influencing the competitive situation among small scale cafeterias in Nigeria

Factor	Response	Frequency										Total
		n_1	n_2	n_3	n_4	n_5	n_6	n_7	n_8	n_9	n_{10}	
Price Variation of orders	GE	5	8	2	5	1	8	-	6	5	1	41
	AE	3	6	2	1	3	3	-	1	-	1	20
	LE	3	7	5	2	2	5	5	-	3	2	34
	Total	11	21	9	8	6	16	5	7	8	4	95
	Mean Score	3.182	2.048	1.667	2.375	1.833	2.188	0.833	2.857	2.250	1.750	2.074
	Cut-off Point	2.050	2.050	2.050	2.050	2.050	2.050	2.050	2.050	2.050	2.050	2.050
Value to customer	GE	7	18	4	8	4	11	1	3	2	2	60
	AE	3	2	1	-	-	2	1	4	3	2	18
	LE	1	1	4	-	2	3	3	-	3	-	17
	Total	11	21	9	8	6	16	5	7	8	4	95
	Mean Score	2.545	1.952	2.000	3.000	2.333	2.500	1.600	2.429	1.875	2.500	2.453
	Cut-off Point	2.050	2.050	2.050	2.050	2.050	2.050	2.050	2.050	2.050	2.050	2.050
Quality of service delivery	GE	2	7	3	6	4	7	3	3	7	-	42
	AE	4	8	3	2	-	5	1	*	-	4	27
	LE	5	6	3	-	2	4	*	*	1	-	21
	Total	11	21	9	8	6	16	5	7	8	4	90
	Mean Score	1.728	2.047	2.000	2.750	2.333	2.188	2.200	1.286	2.750	2.000	2.333
	Cut-off Point	2.050	2.050	2.050	2.050	2.050	2.050	2.050	2.050	2.050	2.050	2.050
Availability of facilities	GE	3	6	2	1	*	10	*	3	7	-	32
	AE	2	12	1	5	4	1	2	2	1	1	31
	LE	6	3	6	2	*	5	1	2	-	3	28
	Total	11	21	9	8	6	16	5	7	8	4	91
	Mean Score	1.727	2.143	1.556	1.875	1.333	2.313	1.000	2.143	2.875	1.250	2.044
	Cut-off Point	2.050	2.050	2.050	2.050	2.050	2.050	2.050	2.050	2.050	2.050	2.050

* = Missing Data; GE- Great Extent; AE- Average Extent; LE- Low Extent;
Cut-Off Point = Mean + e = 2.00 + 0.05 = 2.050

Based on the data analysis in Table 2 above, it is firstly observed that prices variation of customer's order in Sango (mean score= 3.182); Owode (mean score = 2.375); Abeokuta (mean score = 2.188); Badagri (mean score= 2.857); and Ago Iwoye (mean score = 2.250) determine the level of competitive situation among small scale cafeteria businesses in these areas. In addition, competition (arising from price differentiation) among small scale cafeterias in Sango appears to be very strong given the highest mean score of 3.182. Generally, price variations of a particular customer's order among small scale cafeteria seem to have a weak influence on their competitive situation (given that the mean score = 2.074 > cut-off point = 2.050). Price variations of identical customer's order among small scale cafeteria are accepted as a condition for the achievement of the desired payoff posed by business game in Ogun State. Thus, price variations of identical customer's order influences competitive situation among small scale cafeterias in Ogun State to a low extent.

Secondly, it could be observed that cafeteria owners in Sango (mean score= 2.545); Owode (mean score= 3.000); Ijoko (mean score= 2.333); Abeokuta (mean score= 2.500);

Badagri (mean score= 2.429); and Ilepa (mean score= 2.500) give out appreciable customer value. It appears that the competitive situation in Owode may be tough based on the great customer value given by the cafeteria owners in this area. In areas such as Ifo (mean score= 1.952); Ijoko (mean score= 2.000); Imeko Afon (mean score= 1.600); and Ago-Iwoye (mean score= 1.875), the customer value appears to be low. This may be as a result of lack of adequate knowledge about the significance of customers' patronage and their retention in these areas. On the general note, empirical verification proves that customers' value influence competitive situation in Ogun State to a moderate extent (given that the overall mean score = 2.453 > the cut-off point = 2.050). This implies that cafeteria owners pay genuine attention to customer's service, and ensure effective communication and relationship with their customers.

Thirdly, the table shows that cafeterias in Owode (mean score= 2.750); Ijako (mean score= 2.333); Abeokuta (mean score= 2.188); Imeko-Afon (mean score= 2.200); and Ago-Iwoye (mean score= 2.750) embrace quality service delivery in their business environment. This implies that individual cafeteria owners know the benefit of providing distinguished service to customers in order to retain a reasonably large market share. Though, it is observed that cafeterias (in Sango, Ifo, Ijako and Badagri) have very low concern for service quality in their business environment. The result from Badagri (mean score= 1.286) may not be considered, given that colossal of data was missing. However, empirical investigation reveals that quality consideration of service delivery is a subject of competitive situation among cafeterias in Ogun State, Nigeria (given that the overall mean score = 2.233 > the cut-off point = 2.050). This implies that individual cafeteria owner's drive towards delivering high quality services will often strengthen competitive situation in the business environment. This aligns with the assertion of Crossman (n.d.) that all players behave rationally. Meanwhile, the game theory assumes that all players engage in similar task to obtain just one payoff. With this understanding, Porter (1985) emphasizes that a successful strategy needs to be formulated and implemented in a way that improves the position of the organization.

Finally, the table depicts that location of cafeterias in Ifo (mean score= 2.143); Abeokuta (mean score= 2.313); Badagri (mean score= 2.143); and Ago-Iwoye (mean score= 2.875) is a strategic point embraced by owners in these areas. It appears that cafeteria owners in other areas are indifferent about situating their businesses in strategic geographical areas. Empirical investigation reveals that locations of cafeterias in strategic places have little or no influence on the competitive situation in Ogun State (given that the overall mean score = 2.044 < the cut-off point = 2.050).

Table 3 Showing adoption of game theory and its effect on overall performance of small scale cafeteria in Nigeria

Observation/Expected	Frequency											
Frequency	n1	n2	n3	n4	n5	n6	n7	n8	n9	n10	Total	%
Yes	3	10	4	7	6	9	4	4	7	4	58	61.1
Exp. Freq	6.72	12.82	5.49	4.88	3.66	9.77	3.05	4.27	4.88	2.44		
No	4	3	2	-	-	6	1	2	-	-	18	18.9
Exp. Freq	2.08	3.98	1.71	1.52	1.14	3.03	0.95	1.33	1.52	0.76		
Not Sure	4	8	3	1	-	1	-	1	1	-	19	20.0
Exp. Freq	2.20	4.20	1.80	1.60	1.20	3.20	1.00	1.40	1.60	0.80		
Total	11	21	9	8	6	16	5	7	8	4	95	100

Source: Field Survey, 2016

$$X^2 = \frac{\sum (F_o - F_e)^2}{F_e} = \mathbf{31.032}$$

At α = 0.05 level of significance with 18 degrees of freedom, the critical value for X^2 is 28.869. Consequently, since the calculated X^2 of 31.032 is greater than the critical value X^2 of 28.869 (that is, $X^2 > X^2_{0.05}$). We therefore conclude that the adoption of game theory, in the business game, has an effect on the overall performance of small scale cafeterias in Nigeria. This implies that game theory is efficacious as a solution tool for addressing the business game. This finding augments the assertion of the study by Bergen (1962) that Game Theory has its purpose just to analyze such situations of conflicting interests. This is because the assumption of game theory will help owners to analyze the business game and determine an effective strategy to gain a desired pay-off.

Table 4 Showing differences in the adoption of game theory by small scale cafeterias

	n1	n2	n3	n4	n5	n6	n7	n8	n9	n10	F-Cal	F-Crit
Mean	2.091	1.905	1.889	1.250	1.000	1.500	1.200	1.571	1250	1.000	1.120	2.393
SD	0.831	0.944	0.927	0.707	0.001	0.632	0.447	0.787	0.707	0.001		

SD – Standard Deviation; F-Crit= $F^{9.20}_{0.05}$

Table 4 shows the description and variance analysis of the effect of the adoption of game theory on the overall performance of small scale cafeterias. Given the varying means, the result shows that mean of the effect of adoption by small scale among cafeterias in Sango (2.091) is very evident, as it is above the critical point. The standard deviation (0.831) shows that there is little divergence in the effect of the adoption of game theory by this small scale among cafeterias in Sango. This result implies that these small scale cafeterias now appreciate the assumption of game theory in their competitive business environment. It is also viewed from the table that though there are observed differences in the effect of the adoption of game theory among small scale cafeterias in other areas such as Ifo (mean- 1.905, SD- 0.831), Ijoko (mean- 1.889, SD- 0.927), Owode (mean- 1.250, SD- 0.707), Ijako (mean- 1.000, SD- 0.001), Abeokuta (mean- 1.500, SD- 0.632), Imeko Afon (mean- 1.200, SD- 0.447), Badagri (mean- 1.571, SD- 0.787), Ago iwoye (mean- 1250, SD- 0.707), Ilepa (mean- 1.000, SD- 0.001); but it is not evident enough. The empirical result shows that there are no significant differences in the effect of the adoption of game theory by small scale cafeterias in the study areas. This may be as a result of little knowledge possessed regarding the adoption of game theory in these areas during the period of this present study.

CONCLUSION

Price and quality of service play a crucial role in the competitive situation among small scale cafeterias. Price interrelates with quality of service rendered by cafeteria owners. This means that all cafeteria owners are aware that high quality attracts high price, ceteris paribus. Thus, cafeteria owners pursue high quality-price or low quality-price approach to retain customers' patronage. In addition, creating customer's value is also an adopted approach by

cafeteria owners to retain customers' patronage. Customer's value captures price affordability of orders and receiving quality for what is paid. The rational behind establishing customers' value is to enhance high sales and profitability. These factors account for the outlook of competitive situation among small scale cafeteria in Ogun State, Nigeria.

The adoption of game theory, in the business game, has an effect on the overall performance of small scale cafeterias in Nigeria. The bottom-line for evident effect of this adoption is the understanding of the game theory's assumptions. For cafeteria owners to grow competitive advantage, game theory is considered an essential tool. The assumption of game theory will guide owners in analyzing the business game and determining the effective strategy to apply to gain a desired pay-off.

Based on the findings above, the study recommends that:

i. Cafeteria owner-managers should analyze the price-benefit of orders to enable them to establish their competitive position in the business game. This will also enhance better knowledge of what price to set to win the business game.
ii. Cafeteria owner-managers should intensify the effort in making appropriate decisions regarding the location of their cafeterias in lieu of commitment of intensive resources.
iii. Cafeteria owners should ensure high quality service delivery and establishment of customer's value. Competitive advantage can be enhanced where customer's value and service quality are established.
iv. Cafeteria owners should adopt game theory to competitive situation in their business game. The assumption of game theory will guide owners in determining the effective strategy that is suitable for enhancing high performance of businesses in Ogun State, Nigeria.

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DESKRIPTIVNA ANALIZA KONKURENCIJE I USVAJANJA TEORIJE IGARA U POSLOVNOJ UTAKMICI MALIH KAFETERIJA U NIGERIJI

Ova studija fokusirala se na konkurentsku situaciju i poslovnu utakmicu malih kafeterija u Nigeriji. Stoga su istraživani faktori koji utiču na konkurentsku situaciju malih kafeterija u Nigeriji i usvajanje teorije igara u poslovnoj utakmici, kao i njenog uticaja na ukupno poslovanje malih kafića u Nigeriji. Studija je sprovedena na odabranim kafeterijima iz deset oblasti u državi Ogun, u Nigeriji. Ova studija analizirala je podatke prikupljene u tabeli deskriptivnom metodom i koristila Chi-kvadrat test i ANOVA statistički metod. Nalazi pokazuju da cena, kvalitet usluge i vrednost za kupca utiču na konkurentsku situaciju u malim kafeterijama i da usvajanje teorije igara u poslovnoj utakmici utiče na ukupno poslovanje malih kafeterija u Nigeriji. Ipak, empirijski rezultat dokazuje da je uticaj beznačajan. Studija je zaključila da faktori (kao što su cena, kvalitet usluga i vrednost za kupca) utiču na konkurentsku situaciju malih kafeterija u Nigeriji, i da vlasnici kafeterija mogu povećati konkurentsku prednost primenom pretpostavki teorije igara. Zbog toga ova studija preporučuje da vlasnici-menadžeri kafeterija treba da obrate posebnu pažnju na cene, kvalitet usluge i vrednost za kupca što će – im omogućiti da poboljšaju održivu konkurentsku poziciju u poslovnoj utakmici.

Ključne reči: *teorija igara, konkurentna situacija, igrači, isplata, male kafeterije*

FACTA UNIVERSITATIS
Series: **Economics and Organization** Vol. 14, N° 3, 2017, pp. 217 - 230
https://doi.org/10.22190/FUEO1703217T

Review Paper

BANK REGULATIONS IN MODERN FINANCIAL ENVIRONMENT

UDC 336.71.078.3

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Abstract. *The paper analyzes the role and importance of bank regulations in ensuring safe and stable banking operations. The modern business environment in which banks operate is unstable, turbulent, and quite unpredictable. Unlike traditional business conditions, banks are now exposed to growing and diverse risks, as well as frequent crisis situations. Accordingly, control over banking operations is becoming a necessity. The need for regulation can be justified by the fact that the market, left to itself, cannot remain competitive in the long term. To fulfill their goals, regulations must constantly adapt to changes in the environment. The aim of the paper is to point to the necessity of regulatory changes in the banking sector. By critical review of certain regulatory changes, the authors conclude that they significantly contribute to safer banking operations and system stability.*

Key words: *bank regulations, regulatory changes, banking crisis, Basel regulations*

JEL Classification: G21, G28

INTRODUCTION

The banking business is very dynamic and changes in line with the changing economic environment and regulations. The traditional role of banks has rapidly changed in response to changes in the global environment at the end of the twentieth century. These changes, essentially reflected in deregulation, increased competition, growth of fees in total revenues, increase in the relative share of non-performing loans in total loans, emergence of new financial instruments, development of information technology and market globalization, characterize modern environment and influenced, in general, the

Received July 03, 2017 / Accepted August 18, 2017
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decline in bank profitability and emergence and growth of new business activities with increased risk (Todorović, 2015, p. 16). Given that modern banks appear as a reflection of the entire economic and financial system, ensuring optimal efficiency of the banking system and individual banks is crucial.

The specificity of banks is reflected primarily in the monetary nature of their sources (a vista deposits) and the role in payment operations. Through their lending function and access to information on debtors, banks establish long-term relationships with their users, based on mutual trust and mutual benefit. Such a cooperation provides debtors with stable and reliable working capital (even in unexpectedly unfavourable time periods), and banks with reliable sources of high profit. As members of the monetary system, banks are unique institutions in terms of ability to create money, i.e. increase money supply by granting loans.

Banks are the most important institutions of the financial system and have a primary role in mobilization, concentration, and allocation of funds. The functioning of the economy depends on the supply of money, payment system, and uninterrupted credit flow. In fact, banks' deposit accounts, as a component of money supply, provide liquidity, mobility, and affordability, which is necessary for the efficient functioning of the payment system in each country. Banks are the primary source of liquidity for all participants in the system and the main channel for the implementation of monetary policy.

Bearing in mind the indisputably important role of banks for overall economic trends, it is important to ensure their successful business and, thereby, preserve systemic stability. Therefore, banking operations are, even in deregulated market conditions, most thoroughly regulated area. An adequate regulatory framework should, among other things, protect depositors, investors, and financial systems in different national economies. However, the pre-crisis regulation model in both national and international frameworks gave wrong incentives to banks, encouraging institutions and individuals to take too big risks. With the advent of crisis, it became clear that the established regulatory framework needed to be changed.

Therefore, the subject of the paper will focus on regulatory changes in the banking sector, caused by the global financial crisis, which aim to ensure the safety of banking operations and system stability.

Respecting the previously defined research subject, the main objective of this paper is to review the effectiveness of bank regulations and regulatory policy changes on dealing with banking problems and preserving the stability of banking systems.

In line with the defined research subject and objective, the paper will test the following hypothesis: a turbulent and uncertain modern environment requires modern regulatory changes that will contribute to reducing the banks' exposure to business risks and ensure systemic stability.

To test the starting hypothesis, the paper will apply qualitative methodology based on the study and a descriptive analysis of the defined problem. Consulting the relevant literature, dealing with theoretical generalization and practical experience of authors who have researched the issue under discussion, will enable a comparison and synthesis of different views, on the basis of which to carry out general conclusion about the impact of specific regulatory changes on bank performance.

The paper will first analyze the need for bank regulation. After identifying the crucial importance of regulation for banking operations, attention will focus on possibilities and limits of its proper application. Finally, regulatory changes that have become necessary during the crisis will be reviewed. Specifically, the most significant is the reform of Basel Framework, which will be given special attention.

1. THE NEED FOR BANK REGULATIONS

Regulation of banking operations is accompanied by a series of concerns. Despite changes in the global environment, essentially reflected in deregulation, liberalization, and internationalization of business, banks are generally still most thoroughly regulated institutions in the financial system. Regulators agree in their assessment that crisis in the financial and economic system must be avoided even at the cost of overregulation and overprotection of banks when most other economic sectors open up globally. Preoccupation with systemic risk is forcing regulators to be tolerant of the anti-competitive behaviour of banks. Bearing in mind that users of banking services are the main drivers of the economic system, regulators aim to increase the transparency of banking operations. There are two basic arguments in support of the necessity of regulating banking operations.

First, the importance of a stable banking system is reflected in ensuring optimal and efficient allocation of resources, and, thereby, fostering economic growth. Past experience and practice have shown that leaving the banking system to spontaneously functioning market laws exposes banks to systemic risks, which also leads to instability of the entire banking system. Given the nature of their activities, banks are more sensitive to systemic risk than non-financial institutions. The problems individual banks face may affect the system as a whole, given company insolvency and clients' fear that their deposits will be threatened both in that and in other banks. Bank run occurs, involving sudden and massive withdrawal of deposits and illiquidity problem. Due to insufficient reserves to cover the deposit outflow, banks are forced to sell part of their traditionally non-performing loans at prices lower than the market price or at a loss. A chain reaction produces a banking panic, which manifests itself in the entire banking, even economic system illiquidity. In accordance with the foregoing, an adequate regulatory framework should ensure public confidence in the banking system and its stable and secure functioning.

Second, an adequate regulatory framework is necessary in order to eliminate various market imperfections (asymmetric information, adverse selection, and moral hazard), which significantly reduce the efficiency of operations of all market participants. Asymmetric information leads to wrong selection of loan applications due to difficult risk assessment and return on specific projects, while deliberately taking high risks occurs as a result of moral hazard.

Control over banking operations can be viewed from two aspects: 1) macro-economic, which aims to control the functioning of monetary flows, or the amount of money in circulation, price and exchange rate stability, and the achievement of other economic policy goals, and 2) micro-economic, which aims to regulate the operations of individual banks and to protect the interests of depositors and creditors (Beke-Trivunac, 1999, p. 16).

Financial market development, which caused the separation of macro and micro control, diversification of banking operations, and the loss of boundaries between banking and non-banking activities, was made difficult by finding the most appropriate system for the regulation and supervision of complex financial institutions (Vuksanović & Todorović, 2013, p. 10). Integration of different types of financial services and unclear boundaries between different financial institutions imposed a question of choosing between functional and institutional system of regulation and control.

A functional regulatory system means that a particular financial activity is subject to a uniform prudential regime, independently of the legal structure of institutions that perform

a given activity. From the perspective of the institution, it means that it is subject to control by as many regulatory authorities as many different activities it performs. However, the system of functional regulation requires that, along with individual institutions, there is a supreme institution for the consolidated supervision of the financial institution as a whole. Specifically, it will be an entity responsible for assessing overall risks to the entire system of a financial institution.

The institutional system of regulation means that every individual type of financial institution is regulated and supervised by a regulatory authority. This system, established according to the sector to which the institution concerned belongs, is effective only in relation to strictly specialized financial institutions.

Regardless of the chosen system of regulation and control, potentially there is always the possibility that the powers of various regulatory bodies overlap. In this context, integrated prudential supervision could minimize any negative consequences of these regulation systems. It can also allow for the achievement of two objectives: 1) uniform control of institutions supervised, and 2) competitive neutrality of prudential control over all institutions supervised (Mešić, 2004, p. 58).

Regardless of the chosen regulatory system, the fundamental objectives of bank regulations are related to: ensuring security and solidity of banks and financial instruments; ensuring an efficient and competitive financial system; ensuring monetary stability in the country; maintaining integrity of the national payment system; protecting customers from abuse of credit institutions (MacDonald & Koch, 2006, p. 4).

At the same time, it cannot be denied that bank regulation is an expensive process, and incremental costs of compliance with regulatory process are usually passed on to end users, resulting in higher costs of financial services and possibly limited mediation. These are the costs of certain activities required by regulators, which would not be undertaken in the absence of regulation. Examples of compliance costs include costs of all additional systems, training, time, and capital required by the regulator. In addition, regulatory costs can act as a barrier to market entry and thus strengthen the monopoly position of certain banks.

However, regulatory costs are not a sufficient argument to eliminate the need for regulation of banking operations. Regardless of the costs of the regulatory process, the users of banking services themselves require adequate regulation, because market solutions cannot assure them that they are protected in the right way.

2. EFFECTIVENESS OF BANK REGULATIONS

Given that underwriting risk is a prerequisite of economic growth, and that banks themselves knowingly and willingly underwrite and manage risks in their business, the question revolves around the primary objectives of bank regulations. It is clear that the basic aim is to limit banks in taking too big risks, in order to eliminate moral hazard within the safety net, designed to protect the banking system and individual depositors.

In the modern sense, regulatory framework can be viewed as a “line of defense” or “buffer”, which partially protects public funds from bank losses, by strengthening market discipline and positive assessment of safety net. Although they focus on capital, bank regulations include requirements for holding liquid assets, loan loss reserves, loan concentration limits, quick corrective action, different rescue procedures of problem banks, etc. The current

regulatory framework is based on three key pillars, namely: (1) prudential norms that seek to harmonize different incentives *ex-ante*, (2) *ex-post* safety net (deposit insurance and lender of last resort), aimed to attract small depositors and prevent contagious run on solvent banks, and (3) *"line-in-the-sand"*, which separates the world of prudentially regulated (commercial banks) from the world of unregulated institutions (Torre & Ize 2009, p. 6).

The third pillar (line in the sand), which separates the regulated and non-regulated financial institutions, is based on three key arguments. First, introducing regulations requires extensive and complicated procedures, and may limit innovation and competition. Therefore, it must be accompanied by adequate and expensive supervision. Second, the expansion of inadequate monitoring outside the commercial banking leads to an increase in moral hazard. In addition, poorly regulated intermediaries can get undeserved high-quality rating. Thirdly, it is considered that market investors (outside the field of small depositors) are well informed and fully responsible for their own investment. As a result, they can effectively oversee unregulated financial intermediaries, and influence them to keep an adequate amount of capital in order to minimize moral hazard.

In line with this explanation, only depository institutions are prudently regulated and supervised under the current regulatory architecture. Accordingly, they benefit from the safety net. Other intermediaries do not enjoy safety protection, and they are also not burdened with prudential norms. Instead, unregulated intermediaries are subject to market discipline and specific regulations on the securities market, which focus on transparency, governance, investor protection, market integrity, and so on.

It is obvious that such regulatory architecture has many disadvantages and that it is quite unbalanced. Exceptionally high growth of the so-called "shadow banking", which is based on the securitization of credit risk, off-balance sheet operations and assets, and rapid expansion of highly leveraged intervention by investment banks, insurance companies, and hedge funds, justifies the previously stated stance. This especially became apparent with the emergence and expansion of the *Subprime* crisis, when, finally, safety net had to be expanded sharply to cover both regulated to unregulated institutions. In other words, unregulated intermediaries became systemically relevant, and were, therefore, without being asked, involved in the *ex-post* safety net.

Based on the above, the question is whether and how bank regulations in general can be justified and effective. The answer to this question depends on the objectives of regulations. In this context, they can be successful in achieving some goals, but less successful in other areas. If safety and stability of the banking system are the primary objectives, with a simultaneous collapse of a large number of banks, other objectives of banking regulations cannot be achieved (Todorović & Jakšić, 2009, p. 122). A large number of banking bankruptcies and crises, both in previous periods and today, suggests that prudential regulations have limitations, and that in some countries they work better than in others. One of the limitations lies precisely in systemic causes of banking crises. Most banking crises are associated with unstable economic conditions, such as deflation of asset prices, rising interest rates and exchange rates, and so on. Prolonged stability and strong economic growth could encourage banks to, without adequate credit analysis, enter high-risk lending transactions, which, in the long term, may adversely affect the stability of the banking system (Todorović, 2015, p. 90).

The question is why similarly caused crises reoccur, despite the development of a large set of prudential regulations over the years, designed to prevent systemic collapse.

In many cases, regulations not only failed to prevent, but they significantly worsened the problems raised. For example, the key regulation in the United States, which emerged from the Great Depression, was the *Glass-Steagall Act*, which aimed to protect commercial banks from price fluctuations on the stock exchange, by separation of commercial and investment banking. Furthermore, savings and loan crisis initiated the regulatory requirements for securitization, as a means of transferring credit risk to financial markets. Today it is obvious that investment banks and securitization were the key initiators of the *Subprime* crisis (Todorović, 2013, p. 222).

The main problems that intermediaries face in their business are: moral hazard, external negative impacts (externalities), and uncertainty. In an attempt to solve a problem, regulations often worsened other problems. The failure of regulations largely resulted from partial (piece by piece) approach to regulatory reform. For example, the introduction of deposit insurance after the Great Depression, which was intended to alleviate instability caused by depositors' run on the banking system (problem of externalities), worsened the problem of moral hazard. Then, strengthening prudential norms after the savings and loan crisis, which was aimed at solving the problem of moral hazard, indirectly worsened the problem of externalities (there was a rise of unregulated financial intermediaries, who did not have regulatory-induced motives to worry about system liquidity and stability). This problem, coupled with business uncertainty, is in the epicentre of the *Subprime* crisis.

The global financial crisis has shown that the regulatory framework had many failures (Torre & Ize, 2009, p. 21-22). First, there is a clear line between *ex-ante* prudential standards and *ex-post* safety net. *Ex-ante* regulatory framework focused on the stability of assets, and *ex-post* safety net on maintaining liquidity of liabilities. In addition, growing systemic liquidity risks were not covered by regulations, which was their main flaw. Second, prudential regulation focused on the safety and strength of individual institutions, based on the assumption that the sum of strong institutions is equivalent to a strong system. However, the *Subprime* crisis has shown that such an approach was completely wrong, because it is the system that is most important for the strength of each institution. Third, traditional regulations focused on statistically measurable risks, based on sophisticated and complex measurement techniques and their management. With the development of Basel II Capital Accord, the existing regulatory framework tried to reduce the gap between the ever-growing risks and regulatory business principles. However, the *Subprime* crisis has shown that risk management techniques were too complex, and the control of bank operations incomplete, followed by rising uncertainty in the environment.

Finally, it can be concluded that bank regulations need to be changed in order to reflect the volatile environment in which they operate. Any reform must integrate all three problems (moral hazard, externalities, and uncertainty), and maintain an adequate balance between financial stability and financial development. This is a difficult task, because each individual problem can lead to different and often inconsistent regulatory implications.

3. REGULATORY CHANGES IN MODERN BANKING ENVIRONMENT

In recent years, the scope and complexity of bank regulations have grown continuously, in response to public reaction to frequent occurrence of financial crises and resulting political pressures. Due to increased competition from non-bank financial institutions,

bankers themselves require a change in the regulatory environment. At the same time, every change increases regulatory risk. If the bank does not anticipate such a change and does not include it in its business plan, it will be considerably handicapped and riskier than competing banks. It should be noted that certain changes in the regulatory environment are affected by the relative power of special interest groups, trying to secure an advantage for their members (for example, commercial banks as opposed to investment banks, large banks opposite the small banks, etc.). Regulatory changes or reforms are conditioned by a number of factors.

First, internationalization of banking operations is an important factor affecting the regulatory reform. The development of internationally active banks implies a greater role of foreign banks in many domestic financial sectors. The increased presence of foreign banks raises the question of competence for their regulation. Who is responsible when the bank faces problems on foreign markets – regulator from home or the host country? Generally, for large and complex banks, regulator in the host country supervises the foreign subsidiary's activities, but the regulator in the home country is ultimately responsible if the bank faces difficulties.

Second, the phenomenon of globalization, closely linked to the internationalization of banking operations, affects the change of the regulatory environment. Rising international activities and trade of multinational corporations have increased demand for the services of financial institutions that operate across national borders. As a result, banks are more exposed to risks coming from abroad, i.e. their financial stability is becoming less dependent on risks on the domestic market. Consolidation in the global banking industry has resulted in the emergence of financial conglomerates, i.e. the creation of universal banks that may engage, either directly or through subsidiaries, in other financial activities, such as insurance, leasing, investment banking, and so on. On this basis, greater coordination between national regulators is needed, as well as greater regulatory monitoring of operations of such institutions.

Third, the development of financial innovation and their market importance condition regulatory changes, i.e. requests for new regulations. For example, in early 2005 in the US there was a need to regulate hedge funds (private investment funds which, on behalf of their clients, trade in different assets, such as securities, commodities, currencies, and derivatives), due to their rapid growth and potentially destabilizing activities. The reason why financial innovation attracts regulators' attention is precisely the fact that it often arises from regulatory arbitrage. In other words, financial institutions and markets create new products not only to meet the requirements of their customers, but also to avoid or circumvent existing regulations. If a particular regulation reduces banks' ability to adequately manage risks and achieve satisfactory return, they have a greater incentive to find ways to circumvent the same (Kane, 2015, p. 321). While banks use innovation to circumvent existing regulations, regulators are always one step behind them. This phenomenon is known as regulatory dialectic.

In addition to the previously mentioned factors, there are many others that can have a significant impact on the regulatory environment. Among other things, changes in the regulatory framework are conditioned by large banking and financial crises. The very emergence of crisis is an indicator that the *ex-ante* established regulatory framework is not adequate, and, therefore, requires reform.

Given that, in the world of uncertainty, even best regulations and supervision probably will not completely eliminate the risk of systemic crisis, improving system features of the safety net will have special significance in the new regulatory framework (Todorović, 2013, p. 223). Thus, the authorities in the United States, shortly after the outbreak of

crisis, initiated changes in the deposit insurance system, referring to a temporary increase in the amount of insured deposits. By the *Emergency Economic Stabilization Act*, the United States, on 3 October 2008, increased deposit coverage from 100,000 to 250,000 dollars (Hansen et al., 2009, p. 50-51).

The current crisis has influenced the temporary increase in insured deposits in the European Union in the amount of 50,000 euros in June 2009, and, during 2010, the limit increased to 100,000 euros. At the same time, some countries, such as France and Germany, introduced temporary complete deposit coverage, so depositors would not lose their money, and in order to preserve confidence in banks during the crisis. Behind unlimited deposit guarantee, there are the state and political structures of a given country (Thematic Review on Deposit Insurance Systems, 2012, p. 11). A characteristic of the European Union market is that national supervisors are not interested in preserving the integral value of their banks operating abroad. During the crisis, the tendency of national supervisors is aimed at preserving the stability of the national parts of cross-border banks. This position is supported by the well-known financial trilemma, which indicates that the three major objectives (maintaining global financial stability, strengthening cross-border financial integration, and preserving national integrity) cannot fit easily (Schoenmaker, 2012). Each of these three objectives can fit relatively easy with others, but it is difficult, almost impossible, to achieve all three.

However, in order to maintain both internal and cross-border value of European banks, it is necessary to consolidate supervision, deposit insurance, lender of last resort, and the process of resolving problem banks at the supranational level, i.e. at the level of the European Union (Schoenmaker & Gros 2012, p. 8). In this respect, the proposal is to establish the European Fund for deposit insurance, which would have a significant role in monitoring and resolving problem banks.

Based on the above, it can be concluded that the current situation requires complete revision and reform of the current regulatory environment. In addition, the design of an appropriate regulatory framework faces two major challenges (Torre & Ize, 2009, p. 27-31). The first relates to the need to build such a regulatory framework that will integrate the problems of moral hazard, externalities, and uncertainties, and that will not, by solving one, worsen other problems. Another challenge relates to finding the optimal balance between financial stability and financial development. In this regard, extreme solutions (system resistant to crisis that does not perform its mediating function adequately, or system that is rapidly evolving, but often faces crisis) should be avoided.

In contrast to the pre-crisis period, when the components of bank regulations were stability and safety, capital adequacy, and deposit insurance, today, in the post-crisis period, systemic risk that applies to the entire financial system, not its individual participants, is gaining in importance (Jickling & Murphy, 2010, p. 6). Thus, the regulatory reform should aim to improve the compliance of various incentives in order to minimize systemic liquidity risk and counter-cyclical effects of bank capital. Strengthening prudential norms that encourage keeping the systemically safe assets can help in limiting banks' sensitivity to systemic liquidity shocks.

In a world where regulations are not applied uniformly, financial flows will sooner or later find the line of least resistance, which will provide unregulated intermediaries with comparative advantage and the possibility of rapid climb to the point where they can become dangerous to the system. This problem can be solved by separation of commercial banks and non-deposit institutions. In addition, non-deposit institutions can choose between being prudently

regulated and remaining unregulated. All regulated intermediaries must meet the appropriate prudential requirements in terms of capital adequacy and minimum capital threshold to enter the market, the same as commercial banks. Unregulated intermediaries do not have to meet these requirements, and they should be forbidden to borrow directly from the market. In other words, they should be allowed only to borrow from banks or other regulated intermediaries. This would ensure regulatory neutrality and favour innovation and competition.

In addition, in order to avoid cross-border arbitrage, reform will have to be supported by a minimum degree of international consensus. At the same time, bearing in mind the problem of uncertainty, the reform will have to pay more attention to the growing risks of financial innovation and to review oversight role of the market and supervisors, so supervisors get more responsibility and more power. Through appropriate legislative powers, responsibilities, and instruments, supervisors need to have a greater role in overseeing banking operations. They must focus on the risk and development of the banking system and the establishment of countercyclical prudential requirements, caused by changes in the environment. At the same time, regulators should be given greater authority in the process of regulation, standardization, and approval of all forms of innovation, which must undergo rigorous approval and tests.

Theory and practice have given rise to a large number of important and detailed proposals for establishing a regulatory framework. It is clear that regulators, having state support, tended to, with the adoption of new regulations and laws, fill gaps and weaknesses in terms of bank regulations and supervision. US regulators adopted Dodd-Frank Act, and tried to improve regulations in relation to deficiencies identified through: highlighting the systemic risk; recomposition of responsibilities of the existing and creation of new regulatory institutions; regulation of banks' speculative activities; regulation of financial institutions' liquidation; an end to the concept of "too big to fail".

In order for a regulatory reform to be successful, it is necessary to combine specific rules (which maintain the system within reasonable limits) and institutional reforms that are proportional to greater responsibilities and powers of supervisors and strong enough to overcome a number of difficulties associated with the use of discretion regarding an approach based on transparency and simplicity (Page & Hooper, 2013, p. 52). The system of bank regulations needs to move from an attitude of too complex and confusing rules. Finding the right modalities of implementation and regulatory mix between rules and discretion will be one of the toughest and most important challenges of regulatory reform in the future.

4. Changes to Basel Regulations Caused by Global Financial Crisis

The Basel framework has the most significant impact on the convergence of bank regulation systems, since it allows the transfer of information and exchange of experience on national supervision programs, increases efficiency of international banking supervision techniques, and sets minimum supervision standards, where possible (BCBS, 2009, p. 1). The first two Basel Accords (Basel I and Basel II) had the objective of establishing uniform requirements in terms of the amount of capital, which banks were required to meet. In other words, the objectives were preventing banking crises, promotion of domestic banks as stable and solvent ones, and eliminating problems arising from non-compliance of national legislation. Although other factors, such as liquidity and interest rate sensitivity, are perhaps

even more important in achieving these objectives, adequate capital was for many years the regulators' primary problem. It was only the third accord (Basel III) that highlighted the problem of liquidity as a key factor of instability in the banking system (Banerjee & Mio, p. 2014, 3).

Basel II was created in order to resolve the identified deficiencies and simplification of capital indicators in Basel I (giving priority to the type, not the quality of assets) (Heid, 2007, p. 3885), i.e. accord that did not recognize differences in the quality of credit risk; did not take into account other risks in the banking business, such as, for example, operational risk; ignored the possibility of reducing the credit risk through diversification of assets or through hedging transactions.

However, over time, the so-called indirect costs have been identified, associated with pro-cyclical effects that Basel II may cause in macroeconomics. By increasing sensitivity to credit risk, accord has at the same time increased cyclicality of minimum capital requirements. Thus, capital management can be a big problem in banks. Given recessive economic trends (which today characterize the global economy), banking capital experiences erosion due to losses in credit portfolios (non-performing loans). At the same time, banks are required to hold a higher amount of regulatory capital in relation to the total level of loans, thus decreasing the level of banks' lending activities and further deepening the crisis in economic activity.

The problem of cyclicality of minimum capital requirements of Basel II was the subject of intense discussion in financial and regulatory circles. In this sense, there were requirements to reduce mandatory minimum rate of capital during periods of recession from 8% to, say, 6%, in order to enable credit expansion. Of course, in this case, loans would be approved only to creditworthy customers. However, the Basel Committee, until 2010, relying on several key arguments, stuck to unique and fixed minimum capital rate. First, the introduction of a more flexible capital rate could relativize the basic idea of the Basel Committee regarding the creation of a solid regulatory capital regime in the context of increased risk and uncertainty in the functioning of the macroeconomic and banking system. Second, some raised the question of who would decide on the transition to lower rates of capital – the Basel Committee or the national supervisor. Thirdly, there were no clear criteria for deciding whether there are sufficient macroeconomic reasons for the reduction of regulatory capital.

The emergence of the global financial crisis (*Subprime* crisis) actualized the evident failure of Basel regulations, reflected in inadequate establishment of dynamic links between monetary and prudential policies. The job of the central bank related to ensuring macro stability and the provision of services of the lender of last resort, while the supervisors were responsible for prudential regulation and financial stability. In addition, regulations did not require their strong mutual cooperation, which is where one of the main causes of the crisis lies. Insufficient attention of both monetary authorities in relation to implications of their actions on financial developments and supervisors in relation to macro dynamics deeply contributed to the crisis.

Since the global financial crisis revealed the conceptual shortcomings of Basel II, which failed to prevent and stop the crisis flows, the need for counter-cyclical control instruments and mechanisms arose, which associated capital needs with the rate of change in bank lending. Thus, in 2010, the Basel Committee issued some guidelines to Basel III, in order to improve banks' ability to absorb shocks arising from the environment, increase

the transparency of banks, and establish appropriate regulatory frameworks at the global level. In other words, this document is a result of the efforts to make the regulatory framework of the banking business more stable, while stressing the importance of adequate risk management.

Basel III standards combine two complementary approaches to supervision, micro approach, at the level of individual banks, on the one hand, and macro-approach, on the other hand. Micro-prudential supervision refers to the increasing resistance of banks in periods of market uncertainty by establishing higher quality capital, more comprehensive risk coverage and adequate supervision. At the same time, the basis of macro-prudential supervision consists of three elements: capital buffers, liquidity standards, and leverage ratio (Matić, 2011, p. 180).

Request for a minimum total capital remained the same and amounts to 8% of the risk weighted assets, while the minimum amount of primary capital (Tier 1) increased from 4% to 6%. In relation to Basel II, changes are reflected in the elimination of tertiary capital (Tier III) and the introduction of new categories, such as protective and countercyclical buffers. The meaning of inclusion of protective capital buffer is the creation of reserves in the expansion phase, which can be used to absorb losses during financial and economic stress periods, without prejudice to the required minimum rate of capital. Protective buffer is included in equity, and should be set at 2.5% above the minimum required capital. This will increase the minimum requirements to 8.5% when it comes to primary capital and 10.5% of total capital. Banks will be allowed to withdraw protective buffers during stress and crisis, whereby convergence to the minimum requirement for nominal capital will affect larger restrictions and prohibitions of dividend and bonus payments to employees and shareholders.

The obligation of forming countercyclical buffer is not directly imposed on banks, and national regulators, depending on threats of systemic nature, may require this type of capital. The amount of countercyclical buffer is in the range of 0-2.5% of risk-weighted assets, in order to provide macro-prudential goal of protecting the banking system in terms of excessive credit growth. Practically, regulators use it flexibly to stimulate or reduce loans in various stages of the credit cycle. Also, regulators have left the possibility of introducing stricter rules for systemically important banks, i.e. institutions that can easily endanger the financial system.

Stricter requirements for capital are a necessary but not a sufficient condition for the stability of the banking sector. In order to ensure the necessary conditions for long-term liquidity structure in banking institutions, Basel III has introduced new standards that provide greater resilience of banks to short-term liquidity problems, because it turned out that the problems in banks occurred because of insufficient liquid funds despite possessing adequate amount of capital. Two liquidity standards have been formed, namely:

1) Liquidity coverage ratio (LCR), as a ratio of highly liquid assets and total net cash outflow in the following 30 days, which should be greater than or equal to 100%. It includes the obligation for banks to hold highly liquid assets in an amount equal to a minimum of net cash flows over the next 30 days. This ratio should allow banks to maintain high-quality assets that can be converted into cash during stressful periods (Basel III: The Liquidity Coverage Ratio and liquidity risk monitoring tools, 2013, 6). Liquidity coverage ratio became the minimum standard as of 1 January 2015.

2) Net stable funding ratio (NSFR) represents the relationship between the amount of resources available for stable funding and the amount required for stable funding, which

must be higher than 100. The ratio is intended to limit over-reliance on short-term financing during periods of stress and encourage better assessment of liquidity risk in balance sheet and off-balance sheet activities. It assumes that long-term liabilities are more stable than short-term liabilities, and that short-term deposits of individuals and small businesses are more stable than large investment of other partners of the same maturity (Basel III: The Net Stable Funding Ratio, 2014, p. 2). The net stable funding ratio will become the minimum standard as of 1 January 2018.

Due to the lack of transparency in financial reporting before the crisis, a large number of banks have sought to ensure maximum benefits through modest investment. In this way, banks have become heavily indebted. Therefore, Basel III has introduced a leverage ratio, which should limit the overall exposure of banks to risky activities and eliminate the possibility of their over-indebtedness. Leverage ratio, as a ratio of primary capital and total exposure of banks, must not be less than 3%.

Practically, the Basel Committee made some recommendations for the reform of bank regulations and supervision of banks, primarily related to an increase in capital adequacy ratio, in line with the growing risks of complex and globalized financial operations and improved quality of primary capital. It also made a recommendation on the introduction of minimum global liquidity standard, which was not previously included in the regulation, but could prevent the loss of liquidity.

In addition to the above recommendations for strengthening prudential banking supervision at the micro level, the Basel Committee made recommendations at the macro level. First, capital adequacy ratio must be supplemented by the corresponding internationally harmonized capital availability ratio, in order to prevent the banks to circumvent the requirements of the new regulations. Second, it is necessary to create protective buffers in phases of economic prosperity, which would be activated during the recessive trends in the economy. Third, it is necessary to introduce rules on derivatives, to reduce their use as complex high-risk instruments.

The new accord has emerged as a compromise between American and European banks, which are generally less capitalized, and will, in this respect, have to raise more capital. However, the new regulation has faced mixed reactions in the banking sector. While the regulators' goal was to create a safer banking sector, resistant to crises and boom and bust cycles, bankers expressed fears of slow economic recovery, reduced and difficult lending, and increased interest rates.

In this sense, the regulators allow the new Basel III rules to be introduced gradually, so that banks have sufficient time to adapt to stricter requirements and in order not to jeopardize the economic recovery after the global crisis. Increasing the level of capital began in January 2013, while the new requirements should be fully completed by January 2019. Of course, it is expected that most of the commercial banks will be able to timely increase their capital, while maintaining revenues.

CONCLUSION

Based on the generally known bank features, as well as practically confirmed danger of completely free and spontaneous operation of market laws to the stability of the banking system, the paper points out the importance of establishing an adequate regulatory framework. Regardless of the chosen regulatory system, the fundamental objectives of

bank regulations are related to: ensuring system stability, maintaining security of banking and financial institutions, and protecting customers.

An appropriately designed regulatory framework is necessary to make the right operational decisions and ensure public confidence in the banking system, no matter if regulations cannot fully prevent the banking crisis, eliminate risks in the banking business, or guarantee the correct management decisions and ethical behaviour of bank managers.

Previous remarks require acceptance of the thesis of the necessity of regulating the banking sector. Also, it is clear that a permanently applicable and universal concept of bank regulations does not exist. It is conditioned by specifics and structural aspects of the banking sector in a specific country, as well as the depth of the crisis affecting a specific banking system. Bank regulations are a dynamic category that, under the influence of theory and practice, changes with the passage of time.

Looking at the modern business environment, the current regulatory architecture can be characterized as quite imbalanced. Credit crunch, triggered by the *Subprime* crisis, led the financial and banking system to the unknown terrain. Since the era of stability, i.e. stable prerequisites, is over, the uncertainty on financial markets is today's norm.

It is clear that regulations failed to prevent the collapse of the banking and financial system, which gave rise to some reforms to bring bank regulations in line with the unstable environment in which they operate. At the international level, the most significant changes took place in the Basel regulations, reflected in the adoption of the new accord – Basel III. It aims to make the regulatory framework of the banking business more stable, ensure adequate capital and liquidity of banks, reduce systemic risk, and eliminate cyclical fluctuations in the economy, which, in fact, confirmed the starting hypothesis in the paper.

Finally, it is important to point out that certain regulatory changes, aimed at minimizing the problems of individual banks and systemic problems (such as Basel III), are still in the implementation phase, so their effectiveness cannot be measured reliably. Therefore, future research needs to focus on testing the effectiveness of the existing regulatory changes.

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REGULATIVA BANAKA U SAVREMENOM FINANSIJSKOM OKRUŽENJU

U radu se analiziraju uloga i značaj bankarske regulative u obezbeđenju sigurnog i stabilnog poslovanja banaka. Savremeno poslovno okruženje, u kome banke obavljaju svoju delatnost, je nestabilno, turbulentno i prilično nepredvidivo. Za razliku od tradicionalnih uslova poslovanja, danas su banke izložene rastućim i raznovrsnim rizicima, kao i čestim kriznim situacijama. Shodno navedenom, kontrola nad poslovanjem banaka postaje nužnost. Potreba za regulativom se može pravdati činjenicom da tržište prepušteno samo sebi ne može da održi konkurentnost u dugom roku. Da bi određena regulativa ispunila ciljeve zbog kojih je i doneta, ona se mora stalno prilagođavati promenama u okruženju. Cilj rada je da se ukaže ukaže na neophodnost regulatornih promena u bankarskom sektoru. Kritičkim osvrtom na određene regulatorne promene, autori zaključuju da su one značajno doprinosile sigurnijem poslovanju banaka i sistemskoj stabilnosti

Ključne reči: *regulativa banaka, regulatorne promene, bankarska kriza, bazelska regulativa*

FACTA UNIVERSITATIS
Series: **Economics and Organization** Vol. 14, N° 3, 2017, pp. 231 - 242
https://doi.org/10.22190/FUEO1703231D

Review Paper

INDEPENDENCE AND OBJECTIVITY OF INTERNAL AUDITORS AS DETERMINANTS OF THEIR EFFECTIVENESS

UDC 657.6-051-057.3

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Abstract. *The aim of this paper is to highlight the issue of independence and objectivity of internal auditors, which, given the place and role of internal audit in the system of corporate governance, is increasingly gaining in importance. In determining these concepts, the difference between them is pointed out, with particular emphasis on their importance for internal audit effectiveness. By introducing circumstances in which internal audit functions, the paper especially emphasizes the challenges that internal auditors face in achieving independence and objectivity in their work. In this process, they receive significant support from regulatory decisions regarding the position of internal audit in companies, and especially directions to invest efforts and eliminate all factors that threaten to undermine their independence and objectivity.*

Key words: *internal audit, independence, objectivity, specifics and efforts to ensure independence and objectivity*

JEL Classification: M42

INTRODUCTION

At the present stage of development, internal audit is a function integrated into the system of corporate governance, which provides assurance of effectiveness of all business functions in the company and consulting services to all management structures in carrying out their responsibilities. In this way, it proactively focuses on creating added value for the company. However, producing corresponding effects, i.e. realization of the strategic role, largely depends on independence and objectivity of internal auditors, as well as the fundamental concepts underlying their work.

Received May 22, 2017 / Accepted July 13, 2017
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True, independence and objectivity have always represented the cornerstone of audit theory and practice, though, in the last twenty years, these concepts have especially gained in importance. This is because, as a response to the need to improve the system of corporate governance, internal audit received a dual role, associating it with other participants in the system. Such a unique position has made the issue of independence and objectivity a much larger challenge that must be responded to.

In line with the above, the paper is designed to first clarify what is meant by independence and objectivity of internal auditors, as concepts often mentioned in the same context. Then it goes on to perceive the specifics of ensuring independence and objectivity of internal auditors, arising from their position in the company and the role they play in the system of corporate governance. The last part of the paper presents the efforts of professional bodies, especially internal auditors themselves, in ensuring and preserving independence and objectivity.

1. Independence and Objectivity – The Fundamental Concepts of Internal Audit

Achieving independence and objectivity in work is one of the critical preconditions that internal auditors need to meet to serve the purpose. Only independent and objective internal audit ensures the survival of the profession, which is why the significance of these concepts for internal auditors is often compared to Hippocratic Oath for physicians (Christopher et al., 2009, p.201). Even the very definition of internal audit emphasizes that it is "…an independent, objective assurance and consulting activity..."

True, independence and objectivity are strongly related categories and are often mentioned in the same context. However, these are different attributes that standards define in the following manner (ISPPIA 1100):

"Independence is the freedom from conditions that threaten the ability of the internal audit activity to carry out internal audit responsibilities in an unbiased manner".

"Objectivity is an unbiased mental attitude that allows internal auditors to perform engagements in such a manner that they believe in their work product and that no quality compromises are made. Objectivity requires that internal auditors do not subordinate their judgment on audit matters to others".

Further delineation of these concepts is particularly emphasized in the practical guide "Independence and objectivity", which determines objectivity as a state of mind, and independence as a state of affairs (Jameson, 2011, p. 4). Mutchler (2003) differentiates between these concepts in a similar manner, and describes objectivity as a desirable characteristic of an individual, or the audit team, while independence is the desired characteristic of the environment in which internal audit is performed. In this sense, objectivity is linked to an auditor's individual view, their behavior, personal relationship with others, and, when performing engagements – a sincere belief in their work product and that no quality compromises are made. On the other hand, independence means ensuring the possibility of objective performance of internal auditor's duties, and is linked to the organizational positioning of internal audit in the company, reporting relationships with boards of directors, audit committee, or other governing bodies separated from the management, authority for the evaluation of information, reports, and the like. In doing so,

although the previous can suggest that independence is emphasized at the organizational level, the definition shows that it is "equally important at the individual, functional, and level of individual engagement" (Stewart & Subramaniam, 2010, p. 330).

The fact is that objectivity of internal auditors does not mean concomitantly their independence, and vice versa, independence of internal auditors does not necessarily mean their objectivity. However, it can be said that the basis of ensuring internal audit independence is, in fact, ensuring objectivity in work and proper management of threats to its achievement. In particular, timely identification and elimination of threats that can compromise the objectivity of internal auditors is a prerequisite for the implementation of activities that contribute to internal audit independence, relating to: adequate organizational position of internal audit, establishing a strong control system, adoption of audit charter, establishing the practice of employment and dismissal of internal auditors, and others. In this respect, self-reliance in work and refusal to subordinate one's own judgment to the interests of others, but also one's own personal interest, is something internal auditors must achieve at every stage of their work. According to Mautz and Sharaf, pioneers in the development of auditing theory, independence, i.e. freedom from undue control and pressure must be exercised through:

- Investigative independence – in the selection of areas, relationships, and management policies to be examined,
- Programming independence – when selecting audit techniques and procedures, and
- Reporting independence – statement of audit information obtained by the auditor during the implementation of audit procedure (according to: Andrić et al., 2012).

Code of Ethics for internal auditors also emphasizes objectivity as a principle by which internal auditors must exhibit the highest level of professional objectivity in the collection, evaluation, and communication of information about the activity or process being examined ..., free from undue influence of their own interests or the interests of others in the formation of judgments.

2. Specifics of Ensuring Independence and Objectivity of Internal Auditors

Internal audit functions in two ways: (1) *ex post* – as a provider of objective assurance of efficiency and effectiveness of operations, and (2) *ex ante* – as a catalyst for change by providing advice and guidance in work, which has provided this function a position that provides assistance to all other participants in the system of corporate governance, above all, management. However, its dual role and a unique position in the company are at the same time the cause of specifics of ensuring internal auditors' independence and objectivity. This is because internal auditors, as company employees, exercise control and provide assurance of the adequacy of the established governance structure and business activities. Hence, it is logical to open a number of issues concerning the possibility of internal auditors to independently and objectively carry out their activities. This primarily refers to the possibility of threats from social pressures by the company management, as well as those arising from personal relationships or intimacy, which is why internal auditors can often be the subjects of conflict. Also, practice has shown that company managers require internal audit to expand its activities outside the scope of its work, in order to compensate for the loss of control as a result of the significant complexity of

operations (Sarens and De Beelde, 2006). Internal auditors are often treated as their workers, who are expected to be involved and provide assistance in performing daily management activities. It is also not uncommon for managers to perceive internal auditors as partners with whom they need to work closely to achieve the "common goals", rather than a function that provides assurance of the effectiveness and efficiency of the company processes (Christopher et al., 2009, p. 208). Such management expectations are certainly a serious threat to internal auditors' independent and objective performance of activities within the scope of their work.

Besides, the fact is that, by providing consulting services, internal audit obtains a strategically important position in the company, as it applies a proactive approach to the management process. This, however, may cause internal auditors' bias, because, quite often, auditors need to provide assurance on the efficiency and effectiveness of a process or activity for which they previously made a recommendation for improvement. Nevertheless, although this view is completely logical and relevant, numerous studies show that internal auditors do not fully agree with it. Paape et al. (2003) explored the role of internal audit in 15 European countries, and found that 61% of surveyed internal auditors disagreed with the suggestion that they would significantly preserve their independence if they did not accept advisory role. Also, research by Ahmad and Taylor (2009) has shown that internal auditors do not find a significant link between the occurrence of the conflict, on the one hand, and carrying a double role, on the other. Peurs (2004) dealt with the similar topic and found that most respondents did not see as a problem at the same time assisting company management and independent assessment of the management process. What is more, the perception of internal auditors themselves, that their independence and objectivity are compromised by performing dual roles, is caused by multiple factors: the nature of consulting activities carried out, the existing ownership structure of the company in which they work, the established system of management, and others. This is confirmed by research conducted by Selim et al. (2009), in which they performed a comparative analysis of the extent to which internal audit in companies in Ireland and Italy is involved in providing advisory services and its impact on, among other things, independence and objectivity. The results showed that 36% of respondents in Italy believed that, by providing advisory services, internal audit is able to increase its independence and objectivity, while 38% of respondents in Ireland had a different opinion – dual role decreases independence and objectivity. Also, 64% of respondents in Ireland considered that the risk of conflict of interest largely stems precisely from the dual role of internal audit, while 51% of respondents in Italy believed that this role has no effect on the achieved independence and objectivity. The authors explained the observed differences by the fact that internal auditors in Ireland are involved in providing advisory services related to a wide range of activities in the company, as opposed to auditors in Italy, who traditionally focus on financial audit. Also, Italy has a greater number of the so-called family businesses, so, besides the generally lower concern about achieving independence and objectivity, the existence of personal/family relationships is another reason.

However, despite the beliefs of internal auditors that providing consulting services is not a factor impairing their independence and objectivity, research by Brody and Lowe (2000) suggests otherwise. The purpose of their study was to determine the way in which internal auditors perceive their advisory role – as something that should provide objective

information to managers, or as service that should provide solutions in the best interest of the company. In this sense, their research focused on assessing the level of the achieved objectivity of internal auditors in the process of company acquisition. The results showed that the reasoning of internal auditors varied significantly depending on whether they worked in a company that was a buyer or a seller. Specifically, the study has found that most internal auditors (67.76%), which were in the process of negotiations on the side of the buying company, overestimated the likelihood of inventory obsolescence to achieve lower prices, as opposed to internal auditors on the side of the seller (37.31%). This data indicates that internal auditors are biased and prone to satisfying the interests of their company, following that the provision of consulting services makes them unable to maintain their independence and objectivity. That this is not an isolated case is proven by the results of research conducted by Dickins and O'Reilly's (2009), according to which 89% of 99 audit managers at US companies were involved in various forms of compensation packages. Bearing in mind that compensation packages are conditioned not only by the overall results of company operations, but also the achieved internal audit performance, bias of internal auditors in performing activities is quite logical.

In addition to the dual function they have, specificity of ensuring independence and objectivity of internal auditors resides in the fact that, not infrequently, internal audit is the starting point, i.e. "springboard" for higher management positions. Research by Goodwin and Yeo (2001) shows that 43% of respondents, chief audit executives in enterprises in Singapore, confirm the practice, while in the US, the situation is such in more than half of publicly listed companies (Rose et al., 2013). Also, research by Christopher et al. (2009) shows that 56% of internal auditors in Australian companies believe that the appointment of internal auditors to higher managerial positions is, in fact, a reflection of the business culture. An argument for this practice is that internal auditors carry out their assurance and consultation role in a number of different company functions, which includes a good knowledge of how to perform the activities and manage these functions. Appointing managers, who, based on previous experience in internal audit, stand for well-trained staff, with an excellent understanding of almost the entire company operations, is certainly a significant benefit for the company. However, this may in turn lead to a number of risks to the achievement of independence and objectivity of internal auditors. More specifically, it is a reasonable assumption that internal auditors will, to some extent, be biased in carrying out their activities, bearing in mind that the audited entity has concrete plans to develop their careers. Independence and objectivity is surely brought into question as a result of internal auditors' desire "not to compromise their relationship with the counterparts and not to be characterized as unreliable and untrustworthy colleagues" (Rose et al., 2013, p. 1008). In addition, internal auditors hoping or expecting to move to senior management functions are not sufficiently interested to adequately carry out their activities and show no initiative to improve audit quality.

3. Efforts to Ensure Independence and Objectivity

The fact that only independent and objective internal audit may produce corresponding effects fully justifies the IIA efforts to, by making a significant number of standards and related practical advice, ensure compliance with these concepts. Thus, the standard 1100 states that internal audit activity must be independent, and internal auditors' objective in

performing their duties. This standard is followed by interpretation, according to which an internal auditor should have direct and unrestricted access to senior management and the board, which is actually achieved by double reporting line. This issue is further determined in the standard 1110, according to which the chief audit executive must report to the management level in the company, which allows the internal audit activity to fulfill its obligations. In this sense, organizational independence is achieved when the chief audit executive functionally reports on its work to the audit committee and administratively to senior management level, where functional reporting includes all the issues relating to the scope of internal audit, from planning to reporting on work results, including the quality control of internal audit activities, while administrative reporting involves communication with the appropriate higher management level on administrative matters related to the daily operations of this function.

Standard 1120 promotes personal objectivity of internal auditors, according to which internal auditors must have an objective and impartial attitude in the performance of their tasks. Also, they must avoid any conflict of interest that may reduce confidence in the internal auditor, the internal audit activity and the profession, and in related Practice Advisory 1120-1, considerable personal responsibility in this regard belongs to the chief audit executive, who should, whenever possible, periodically rotate tasks of internal audit staff.

Finally, standard 1130 points to the obligation of disclosure of details of impairment to independence and objectivity of internal audit. Abundant Practice Advisory related to this standard indicates causes of impairment to independence and objectivity, and responsibilities of internal auditors and chief audit executives to disclose details of impairment and adequately react in these situations. The importance of identifying threats to achieving a high level of independence and objectivity has made IIA give them special attention in their practical guide. Thus, impairing objectivity may result from (Jameson, 2011, p. 7-9):

- Social pressure on internal auditors when external auditors, regulators, management, and others consider that any internal audit engagement must generate certain findings, or when management expects that auditors "overlook" suspicious items, etc.;
- Economic interests, in the sense that an internal auditor's negative findings may impact future company operations, and, thus, the realization of their economic benefit as company employee, or in situations where work or department of individuals who directly influence the internal auditor's status and salary is audited;
- Personal (family) relationships or intimacy, as a result of long-term co-operation, between internal auditors and individuals whose work or department is audited;
- Cultural, racial or gender bias of internal auditors;
- Psychological bias of internal auditors about the role they perform – if auditors have a critical perspective of internal audit, it is very likely that they will overlook the positive things and vice versa, the perception of internal audit as a facilitator for improvement can cause them to overlook negative things;
- Audit of auditor's own work, in the sense that audit focuses on activity, process or work of the department for which the auditor previously, serving as a consultant, gave a recommendation for improvement;
- Threats or intimidation of the internal auditor by the audit client or other stakeholders.

In addition to standards and Practice Advisory, IIA Code of Ethics provides that internal auditors should not participate in any action or attitude (as opposed to the interests

of the organization), or accept anything that might impair or seemingly undermine their professional judgment or independent appraisal. Furthermore, they must disclose all material facts with which they are familiar, and which could, were they not disclosed, distort the reporting of activities which were subject to audit.

However, despite the existence of professional regulations, independence and objectivity of auditors are much higher requirements than those imposed by rules, because it is not realistic to expect that explicit rules will cover all potential sources of bias. At the same time, they are neither a guarantee, since independence is the subjective characteristics of the individual that is difficult to quantify (Andrić et al., 2012, p. 86). Independence and objectivity of internal auditors primarily depend on their relations with the governing bodies of the company, from the support they receive at work, and then the skills of internal auditors to withstand various threats.

3.1. Establishing appropriate relations with management and the audit committee

Establishing clear and, above all, fair and constructive relations between internal audit, on the one hand, and company management and the audit committee, on the other, is a precondition of an adequate organizational position of internal audit. In this regard, relations between internal auditors and management are complex in particular, due to their close cooperation that has to be achieved in order to provide mutual support in performing activities, all in order to create added value for the company. This cooperation is necessary; however, it is reasonable to question the extent to which internal auditors can remain independent if they bind and directly subordinate their activities to management; what should be the limits of their cooperation? Looking for an adequate response imposed the view that the relationship between internal audit and management should be constructive and balanced – neither too friendly nor unfriendly (European Confederation of Institutes of Internal Auditing, 2005). Such a relationship is shown in Figure 1.

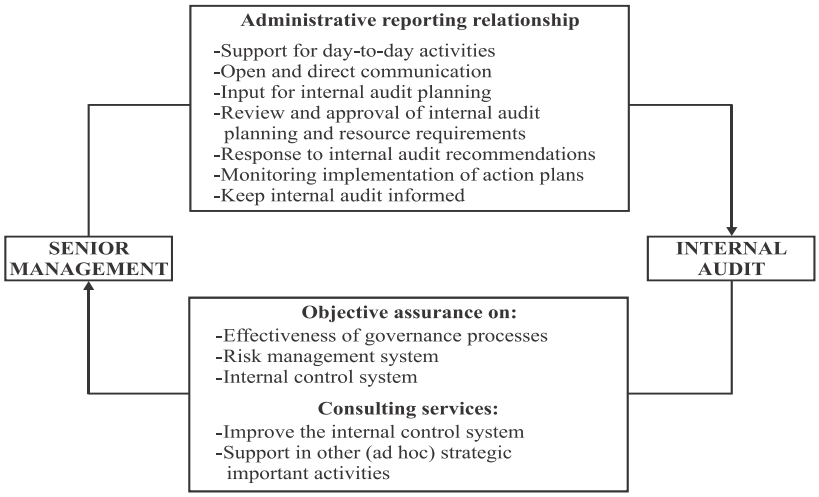

Fig. 2 Relationship between internal audit and senior management
Source: Sarens & De Beelde, 2006, p. 224

The figure clearly shows that internal audit provides assurance and consulting services, thus providing significant support to company managers in the management and implementation of strategic goals. For these reasons, it should align its objectives with the strategic objectives set by the management, and focus its activities on areas which the management believes are the key to success. On the other hand, company management is also expected to provide significant support to internal audit in performing its activities. This support is determined in Performance Standards, and, thus, standard 2010 states that management should provide significant inputs when creating audit plans, with the aim of pointing out high risk areas or business opportunities. Furthermore, standard 2020 prescribes that the chief audit executive is obliged to inform the management about the planned activities and resource requirements, including any significant changes that have occurred in the meantime, in order to determine whether internal audit objectives and activity plans reflect company plans. And, finally, in order to examine the possibilities of overcoming possibly identified problems, according to Performance Standard 2060, company management, next to the board, must obtain an internal audit report on the purpose, authority, and responsibilities of internal audit, and performance in relation to the plan.

Such a relationship should ensure the achievement of synergistic effects and directly contribute to the improvement of company management, while providing the ability to achieve a high level of independence and objectivity of internal audit. Managers are the ones who largely orient internal audit activities and provide support for the performance of audit activities. However, this does not mean that internal auditors should be considered as their "servants", and that the impact on their work should go beyond the powers of management. Thus, provision of inputs for internal audit plans and consideration of requests for resources, together with the audit committee, is desired and prescribed by standards, but internal auditors and the audit committee should have full autonomy for the final prioritization. This is because if management does not want internal audit to focus on some specific areas, they can limit internal audit resources, and, thus, significantly reduce audit activity (Christopher et al., 2009). Also, the issue of employment and dismissal of internal auditors should not be the responsibility of the company managers as audited entities, for direct subordination of internal auditors and bringing their independence and objectivity into risk.

Based on the above, it can be concluded that "the greater the influence of management on internal auditors, the less they are independent in carrying out the tasks entrusted to them" (Kondić & Petrović, 2012, p. 133), which is why establishing a balanced relationship to provide both sides with an opportunity for the proper performance of tasks entrusted to them is a priority.

Unlike company management, greater involvement of the audit committee in internal audit activities is desirable or necessary, because it is an authority with the primary responsibility for the effective functioning of internal audit. The relationship between internal audit and the audit committee is "much more than relationship between the supervised and the supervisor" (Goodwin & Yeo, 2001, p. 110), because the audit committee primarily focuses on safeguarding the independence of internal audit from management (Kamau et al., 2014). This is primarily achieved by:

- *Approval of internal audit charter/rulebook*, which sends a special message to management that chief audit executive may appeal to a higher authority in the case

of controversial issues. Approval of the charter implies that internal audit is free from barriers that might otherwise prevent it from making the necessary disclosures to the audit committee;

- *Approving risk-based internal audit plan and budget* – based on a risk study prepared by internal auditors and significant inputs received from the company management, chief audit executive shall submit to the audit committee a draft plan, which they, as the ultimate coordinator, review and finally approve;
- *Receiving reports from the chief audit executive* on the execution of internal audit activities in relation to the plan and on other matters and measures related to significant audit findings in the report that their internal auditors provided;
- *Approving decisions concerning the appointment and dismissal of chief audit executive*. Although chief audit executive is, as a rule, administratively responsible to company management, audit committee is responsible for their recruitment and dismissal. Company management informs the audit committee of potential candidates and makes a proposal. Also, management can make a strong statement of reasons why the current chief audit executive is not fulfilling their responsibilities and that they should be transferred or dismissed. After the company management's decision proposal, audit committee makes the final decision on appointment or dismissal of chief audit executive.

By performing these activities, audit committee ensures that internal audit activity is structured in a way that ensures organizational independence. Additional support to internal audit comes from complete and unrestricted access to documents and people within the company. Also, the possibility of direct and regular communication between the chief audit executive and the audit committee chairman, attending committee meetings to discuss internal audit plan, significant findings, methods of implementation of recommendations, and others further support the independence of internal audit. The great importance here belongs to private meetings between the chief audit executive and the audit committee, bearing in mind that they often discuss sensitive internal audit findings, for which the presence of the company management is not desirable.

3.2. Threat management to achieve independence and objectivity

Achieving independence and objectivity in work is subject to significant efforts made by internal auditors themselves, aimed at adequate assessment and management of any situation that threatens to endanger them. Significant support in this regard comes from IIA Framework, aimed at promoting and fostering independence and objectivity of internal audit in the company (Jameson, 2011). Specifically, this Framework presents the multi-stage process of threat management, which initially involves *timely identification of any threats* to independence and objectivity. It is the responsibility of internal auditors to even seemingly insignificant events and circumstances that may reduce their ability to freely and impartially carry out their activities recognize as a threat. Initial identification of threats at this stage should be communicated to the chief audit executive for a decision on the organization of a proactive approach to eliminate them.

In the second phase, it is necessary to *assess the significance, i.e. strength of the impact of circumstances or events identified as a threat*, and to distinguish whether it is directed at impairment of independence or objectivity. In addition, it is very important to

look at whether it is already present or is expected to appear and intensify in the future. This provides the ability to *identify specific factors to mitigate* the identified threats. More specifically, at this stage, it is important to assess whether it is possible to mitigate the threat and consider how to provide the best results: ensuring support from the audit committee, establishment of legal, i.e. professional penalties and other measures to ensure the smooth performance of tasks. After their application, internal auditors should assess whether and to what extent the threat has been mitigated and the risk of inefficient performance reduced to a minimum. However, internal auditors are expected not to rely on the assumption that measures taken fully eliminated threat. They must *assess the residual risk* of threat, relying on their reasonable judgment. If they assess that there is risk or if they are not completely sure of their independence and objectivity, they must inform the chief audit executive, and, possibly, the board of directors or audit committee. Certainly, internal auditors are expected to *proactively manage the remaining threat*. By using different tools, such as reference to audit charter, segregation of duties, contracting work with third parties, and the like, internal auditors, to the extent possible, complete tasks without bias and impairment.

Regardless of the identification of the mitigating factors and the efforts of both auditors and company management, the possibility of threats that cannot be eliminated yet exists. In such situations, the auditor is expected to *assess the existence of unresolved threats* and, in relation to the corresponding sides, consider the possibility of independent and objective performance of tasks. Very often internal auditors inform users of audit services on the circumstances, and, if, after consultation with them, a decision on further work is made, it is important to consider the implications of the report to be prepared by internal auditors.

Mitigating factors that have been identified, the manner of their implementation, and any measures taken to eliminate threats to independence and objectivity are very important to be *adequately documented*. This document is an important source of information for management structures within the company and external teams performing quality assessment of internal audit, commitment of internal auditors, and efforts to preserve independence and objectivity. In addition, at this stage, it is important to describe in detail the threats that could not be eliminated and the mode of work in these situations.

Proper management of threats to independence and objectivity implies continuity in work. Chief audit executive is expected to, for each audit engagement, conduct a comprehensive review of activities, not only auditors', but also of other employees, aimed at safeguarding independence and objectivity.

CONCLUSION

Full utilization of the internal audit's potentials to improve the corporate governance system is largely conditioned by the independent and objective approach of internal auditors in defining the scope of their work (having full control over the nature of their work), implementing activities (freedom to collect and evaluate evidence) and communicating results (freedom in reporting the results of their work without any pressure). However, the unique place they take in the aforementioned system, as well as the dual roles they have, are the reasons why the independent and objective performance of internal auditors is one of the greatest challenges of modern auditing practice.

The specifics of ensuring independence and objectivity, as determinants of the effective performance of internal auditors, have conditioned that the IIA, as the most influential professional organization in this field, specifically directs its efforts to respect these concepts. In addition to adopting a large number of standards, the IIA provides support to internal auditors through practical advice, guidance, and the like. Apart from respecting professional regulations, internal auditors are expected to be able to recognize and adequately manage any threat of violation of independence and objectivity. In this way they will avoid situations that their independent operation and the possibility of objective professional judgment and decision-making could be questioned.

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NEZAVISNOST I OBJEKTIVNOST INTERNIH REVIZORA KAO DETERMINANTE NJIHOVE EFEKTIVNOSTI

Cilj autora ovog rada jeste isticanje problema nezavisnosti i objektivnosti internih revizora, koje zbog mesta i uloge koju interna revizija zauzima u sistemu korporativnog upravljanja, sve više dobija na značaju. Determinisanjem ovih koncepata ističe se razlika među njima i posebno apostrofira značaj koji imaju za postizanje efektivnosti interne revizije. Predstavljanjem okolnosti u kojima interna revizija deluje, posebno se naglašavaju izazovi sa kojima se interni revizori suočavaju u ostvarivanju nezavisnosti i objektivnosti u radu. Značajnu podršku u tome pružaju ima prikazana regulatorna rešenja u vezi sa pozicioniranjem interne revizije u preduzeću, a posebno usmeravanje internih revizora na ulaganje napora u otklanjanju svih faktora koji prete da im ugroze nezavisnost i objektivnost.

Ključne reči: *interna revizija, nezavisnost, objektivnost, specifičnosti i napori u obezbeđivanju efektivnosti interne revizije*

FACTA UNIVERSITATIS
Series: **Economics and Organization** Vol. 14, N° 3, 2017, pp. 243 - 253
https://doi.org/10.22190/FUEO1703243J

Review Paper

IMPACT OF TAX POLICIES ON TOURISM COMPETITIVENESS IN SERBIA AND OTHER NEIGHBORING AND EUROPEAN UNION COUNTRIES

UDC 336.2:338.48(497.11:4-672EU)

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Abstract. *Tax policy has a significant impact on the tourism sector, its development, employment, and the decision of tourists to visit a destination. The impact of tax policy on the price of tourism services also reflects on the tourism and travel sector's competitiveness level. The subject of this paper is tax policy in the area of tourism in Serbia and some neighboring and European Union countries (Croatia, Montenegro, Albania, Macedonia, Bulgaria, Slovenia, Hungary, Romania). The aim of the paper is the analysis of tax rates in the tourism sector in the countries under consideration, and the level of tourism sector's competitiveness in terms of the impact of tax policy on business and investment. Methodological basis in this paper relies on the World Economic Forum data (WEF) on Travel & Tourism Competitiveness Index (TTCI). Research has shown unfavorable position of Serbia, as well as most countries in the region, in terms of effects of tax policy on business and investment.*

Key words: *competitiveness, taxes, tourism, hotel management*

JEL Classification: H2, Z32, K34.

INTRODUCTION

The tourism sector is nowadays important for a number of countries in terms of its share in gross domestic product (GDP), employment, foreign exchange inflows, and it also encourages the development of other tourism-related activities. According to the World Travel & Tourism Council (WTTC) for the year 2015, the share of tourism in global GDP was 9.8%, with 284 million people employed, and future growth projections

Received June 01, 2017 / Accepted July 11, 2017
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of 4% per year and employment of 370 million people at a global level by 2026. This means that every ninth job position will be in the tourism sector (WTTC, 2016). The tourism sector is a source of tax revenue, but, on the other hand, the tax policy can significantly foster the development of tourism, investment in the tourism sector, and create multiple development effects. The tax rate on accommodation or in the hospitality industry has a significant impact on tourists' choice of destinations for travel or accommodation. The research subject is the tax policy in the field of tourism in Serbia and other neighbouring and European Union countries. The aim is to analyze the level of tax rates in the tourism sector in Serbia and some countries in the region. In addition, the aim is to look at the achieved level of competitiveness of the tourism sector in terms of the tax policy impact on business and investment.

1. TAX POLICY IN THE FIELD OF TOURISM IN SERBIA AND SOME NEIGHBORING COUNTRIES

One of the important public policies, with a significant impact on the tourism sector, is tax policy. Tax rates have an impact on investment in this industry, prices of tourism products and services, but also tourists' preference to pay higher prices for services. One of the most important factors for tourists when selecting a tourist destination is the price of accommodation and food. Tourists tend to choose countries with more favorable prices. (Dombrovski & Hodžić 2010, p. 137)

Table 1 VAT rate in tourism and hospitality in 2016 (%)

Country	VAT rate in tourism and hospitality	
	Accommodation	Restaurant and catering services
Slovenia	9,5*	*22 (9.5% applies to the preparation of meals)
Croatia	13*	13*
Montenegro	7**	19**
Albania	20****	20****
Macedonia	5***	18
Serbia	10	20
Bulgaria	9*	20*
Hungary	18*	27*
Romania	20 (9% Accommodation provided in hotels and similar establishments, including the letting of places in camping. In case of half board, full board or all-inclusive accommodation, the 9% rate applies to the total price of accommodation which may include alcoholic beverages)*	20 (9% excluding alcoholic beverages other than draft beer)*

*Source: *European Commission, VAT rates applied in the Member States of the European Union, August 2016.*
***Ministry of Sustainable Development and Tourism of Montenegro, http://www.mrt.gov.me/vijesti/164337/Unapredenje-konkurentnosti-Crne-Gore-kao-turisticke-destinacije.html (24.01.2017)*
****Republic of Macedonia, Public Revenue Office, http://www.ujp.gov.mk/s/plakjanje/povlasteni_danocni_stapki (19.01.2017.)*
*****TMF Group, 2016 VAT rate changes in Europe, https://www.tmf-group.com/~/media/files/pdfs/vat%20documents/2016%20vat%20rate%20changes%20in%20europe_table_digital.pdf; there is an on-going debate on reducing VAT in tourism from 20 to 5% (24.01.2017)*

"The rise in tourism competitiveness will increasingly require strengthening efforts to retain existing and attract new visitors. The decisive factor in this regard is the quality of service and the price of the tourism product. The largest expenditure is hotel accommodation, which is substantially determined by the level of fiscal and non-fiscal burdens" (Bratić et al., 2012, p. 256). An increase in tax burdens significantly affects, i.e. endangers the tourism sector (Tax Reform Threatens Tourism, DW). Higher tourism tax rates decrease price competitiveness and competitiveness of the overall business environment for the development of a tourist destination.

The tourism sector is significantly affected by the tax rates on accommodation and hospitality services. Thus, the tax rates for these two types of services are substantially different, with hospitality services usually involving higher tax rates.

In Serbia, the rate of value added tax (VAT) in hospitality industry is 20%, while a special value added tax rate of 10% is applied to accommodation services in accordance with the law governing tourism (Law on Value Added Tax, Article 23).

Based on the analysis of the current VAT rate in the accommodation and hospitality industry in Serbia and analyzed countries (Table 1 and Figure 1), it can be noted that Romania and Albania have the highest VAT rate in the accommodation sector (20%), while the lowest is recorded in Macedonia (5%). The highest VAT rate in the hospitality industry is recorded in Hungary (27%), followed by Slovenia (22%), Romania, Albania, Bulgaria, and Serbia, with 20% each. If one looks at the average level of VAT rates in the observed group of countries, it is evident that Serbia has a lower VAT rate in the accommodation sector in relation to the average of the observed group of countries, and a slightly higher VAT rate in the hospitality industry compared to the average.

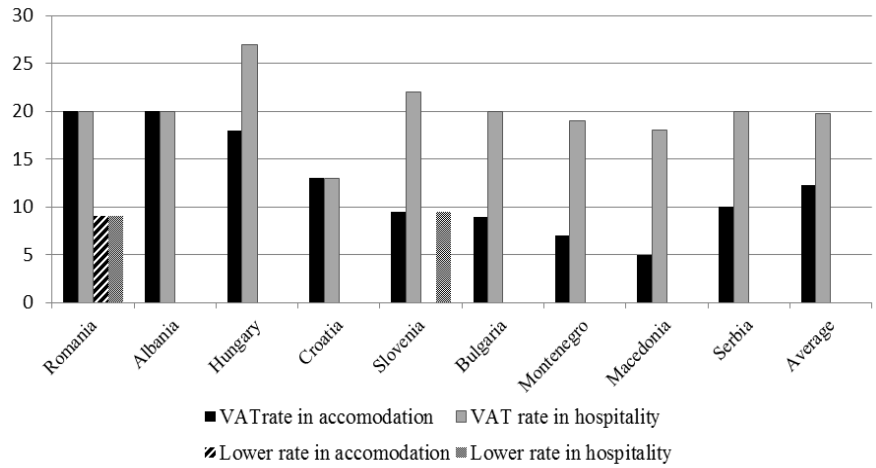

Fig. 1 VAT rates in the accommodation and hospitality industry in Serbia and neighboring countries for the year 2016

A large number of countries which reduced the tourism VAT rate experienced significant benefits. Reducing VAT in the tourism industry lowers prices, stimulates demand, and generates revenue for investment in manpower and tourist facilities (Geoff, 2014).

Referring to a study by Deloitte and Touche in 1998, Bratić, Bejaković, and Devčić (2012) indicate that higher tax burdens lead to a decrease in tourism revenues, while an increase or decrease in the tax rate significantly influences the decision about the destination where tourists travel and the type of accommodation.

Thus, in Montenegro, "in the last ten years, the VAT rate on accommodation in hotels and other similar forms of accommodation has been at the level of 7%, and, in that period, the revenue from tourism has risen from 200 to 800 million euros" (Ministry of Sustainable Development and Tourism of Montenegro, 2017).

The study entitled "Information on the analysis of impact of incentives and tax reliefs in tourism on the economy and public finances of Montenegro in the medium term" analyzes the impact of fiscal incentives to improve tourism competitiveness. "The analysis shows that the application of incentives and tax reliefs in the tourism industry will have a net positive impact on public finances in the amount of 101 million cumulatively over a period of three years (27.7 million euros in 2016, 27.7 million in 2017, and 45.6 million in 2018), generated primarily by the growth of budget revenues in construction and related industry, based on the Ministry of Sustainable Development and Tourism's assumption on the construction and reconstruction of 76 hotels and hybrid hotels with 4 and 5 stars in this period" (Government of Montenegro, 2017).

In Croatia, the "measure to lower the level of VAT was introduced in 2014, thus increasing price competitiveness and investment in the entire sector. Comparing prices in restaurants and hotels in Greece, Italy, and Turkey with Croatia shows that Croatian tourism is competitive. These prices are about 4 percent lower than in Turkey, and even almost 50 percent lower than in Italy" (Cota, 2016).

The reduction of tax rates in the tourism sector has a significant impact on employment. Thus, "the 2012 Deloitte survey indicates that the reduction in the VAT rate on food in French restaurants from 19.6% to 5.5% of 1 July 2009 in the first five quarters after this measure resulted in 28,200 new jobs, and prevented the closure of 15,000 businesses and 30,000 jobs" (Ministry of Sustainable Development and Tourism of Montenegro, 2016). In Ireland, the Ministry of Finance in 2011 reduced VAT in the tourism sector from 13.5% to 9.5%, in order to support tourism and stimulate employment in this sector. The analysis shows that the first 12 months since the introduction of lower tax rates saw an increase in activity in the tourism sector, improved tourists' assessment of services in terms of "value for money", and increase in the number of employees in the tourism sector by about 10,000 (OECD, 2014).

2. THE IMPORTANCE OF TAX POLICY TO IMPROVE THE COMPETITIVENESS OF THE TOURISM SECTOR

Competitiveness of the tourism sector can be monitored by the *Travel and Tourism Competitiveness Index* published by the World Economic Forum. The structure of this Index is composed of four subindices (World Economic Forum, 2015):

1) *Enabling environment*,
2) *Travel and tourism policy and enabling conditions*,
3) *Infrastructure*, and
4) *Natural and cultural resources*.

Travel and Tourism Competitiveness Report of the World Economic Forum for 2015 analyzes the performance of the tourism industry in 141 countries in the world. Table 2 shows scores and ranking of the analyzed group of countries by travel and tourism competitiveness in the period 2009-2015. The top-ranked country is Croatia (33rd in the world), followed by Slovenia (39th), Hungary, Romania, and Montenegro. The lowest ranked countries in the observed group are Macedonia (82nd), Serbia (95th), and Albania (108th place). Serbia has significantly worsened its position in the global list of countries according to the Travel and Tourism Competitiveness Index. Serbian ranking has dropped by as much as 13 positions in 2015, compared to 2011.

Table 2 Travel and Tourism Competitiveness Index in Serbia and observed countries in the period 2009-2015

Country/year	2009		2011		2013		2015	
	Ranking	Score	Ranking	Score	Ranking	Score	Ranking	Score
Slovenia	35	4.53	33	4.64	36	4.58	39	4.17
Croatia	34	4.54	34	4.61	35	4.59	33	4.30
Montenegro	52	4.29	36	4.56	40	4.50	67	3.75
Albania	90	3.68	71	4.01	77	3.97	108	3.22
Macedonia	80	3.81	76	3.96	75	3.98	82	3.50
Serbia	88	3.71	82	3.85	89	3.78	95	3.34
Bulgaria	50	4.30	48	4.39	50	4.38	49	4.05
Hungary	38	4.45	38	4.54	39	4.51	41	4.14
Romania	66	4.04	63	4.17	68	4.04	66	3.78

Source: World Economic Forum, The Travel and Tourism Competitiveness Report 2009, 2011, 2013, 2015, Geneva, Switzerland

Of importance for the analysis of the effects of tax policy on the tourism sector is first the analysis of the observed countries' positions according to the Travel and Tourism Competitiveness Index subindex – *Enabling environment*.

The analyzed subindex, *Enabling environment* for travel and tourism development, comprises five pillars based on which to assess the level of competitiveness:

1. Business environment
2. Safety and security
3. Health and hygiene
4. Human resources and labour market, and
5. ICT readiness (World Economic Forum, 2015, p. 4).

The country with the most favourable environment for travel and tourism development in 2015 is Hungary (33rd in the world), followed by Slovenia and Bulgaria. Serbia, with respect to all the analyzed countries in the region, has the worst environment for travel and tourism development, and is 67th in the world (Table 3).

Table 3 Position of Serbia in relation to observed countries according to the structure of the Travel and Tourism Competitiveness Index in 2015

Country/Travel and Tourism Competitiveness Index Subindices	Enabling environment		Travel & Tourism policy and enabling conditions		Infrastructure		Natural and cultural resources	
	Rank	Score	Rank	Score	Rank	Score	Rank	Score
Slovenia	42	5.21	25	4.43	42	4.43	53	2.64
Croatia	52	5.08	39	4.33	38	4.54	30	3.23
Montenegro	56	5.01	91	3.95	47	4.12	105	1.93
Albania	49	4.68	122	3.59	90	3.04	135	1.59
Macedonia	49	5.11	110	3.74	74	3.41	125	1.72
Serbia	67	4.72	113	3.71	81	3.19	122	1.75
Bulgaria	46	5.13	22	4.44	52	3.93	48	2.70
Hungary	33	5.28	2	4.76	48	4.06	62	2.47
Romania	59	4.88	35	4.37	71	3.49	66	2.38

Source: World Economic Forum, 2015.
The Travel and Tourism Competitiveness Report 2015, Geneva, Switzerland

Table 4 provides an overview of scores and rankings of Serbia and observed countries according to the *Business environment* pillar. Serbia has the worst ranking in relation to all analyzed countries by this parameter of competitiveness as well. Specifically, Serbia is in the 133rd place in the world (out of 141 countries) by competitiveness of business environment for tourism development. This shows that Serbia is not competitive, compared to other countries, according to the business environment that should enable tourism development.

Table 4 Position of Serbia in relation to observed countries according to the *Business environment* pillar within the *Enabling environment* subindex in 2015

Country	Enabling environment subindex pillar – Business environment	
	Rank	Score
Slovenia	106	4.03
Croatia	125	3.65
Montenegro	73	4.39
Albania	93	4.11
Macedonia	34	4.87
Serbia	133	3.38
Bulgaria	85	4.22
Hungary	79	4.28
Romania	90	4.11

Source: World Economic Forum, 2015.
The Travel and Tourism Competitiveness Report 2015, Geneva, Switzerland

In the observed group of countries, the best business environment for travel and tourism development is found in Macedonia, Montenegro, and Hungary. The least favourable business environment is in Serbia and Croatia.

The mean value of the *Business environment* pillar for the countries of Southern and Western Europe is 4.56. Besides Macedonia, whose *Business environment* pillar value is

above the average among the countries of Western and Southern Europe (4.87), all other countries observed have a lower score of business environment for the performance of tourism activity. In the observed group of countries, as well as among all the countries of Western and Southern Europe, the worst ranked business environment is in Serbia. Hungary, Bulgaria, and Romania belong to the group of countries of Northern and Eastern Europe whose *Business environment* pillar mean value is 4.72. Values of the pillar for these three countries are below the average for the group of countries of Northern and Eastern Europe.

The *Business environment* pillar within the subindex *Enabling environment* is composed of 12 indicators. These indicators are used to identify the extent to which business environment is favourable in a country, including environment for travel and tourism activities. Thus, some business environment indicators are property rights, time required for obtaining building permits, which is especially important for tourism development, time required to start a business, business start-up costs, scope and effects of taxation on incentives to work, scope and effects of taxation on incentives to invest, level of tax rates (World Economic Forum, 2015, p. 6).

Table 5 Position of Serbia compared to observed countries, according to some *Business environment* pillar indicators in 2015

Country/Indicators	Effect of taxation on incentives to work		Effect of taxation on incentives to invest	
	Rank	Score	Ran	Score
Slovenia	134	2.5	132	2.8
Croatia	139	2.2	139	2.1
Montenegro	63	3.7	43	4.0
Albania	52	3.8	82	3.6
Macedonia	19	4.4	19	4.5
Serbia	133	2.6	134	2.7
Bulgaria	89	3.4	80	3.6
Hungary	126	2.8	131	2.8
Romania	137	2.5	126	2.9

Source: World Economic Forum, 2015.
The Travel and Tourism Competitiveness Report 2015, Geneva, Switzerland

The position of Serbia, as well as most countries in the region, is unfavourable in terms of effects of taxation on incentives to work (Table 5). The score of the *Effect of taxation on incentives to work* indicator is obtained based on the World Economic Forum research, in an answer to the question: "To what extent do taxes affect reduction in business activity in your country?" The answer scores range from 1 to 7. Score 1 is given in situation when taxes significantly affect business activity reduction, while 7 means that taxes do not affect business activity reduction. The score of the *Effect of taxation on incentives to invest* indicator is also obtained through research and answer to the question: "To what extent do taxes affect reduction of investment activity in your country?" (World Economic Forum, 2015, p. 484)

Specifically, Serbia is 133rd in the world (compared to 141 nations) by effects of tax policy on business. Poor ranking in the observed group of countries is also recorded in Hungary (126th place), Slovenia (134th place), Romania (137th place), Croatia (139th place). Top ranked countries by effects of tax policy on business are Macedonia (19th), Albania (52nd), and Montenegro (63rd place).

The effects of tax policy on investment are unfavourable in Serbia (134th place in the world), Croatia (139th place), Slovenia (132nd place), Hungary (131st place). These countries are among the last 10 countries in the world by effects of tax policy on investment. This indicates that Serbia has no competitive advantage when it comes to tax policy and its effects on tourism development.

Business environment with stimulating tax policy is of particular importance for business and investment in the field of tourism. Thus, there is a need to introduce various forms of incentives and tax reliefs to stimulate new investment and projects that bring new jobs in the tourism industry. "In order to increase tourism competitiveness, it is necessary to continuously monitor the effects of the existing fiscal burdens and evaluate opportunities to reduce them (especially when it comes to: VAT on accommodation used by foreign tourists, income tax, tax on salaries and other employee benefits, salary contribution, exemption from payment of utilities and other payments, etc.) or eliminate them" (Čerović et al. 2015, p. 6).

3. TAX INCENTIVES IN THE FIELD OF TOURISM IN SERBIA

To ensure economic growth, development of small and medium-sized enterprises, concession investment, employment and better ecological situation, there are various tax incentives (Radičević & Raičević, 2008, p. 143). Of importance to encouraging the development of the tourist industry is the existence of stimulating tax provisions in the *Law on Corporate Income Tax, Law on Personal Income Tax*, and *Law on Mandatory Social Insurance Contributions*.

Law on Corporate Income Tax (Law on Corporate Income Tax) prescribes specific incentives that apply to tax reliefs and incentives for investment. Article 50a of this Law stipulates that "a taxpayer who invests in their own fixed assets, i.e. in whose fixed assets another entity invests more than a billion dinars, uses these funds to conduct primary activity and activities listed in the founding act of the taxpayer, i.e. listed in another act of the taxpayer, which defines activities that the taxpayer performs in the investment period, employs permanently at least 100 people, is exempt from paying corporate income tax for a period of ten years in proportion to the investment". However, to benefit from this tax relief, enterprises in the tourism sector, with less than 100 employees, may find the listed preconditions difficult to achieve.

Although tax incentives are introduced in order to increase the volume of economic activities, the income tax reform abolished some tax benefits that a large number of tourist companies could use, such as incentives for businesses operating in undeveloped areas, tax credit for companies that perform activities of special interest, and so on. Thus, in 2012, Article 47 of the *Law on Corporate Income Tax* was repealed, which allowed taxpayers to reduce profit generated in the newly established business unit in underdeveloped areas by corporate income tax for a period of two years, in proportion to the share of such realized profits in total company profits (Law on Corporate Income Tax Law).

The most important amendment to the *Law on Corporate Income Tax*, adopted in May 2013, was abolition of the right to tax credit on investment in fixed assets. The importance that both the above-mentioned allowances had to a large number of tourist legal entities was reflected in both the freedom of the amount of investment, and in no requirement regarding the number of employees.

No less significant was tax relief abolished in 2010, which was defined in Article 49 of the same law. A taxpayer who employed new workers for an indefinite period of time was allowed to reduce the calculated tax by the amount equal to the amount of 100% of gross wages, i.e. salaries, paid to these employees, plus accrued public revenues paid by the employer. Tax credit was recognized for a period of two years from the date of employment, provided that during that period the number of employees did not decrease, and that the taxpayer in the 12 months prior to the date of employment did not decrease the number of employees.

Looking at the abolition of explained tax relief, and considering applicable tax incentives included in the *Law on Corporate Income Tax*, it can be noted that tax reliefs are poorly applicable in companies in the field of tourism. As tax reliefs in this law are used in order to build competitiveness, it is necessary to redesign them in the field of income taxation, without compromising the attractiveness of the tax system.

Law on Alterations and Amendments to the Law on Personal Income Tax and *Law on Alterations and Amendments to the Law on Mandatory Social Insurance Contributions*, published in the "Official Gazette of RS", No. 112/2015, entered into force and applies as of 1 January 2016, except for certain provisions.

The newly added Article 21d of the *Law on Personal Income Tax* (Law on Personal Income Tax) and the newly added Article 45v of the *Law on Mandatory Social Insurance Contributions* (Law on Mandatory Social Insurance Contributions) prescribe new incentives for employers who employ workers. Tax relief consists in the right to a refund of 75% of tax paid on earnings and 75% of paid contributions, paid by the employee and the employer, for the newly employed person, up to and including earnings paid by 31 December 2017. This means that 75% of income tax and 75% of all contributions, both at the expense of the employer, and at the expense of the employee, are subsidized.

These reliefs can be used by employers, i.e. legal entities, which are, according to accounting regulations, classified as small and micro legal entities and entrepreneurs, according to Paragraph 1 of Article 21v of the Law on Personal Income Tax. To get these benefits, i.e. a refund of taxes and contributions, employers need to employ at least two new workers, in relation to the number of employees that the employer had on 31 October 2015, in line with Paragraph 5 of Article 21v of the *Law on Personal Income Tax*.

In Serbia, there has been an increase in the tax rate, so the income tax rate increased from 10% to 15%, the VAT rate on accommodation increased from 8% to 10%, while the VAT rate on food and drink increased from 18% to 20%. To encourage investment and overall tourism activity, it is certainly necessary to examine the possibilities of reducing tax burdens, which would also contribute to improving the competitive position of Serbia as a tourist destination.

CONCLUSION

For a large number of countries, tourism is a significant source of budget revenue. The tourism sector is sensitive to changes in tax policy, especially to price changes influenced by changes in taxes. Tax burden has an impact on investment in this industry, prices of tourism products and services, but also tourists' preference for a specific destination. A large number of countries in the region (bearing in mind that some are EU members),

which have reduced the VAT rate in tourism, experienced significant benefits in the form of enhanced tourist activities, increased employment, and increased price competitiveness and competitiveness of the entire tourism sector.

The position of Serbia, as well as of most countries in the region, is unfavourable in terms of the effects of tax policy on business and investment. Serbia is in the 133rd place in the world (compared to 141 countries) by effects of tax policy on business. Serbia, Croatia, Slovenia, and Hungary are among the last 10 countries in the world by effects of tax policy on investment. This indicates that Serbia has no competitive advantage when it comes to tax policy and its effects on the development of tourism.

Tax reliefs and other incentives that may be prescribed by legislation are important to encourage the development of the tourism sector. Thus, the Law on Corporate Income Tax Law in Serbia prescribes specific incentives relating to tax exemptions and incentives for investment. The Law on Personal Income Tax and the Law on Mandatory Social Insurance Contributions prescribe reliefs for employers who hire new workers. Prescribed benefits can be used by companies in the field of tourism, but there is a requirement regarding the amount of investment and the number of new employees which companies in the tourism industry can hardly fulfill. At the same time, some incentives relevant to the tourism sector have been repealed.

To improve the competitive position of Serbia as a tourist destination, there is certainly a need to examine the possibilities of reducing tax burdens, which would encourage investment, total tourism activities, as well as tourism-related activities.

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UTICAJ PORESKE POLITIKE NA KONKURENTNOST TURIZMA U SRBIJI I NEKIM ZEMLJAMA U OKRUŽENJU I EVROPSKE UNIJE

Poreska politika ima značajan uticaj na poslovanje turističkog sektora, njegov razvoj, zaposlenost, ali i na odluku turista o poseti neke destinacije. Uticaj poreske politike na visinu cena usluga u turizmu odražava se i na nivo konkurentnosti sektora turizma i putovanja. Predmet istraživanja u ovom radu jeste poreska politika u oblasti turizma u Srbiji i zemljama u okruženju, od kojih su neke članice Evropske unije (Hrvatska, Crna Gora, Albanija, Makedonija, Bugarska, Slovenija. Mađarska, Rumunija). Cilj rada je analiza stope poreza u sektoru turizma u analiziranim zemljama i sagledavanje nivoa konkurentnosti turističkih privreda sa aspekta uticaja poreske politike na podsticanje poslovanja i podsticanje investicija. Metodološku osnovu u ovom radu čine podaci Svetskog ekonomskog foruma (World Economic Forum – WEF) o Indeksu konkurentnosti turizma i putovanja (Travel & Tourism Competitiveness Index – TTCI). Istraživanje je pokazalo da je pozicija Srbije, ali i većine zemalja u okruženju nepovoljna sa aspekta efekata poreske politike na podsticanje poslovanja i podsticanje investicija.

Ključne reči: *konkurentnost, porezi, turizam, hotelijerstvo.*

FACTA UNIVERSITATIS
Series: **Economics and Organization** Vol. 14, N° 3, 2017, pp. 255 - 264
https://doi.org/10.22190/FUEO1703255L

Review Paper

THE IMPACT OF BIG DATA TECHNOLOGIES ON COMPETITIVE ADVANTAGE OF COMPANIES

UDC 004.6:339.137.2

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Abstract. *The emergence of a large quantity of data, from various sources, available in real-time, known as Big Data, has stimulated development of new technologies, techniques, tools, knowledge and skills, which enable us to work with this data. Big Data represents not only a factor from the environment that confronts the companies with an avalanche of data, but also a very imporant resource which provides opportunities for companies to make value on the basis of collected data. Characteristics and possibilities which Big Data technologies offer have positioned them as a valuable factor for gaining and sustaining the competitive advantage of companies. The aim of this paper is to examine the impact of Big Data technologies on competitive advantage of the companies that use them.*

Key words: *Big Data, Big Data Analytics, competitive advantage, strategic activities, companies*

JEL Classification: 033, L21

INTRODUCTION

The development and application of various social networks, smart phones, tablets and intelligent devices connected with sensors have lead to an enormous increase of the volume and variety of data which have become available for processing and analysis in real-time (Heisterberg & Verma, 2014). All that data were named as „Big Data" and caused the development of new technologies, techniques and tools that have the possibility to acquire, process, analyze and store them. Through history companies have striven to get regular and reliable information, but today in a hyper-networked world, they have realized

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the importance of Big Data for their functioning and started to implement some of the Big Data solutions. The aim of this paper is to examine the impact of Big Data technologies on competitive advantage of the companies that use them.

The paper is organized as follows. The first two headings are focused on Big Data definitions, key characteristics, technologies and tools. The fourth and fifth headings are focused on the impact of Big Data technologies on functioning of companies and on key advantages that companies can gain by using those technologies.

1. BIG DATA DEFINITION

By reviewing the literature, numerous definitions regarding Big Data can be found (Lukić, 2015). One of the most accepted and cited is the McKinsey definition, according to which Big Data refers to datasets whose size is beyond the ability of typical database software tools to capture, store, manage, and analyze data (Manyika et al., 2011, p. 1). However, Big Data as a concept is not just a matter of size and challenges for working with these data cannot be overcome with larger storage space and proccesors (Lukić, 2015). The facts that data are largely semi-structured or unstructured and that these data represent 95% of all new data are often neglected (Berman, 2013, p. 2). Some authors pointed out that Big Data represents large quantities of structured, semi-structured and unstructured data that cannot be placed in relational databases (Rouse, 2014), while others stated that Big Data represents data sets whose size and complexity need innovative and special approaches for storing, managing, processing, analyzing and visualization of these data (Chen et al., 2012).

Some attributes that need to exist in order to name data as Big Data are determined over time. These attributes vary from author to author, but there is a consensus among all the authors around three attributes, popularly known as 3Vs: Volume, Variety and Velocity (McAfee & Brynjolfsson, 2012; Minelli et al., 2013). Volume is the huge amount of data that companies are trying to use in order to improve the decision making process across the enterprise. Nowadays, companies measure their collected data in terabytes, petabytes and zettabytes, and there are estimations that people create 2.5 quintillion bytes of data on a daily basis (Walker, 2015). Variety, as the second attribute of Big Data, refers to different types of data because data are available from numerous sources (social networks, digital TV, credit cards, medical devices, sensors, bar codes, smart phones, tablets, etc.) and can be structured, semi-structured and unstructured (Minelli et al., 2013; Kudyba & Kwatinetz, 2014). The third attribute of Big Data, Velocity, is the speed at which data are created, processed and analyzed and reflects the need for real-time decision making on the basis of collected data (McAfee & Brynjolfsson, 2012; Minelli et al., 2013). Beside these three attributes of Big Data, some authors propose Volume as the fourth „V“ in the sense that there can be revealed significant values for companies through analysis of data, while some other authors propose Veracity which refers to questions of consistency, relevance and quality of all available data (Schroeck et al., 2012). It is important to acknowledge that Big Data is not just one of the newest trends in information and communication technologies, but a significant and valuable factor of competitiveness of any company which is surrounded by an avalanche of data (Nerney, 2013; Hagen et al., 2013). In practice, there are no industries or sectors that are immune

to Big Data, because everything we do now leaves a digital trace – data that can be used (Marr, 2015). A few events gave legitimacy and significance to Big Data. McKinsey Institute pubslished a report „*Big Data: The Next Frontier for Innovation, Competition and Productivity"* in 2011, The World Economic Forum held a conference „*Big Data, Big Impact: New Possibilities for International Development*" in 2012, while in the last couple of years a large number of books regarding Big Data impact on productivity and competitiveness of companies has been published (Mayer-Schönberger & Cukier, 2013; Van Rijmenam, 2014; Wasterman et al., 2014; Marr, 2016). Simultaneously, Big Data has become the subject of numerous media (The Economist, New York Times, National Public Radio), leading publishers have introduced new journals regarding Big Data topics [Journal of Big Data (*Springer*), Big Data Research (*Elsevier*), Big Data and Society (*Sage*), International Journal of Big Data Intelligence (*InterScience Publishers*)], while existing journals frequently publish calls for papers regarding Big Data technologies (Journal of Organization Design, Journal of Information Systems and e-Business Management, Journal of Biomedical and Health Informatics, etc.). Meanwhile, conferences on Big Data started to be organized worldwide, but also in our region.[2] In just a few years, Big Data as a concept has entered the scene and become the subject of interest of countries, academics, communities, individuals. The number of faculties, educational institutions and consulting companies which offer different educational programs and trainings in the field of Big Data is also increasing. Because of all of this, Big Data technologies have found their place not just in theory, but also in practice.

2. BIG DATA TECHNOLOGIES AND TECHNIQUES

There are a number of technologies that are developed to work with Big Data. It is believed that at the beginning of the 2000s Google developed tools for Big Data and encouraged the emergence of other technologies and tools that enable collection, processing, analysis and storage of large quantities of different types of data in real-time in a more economical way (Heisterberg & Verma, 2014). Some of these technologies are new, while some of them already existed but were upgraded in order to be able to work with Big Data. Different authors classify Big Data technologies in different ways. There is no single list of all available technologies for working with Big Data because their number is constantly changing - there are new technologies almost every day. Also, a lot of these technologies overlap or are interdependent. Without intending to cover all existing technologies for working with Big Data, in Table 1 are presented some of them, according to Joshi who classified those technologies into several segments – Big Data platforms, databases, business intelligence, data mining, file systems, programming languages, search, aggregation and transfer of data.

[2] Significant conferences and forums devoted to Big Data were organized in Belgrade: Conference „Big Data Analytics for Decision-Making" in May 2015 at the Faculty of Organizational Sciences, forum „South-East European Forum on Data Science" in June 2016 at the Faculty of Organizational Sciences, and Data Science Conferences (organized by Institute of Modern Sciences) were held in October 2015 and 2016.

Table 1 The review of available Big Data technologies

Segment	Technologies
Big Data platforms and tools	Hadoop, MapReduce, GridGain, HPCC, Storm
Databases/ warehouses	Cassandra, Hbase (Hadoop tools), MongoDB, Neo4j, CouchDB, OrientDB, Terrastore, FlockDB, Hibari, Riak, Hypertable, BigData, Hive (Hadoop tools), InfoBright Community Edition, Infinispan, Redis
Business Intelligence	Talendchn, Jaspersoft, Palo BI Suite/Jedox, Pentaho, SpagoBI, KNIME, BIRT/Actuate
Data Mining	RapidMiner/, Rapid Analytics, Mahout (Hadoop tools), Orange, Weka, jHepWork, KEEL, SPMF, Rattle
File Systems	HDFS (Hadoop Distributed File System)
Programming Languages	Pig/Pig Latin, R, ECL
Big Data Search	Lucene, Solr
Data Aggregation and Transfer	Sqoop (Hadoop tools), Flume (Hadoop tools), Chukwa
Various Big Data tools	Terracotta, Avro, Oozie, Zookeeper

Source:Adapted according to Joshi, P. (2015). Analyzing Big Data Tools and Deployment Platforms. International Journal of Multidisciplinary Approach and Studies, 2(2), 45-56.

The most frequently used technologies for working with Big Data are Hadoop, Map Reduce and Big Table which provide opportunities for prompt and effective processing of large amounts of data in real-time or near real-time (Khan et al., 2014).

In the last couple of years, there is a rise of interest on the impact of Big Data analytics which represents the usage of various analytical techniques on large amounts of data from different sources in order to discover hidden patterns, regularities and other useful information (Daft, 2015). There are some important differences between traditional analytics and Big Data analytics. Those differences are presented in Table 2.

Table 2 The key differences between traditional and Big Data analytics

Characteristics	Traditional Analytics	Big Data Analytics
Key data characteristics	Structured data Typical data volume is measured with megabytes and gigabytes	Any type of data: structured, semi-structured and unstructured Typical data volume is measured with terabytes and petabytes
The object of analysis	The sample from known population	Entire population
Facts and findings	Answers on already defined questions	New and unespected findings and facts
Necessary knowledge	Knowledge of analytical techniques and tools, basic knowledge of reporting	Advanced analytical, mathematical, statistical and computer knowledge

Source: Adapted according to Yan, J. (2013). Big Data, Bigger Opportunities, Retrieved from: http://www.meritalk.com/pdfs/bdx/bdx-whitepaper-090413.pdf, Accessed on: 05 November 2014.

As presented in Table 2, the key characteristics of data are significantly changed, data are largely unstructured, present in large quantities and available in real-time. The subject of analysis is extended from the sample to the entire population, while answers are provided to questions that companies were not able to recognize as meaningful for their

functioning. Due to this fact, there is a need for new and different types of thinking on how to gain value on the basis of available data (Taylor et al., 2014). The solution has been found in numerous techniques for analytical processing of data that derive more disciplines including computing, mathematics, statistics and economics. Some of the most frequently used techniques originate from machine learning, neural networks, social networks analysis, optimization methods and similar (Chen & Zhang, 2014). Manyika et al. (2011) made a list of Big Data analytics techniques in which they classified: A/B testing, association rules, classification, clustering, genetic algorithms, machine learning, neural networks, predictive modeling, regression, signal processing, spatial analysis, simulation, time series analysis. Some of the most frequently used algorithms are (Erl et al., 2016):

- Association rule learning presents an algorithm for identifying the connections and relationships among variables. One common application is in retail when this technique detects which products are frequently bought together.
- Classification presents an algorithm that identifies to which category of data belongs some generated information. With this techniques, companies are able to make special customer segments and monitor their behavior.
- Clustering has the goal to classify various objects into groups/clusters based on some common characteristics, for example, classification of customers into groups based on their behavior and adjustment of marketing activities.

In the past few years various software solutions have been developed for visualization of results, because the manner in which results are presented is very important for their analysis and interpretation. It is easier to examine given results and to make conclusions using different tables, graphs and figures. Some of the most popular visualization techniques are (Olshannikova et al., 2015):

- Tag cloud which is used during the analysis of text and refers to the frequency of the usage of certain words or phrases.
- Clustergram is used in cluster analysis and displays the connections and relationships among individual elements in the data depending on the cluster to which they belong.
- Motion charts represent a large number of different data on two-dimensional graphs.

Very frequently used in practice are Heat Maps which present desired results according to provided categories – for example location, brand, market, sales manager and similar. Also, Dashboards are very popular because they provide results of all analyses that users want in one place.

3. The Impact of Big Data Technologies on Functioning of Companies

The potential for strategic value creation based on data has always existed, but today this potential is much larger due to all available data and new technological opportunities for handling them. According to Porter and Millar, information can affect competition by changing industry structure and rules of competition, by giving companies new ways to be better than rivals, and by opportunities to introduce new business models (Porter & Millar, 1985). In the last couple of years, data have been named as the new frontier for innovation, competitiveness and productivity (Manyika et al., 2011), the resource responsible for management revolution (McAfee & Brynjolfsson, 2012), the resource equal to oil and gold (Bilbao-Osorio et al., 2014), and the key determinant for innovation

and creative destruction (Pepper & Garrity, 2014). These attitudes regarding the importance of data are very frequently expressed, because modern companies have become overwhelmed with data, the amount of which is increasing each year by 35% to 50% (Beath et al., 2012). Also, unlike the time when it was possible for information technologies to work only with quantitative data while all other information was not possible to use (Drucker, 2002), in the last few years, due to Big Data technologies, it becomes possible to interpret even data in the qualitative form. Mayer-Schönberger and Cukier introduced the term „datafication" in 2013 with the aim to describe the process of collecting all available data and their transformation into valuable business decisions (Mayer-Schönberger & Cukier, 2013).

On the one hand, Big Data technologies are the factor from environment that confronts the companies with large quantities of data from a variety of sources, while on the other hand those technologies represent the resource of organization which allows the companies that use them to make value on the basis of collected data (Lukić, 2016). Companies which operate in a highly competitive environment must be able to cope with the constantly changing conditions (Janaćković, Milovanović & Milovanović, 2016). The key question which needs to be examined through implementation of Big Data technologies is whether these technologies fundamentally change the business model of a company by creating new business opportunities or if they improve the existing business model (Morabito, 2015; Stackowiak et al., 2015). The managements of organizations need to answer the following questions (Kiron et al., 2014):

- Is the company ready for new ideas?
- Is the company ready to change the way in which it functions?
- Does the company consider data as a valuable resource for its functioning?
- In which way do the employees need to be encouraged to be led by data in the decision making process?

5. THE KEY ADVANTAGES OF USING BIG DATA TECHNOLOGIES

Big Data technologies offer new opportunities for growth and development, but also for the creation of new companies whose business model is based on data (McGuire et al., 2012). Having in mind that customer perspective has become integrated in all processes and activities in a company (Dehghan et al., 2015), and that strategies related to creation of new products or services are based on analysis of information related to customer needs (Stefanovska & Soluncevski, 2015), the application of Big Data can be of tremendous value not only for retaining the existing customers, but for identifying and attracting new ones. The companies that use Big Data technologies can better understand their customers, employees, business processes, partners and identify all those activities in which improvements are needed (Adduci et al., 2011; Wamba et al., 2015).

There are few characteristics of Big Data technologies that can be very useful to companies that use them (Manyika et al., 2011, pp. 4-6):

- Transparency. All data that exist inside and outside the company become available in one place, so the company can establish „one version of the truth". Employees can easily find data which they need in one location, which consequently leads to savings in time and effort.

- Experimentation in order to identify different needs of customers and to create more custom products and services. Companies can collect more detailed data about customers, their opinions and attitudes about products and services. Thanks to different analytical techniques, companies can examine the effects of certain improvements in products and services.
- Identification of different customer segments in order to adjust products and services according to their needs and requirements. By creating different customer segments, companies gain a clearer picture of how they can meet customer needs better, and thus have a basis not only for improvement of existing products and services, but for the creation of new ones. Segmentation may be based on the large number of different criteria – income, age, location, buying habits, etc. (Kiron et al., 2011).
- Support for decision making process with automated algorithms. Sophisticated software has the possibility to improve the decision making process with automated algorithms which automatically analyze collected data and initiate corrective actions. The application of controlled experiments to test hypotheses and analyze the results of the decisions made, can significanly improve the decision making process (McGuire et al., 2012). Many authors pointed out that one of the significant changes is a shift from intuitive decision making to data driven decision making (Provost & Fawcett, 2013; Minelli et al., 2014).
- Improvement of existing products and services and the introduction of new ones. By identifying certain relationships in data, companies can realize important facts about products and services. The results of the analysis can be a new product, service, improvement of existing product or service, a new approach to pricing, etc. (Davenport, 2014).

The application of Big Data technologies requires from company's management to be focused on activities related to customers, products, processes in order to optimize the key activities and identify new opportunities for further growth and development. The key objectives that companies want to achieve by using Big Data technologies are: identifying new sources of revenue, cost reduction, better sales, distribution, marketing activities (Schmarzo, 2013). Besides that, Big Data technologies have a great impact on the decision making process. Decision makers want to have the right data at the right time and in the right format (Power, 2015), so the decisions can be based on data, leaving intuition and gut feeling aside (Provost & Fawcett, 2013). Morabito emphasized that due to the application of Big Data technologies it is possible to: (1) improve the decision making process; (2) improve business performance in the entire company; (3) develop integrated access to key information and data (Morabito, 2015). Furthermore, Big Data technologies create opportunities for more precise adjustment of products and services because companies can monitor data for each customer individually and consider their buying habits, location, response to incentives, demographic characteristics such as business, memberships in various organizations, opinions and attitudes on social networks, blogs and forums (Morabito, 2015). Consequently, Big Data technologies have an impact on strategic and operational activities of companies (Table 3).

Table 3 Key impacts of Big Data technologies on strategic and operational activities

Impacts	Benefits	Examples
Strategic Activities	Faster decisions	Faster strategic decisions
	Better decisions	Advanced and precise data analysis
		Assessment of the effects of made decisions
		Quantified impact of decisions which are made
	Proactive decisions	Application of predictive analytics to identify potential customers
Operational Activities	The improvement of organizational capabilities	Finding the causes of problems and making proposals for their overcoming
		The release of employees from the activities that have small value
	Increased Automation	Reduction of effort needed for reporting
		The release of management from activities that have small value
	Elimination of redudant tools	Elimination of all redundant tools for data collection, processing, reporting and analysis
	Speeding up the processes	Transparency of all information and data regarding processes

Source: Adapted according to Hagen, C., Ciobo, M., Wall, D., Yadav, A., Khan, K., Miller J., Evans, H. et al. (2013). Big Data and the Creative Destructions of Today's Business Models, A.T. Kearney Inc.

Regarding strategic activities of companies, Big Data technologies have a large impact on the decision making process, because due to their application decisions are faster, better and proactive. Beside strategic, operational activities are also under the impact of Big Data technologies, firstly through automation and improvement of business processes, but also through development of organizational capabilities for solving problems and elimination of activities with small added value.

CONCLUSION

Technology progress caused generation of data with high volume, velocity, and variety, known as Big Data, which are available in each industry and company. These data have stimulated the development of new technologies, techniques and tools that are able to collect, process, analyze and store them. Companies that realized the potential for value creation on the basis of collected data, started to implement some of the Big Data solutions. In this paper are examined the key impacts of Big Data technologies on competitive advantage of the companies that use them. Transparency, identification of new customer segments, support for the decision making process with automated algorithms, improvement of the existing products and services, and introduction of new ones are among the key advantages that companies can gain. Consequently, Big Data technologies have lead to better strategic and operational activities in companies and become an important factor of their competitiveness. Any aspect of further investigation of the impact of Big Data technologies on competitive advantage of companies may be of great benefit not only for managers, but also for all employees who work with those technologies. One of the important questions that requires further investigation is to identify which factors are necessary for successful use of Big Data technologies in companies, because technology on its own, without broader purview about other factors will not have great benefits.

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UTICAJ TEHNOLOGIJA ZA RAD SA VELIKIM OBIMOM PODATAKA NA KONKURENTSKU PREDNOST KOMPANIJA

Pojava velikih količina podataka koji potiču iz različitih izvora i koji su dostupni u realnom vremenu, stimulisala je razvoj novih tehnologija, tehnika, alata, znanja i veština koje omogućavaju rad sa njima. Velike količine podataka i tehnologije za rad sa njima predstavljaju značajan resurs koji kompanijama koje ih primenjuju omogućava da na osnovu raspoloživih podataka kreiraju vrednost. Karakteristike i mogućnosti koje tehnologije za rad sa velikim obimom podataka pružaju pozicionirale su ih na mesto važnog faktora za sticanje i održavanje konkurentske prednosti kompanija. Cilj ovog rada jeste da ukaže na koji način primena tehnologija za rad sa velikim obimom podataka utiče na konkurentsku prednost kompanija.

Ključne reči: *veliki podaci, analitika velikih podataka, konkurentska prednost, strategijske aktivnosti, kompanije*

FACTA UNIVERSITATIS
Series: **Economics and Organization** Vol. 14, N° 3, 2017, pp. 265 - 279
https://doi.org/10.22190/FUEO1703265R

Review Paper

HELIANT HEALTH INFORMATION SYSTEM AS A SUPPORT TO ELECTRONIC BUSINESS OF HEALTHCARE ORGANIZATIONS IN SERBIA

UDC 004:614.2(497.11)

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Abstract. *Electronic business of healthcare organizations is a specific technological innovation when it comes to providing adequate healthcare services. The process of providing healthcare services in this case is supported by electronic health record, which is an integral part of health information systems. Monitoring of the healthcare services providing process using tools of electronic health (e-health) in this paper, will be based on the software for graphical modelling, which will target key activities, participants and variables of the process, and make its mapping. This is because the analysis of electronic business processes of healthcare organizations reveals activities that can be cost-optimized for more efficient delivery of health services and faster response on the patient's condition. In this work, process analysis was conducted on the case of health information system Heliant Health, which is used in most public medical institutions of the Republic of Serbia.*

Key words: *electronic business, electronic health, electronic health record, process analysis, healthcare organizations*

JEL Classification: C63, I10, M15, P36

INTRODUCTION

Research motivation for writing this paper is the problem of implementation, use and development of integrated health information systems in the Republic of Serbia. A special attention in this paper relates to Heliant Health, a health information system that is used in local healthcare centers, hospitals and most clinics on the territory of the Republic of

Received March 8, 2017 / Revised May 02, 2017/ Revised June 23, 2017 / Accepted July 05, 2017
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Serbia. Its functioning will be analyzed in the light of compatibility with the International standard for health information systems Health Level Seven- HL7, which provides basic guidelines for networking, communication and monitoring of the patient health condition, by all participants in the process of providing healthcare services, at the primary, secondary and tertiary level.

One of the major research problems in this paper is analyzing the efficiency and interoperability of business processes, providing healthcare services. Using one of the most popular norms of graphic process modelling Business Process Modelling Notation 2.0 (BPMN 2.0), with the addition of a Gantt chart of all electronic activities providing healthcare services, we will analyze the functioning of the health information system (HIS) Heliant Health, used in the Republic of Serbia and its comparison with the HL7 concept. Also, this paper deals with the analysis of the medical treatments at all levels of healthcare protection which is supported by electronic health record information as an important tool in the patient's treatment. All of this aims to detect any distortion in the execution of the healthcare organizations business processes, and make recommendations for improvement and increasing efficiency in patient treatment, a better integration of health stuff and save time and resources providing healthcare services.

One of the key problems related to Heliant Health, in the context of the standard HL7, is primarily the absence of network and disconnection of some of the participants in the process of providing healthcare services using electronic health records, which leads to delays in treatment and effective monitoring of the patient and timely response in case of urgent situations. The connection between participants in the process of providing healthcare at the primary, secondary and tertiary levels can be achieved by adjusting the Heliant Health process to HL7 standards. Also, it is possible to implement changes to improve the process of providing healthcare services through the Health Heliant, in order to achieve compatibility with the HL7 standards.

1. Methodology and Literature Review

Research methodology in order to obtain the appropriate results and answers of setting hypothesis of the paper will be based on BPMN modelling. Specifically, using BPMN in this paper will be created the process of providing healthcare services at the primary, secondary and tertiary levels with the support of the electronic card based on the current situation in the Republic of Serbia, using Heliant Health health information System. Also, through the process modelling will be given a proposal for improving the provision of healthcare services. On the other hand, using a Gantt chart created on the basis of BPMN process, you should become familiar with the activities duration of providing healthcare services process and their percentage contribution to carry out the process of providing healthcare services supported by Heliant Health. On the basis of their (in)compatibility we will give proposals for improving the integration of the participants, in order to achieve the standard HL7 and provided even international cooperation in delivery of healthcare services, of course with the support of information from electronic medical record. In addition, the methodology used in this work will be explained in detail using BPMN tools.

Electronic health as a growing research field in both the public and private health sector, as well as in e-business and IT, shows the importance of developing a service-oriented architecture of information systems associated with web. This resulted in the number of papers that aim to analyze e-business models of healthcare organization and bridge the gap between theory and practice. In order to understanding business objectives of healthcare organizations in their work Alahmadi, Soh and Ullah, analyzed the entire flow of the providing healthcare services process and its main features (Alahmadi et al., 2014). On the other hand, the laying of foundations, both in literature and in practice with regard to the development of e-health in recent years placed Emanuele and Koetter discovering opportunities and challenges for further evolution of e-Health (Emanuele & Koetter, 2007).

Business process modelling and its management, in order to decrease operational and other costs and also human errors, make a significant progress in case of analizing electronic health data and improving healthcare services (Becker, J. & Janiesch, C., 2007). Also, using workflow methodology with software tools, Electronic Health Record systems and its features could be better monitored and controlled and contributes to more efficient e-business of healthcare organizations (Alhaqbani, B. & Fidge, C., 2007).

2. Defining the Model Of Process

Successful organization management, and especially increasing its efficiency in order to achieve the goals set, is possible only under the assumption of excellent knowledge of its internal composition and mode of operation. Organizational operations are achieved through a series of related and goal oriented business processes. The complete definition of the business process in principle is never final, but it can be assumed that the business process is a set of related work steps for which it is possible to determine the duration and necessary resources.

The organization efficiency can be increased by improving and restructuring its business processes. However, it is essential that all participants fully understand the business processes, which will be possible if the processes are described in a unique and accessible way. Business processes and their connections may be described using various techniques. Description by spoken language is certainly one way, but it can be imprecise, and communication capabilities could expose participants to different interpretations of spoken words. So, today's business processes are accurately described by a set of graphical symbols with precisely defined semantics and firm rules of their connection.

Modeling business processes is achieved by effectively controlling the quality of business processes performances in line with the business strategy. If an organization sets a high-quality monitoring system of business process, modeling will provide long-term profit. Because of their dynamic presentation, simulation methods are now more attractive, so the software solutions, that are based on the graphic modelling, are increasingly integrated with the rolled programming language into executable language that can be displayed as a simulation. One of the most common graphic norms for modelling processes is BPMN 2.0 with the addition of the programming language execution (Rojo et al., 2010).

Regardless of the modelling selection methods, it is necessary to know something about software solutions, which facilitate the business modelling, and not cause additional complications. It requires IT personnel to perform modelling in accordance with the needs of companies, which includes additional investments that the company was not always willing to implement, because the results appear only after a certain time. These are investments with indirect economic impacts, where exploitation occurs after a certain period of using the investment. This study and research paper deals with the analysis of the medical treatments at all levels of healthcare protection which is supported by electronic medical records, in order to answer the question of business processes efficiency of healthcare organizations, as a specific business entities.

According to the generic definition of the business process, it is a set of related activities and decisions, which is performed on external incentive to achieve a measurable objective of organization, takes time and consumes few resources as input, transforming them into specific products or services of interest to the customer or user. Analyzing the definitions in some detail by showing the following parts (Emanuele & Koetter, 2007):

- A set of related activities and decisions. It means that this is a deliberate set of actions and decisions (and not a conglomerate) that lead to achieving the objectives and satisfying the needs of some customers or users.
- It runs on external incentive.
- The organization does nothing nor consumes any resources if there is no requirement or incentive from a customer or user. In manufacturing organizations that incentive is customer orders, even though it may not always be immediate, but it can be planned (depending on the system of production management).
- Specific products or services. Each output execution process must be individually identifiable (meaning that it cannot give any other process), and measurable. For example, Process Design and Development (this can be a group of processes, but also the name of the organizational unit that performs them) is not a process, instead of that the process will be designed transformer.
- Value for customer. Organization which exists in itself would have no sense, it only exists because of the customers or users of its products or services. However, in complex organizations whose activities are organized on the principle of the value chain (the Value Chain) customer or the user may not always be the external, but it may be some internal organizational units.

It should be noted that this definition of the business process should not be taken formally. Practice shows that a large effort around modelling is useless if at the beginning the processes that correspond to this definition are not recognized.

3. THE ROLE OF ELECTRONIC HEALTH RECORD IN THE BUSINESS OF HEALTHCARE ORGANIZATIONS

The electronic health record (EHR) of an individual user/patient is a set of longitudinal data (continuously throughout life) essential for health, collected and pulled from electronic medical histories, and electronic patient records from different healthcare institutions, which could be shared between relevant health institutions and/or healthcare professionals for the purpose of health promotion, disease prevention, diagnosis, treatment

and rehabilitation of these patients. The main objective of the EHR establishment is to provide quality healthcare and increase overall efficiency, quality and safety of the system in order to provide benefits primarily for patients and healthcare workers accessing high-quality data and provide information for the development strategy, better management and health policy. The purpose of the EHR is the integration of information systems of various medical institutions through the collection of personal data about health status of patients, and their electronic downloading from the place where services are provided. This enables better communication of health workers and awareness about relevant health information for a specific person, and therefore increases the possibility of successful treatment.

Implementation of information and communication technologies in healthcare systems is followed by the emergence of new terms and concepts and their use in different contexts, both in Serbia and in all the countries in the world and in all languages. Some of the most commonly used terms in Serbia are "electronic health record", "electronic medical history", "electronic health records", "electronic health record" and other terms that, at first sight, are the same. The second term represents a group of so-called "unified electronic health records" (Eng. "Electronic health record"), which includes all the information about patients that were recorded continuously throughout their lives. It also includes information about medical services that have occurred in various health institutions according to the current patient state.

The terms "electronic patient record" and "electronic medical histories of patients' indicate electronic records in healthcare organizations, analogous to writing (paper) documents, "cards" in primary healthcare and "medical histories" in hospitals. For this type of electronic records it is true that its emergence resulted from the introduction of ICT in individual institutions, and they are primarily used by the healthcare workers who have direct contact with patients in the healthcare service. They primarily serve for medical procedures or processes of health promotion, disease prevention, diagnosis, treatment and rehabilitation with individual customers/patients (possibly with a small group of users/patients).

Taking all of the above mentioned into account, in the context of healthcare system in Serbia, we can briefly say that "electronic patient record" (in the primary healthcare), or "electronic medical histories of patients" (in the secondary and tertiary healthcare) corresponds to the English term "electronic medical record - EMR" and contains information related to the work in individual practices of healthcare workers, or in a health institution or private practice (in accordance with the Law on healthcare in the Republic of Serbia). Compared to the medical records in written (paper) form, the electronic card and electronic medical history of the patient have the following advantages (Kirchner et al., 2013):

- Easy identification and monitoring of patients in time for preventative checks, inspections or screening,
- Easy monitoring of certain essential characteristics and findings in patient state, such as blood pressure, sugar levels in blood, immunization (vaccination), etc.,
- Easy monitoring and evaluation of their own practice, as well as conducive, data and evidence-based, planning and implementation of quality improvement and safety practices of health workers and institutions.

What is crucial for electronic medical histories (electronic cards) of patients is a very limited flow of health information and data, and the data of patients (sometimes crucial for health) remain within the limits of a health institution. What typically happens when it is necessary to transmit information to other healthcare professionals is that the necessary information is usually printed and also in writing, transfers to other health institutions. In terms of exchange and flow of information between different medical institutions, electronic medical history (cardboard) of patients does not differ much from medical records in paper form.

3.1. Process analysis of Heliant Health activities using BPMN

The process analysis of Heliant Health activities was done in order to clearly target all the activities carried out during the e-health in one organization which is normally used by the mentioned health information system. Namely, it is evident that there is a medical procedure that must be respected and therefore e-commerce of healthcare organizations which provide healthcare services for patients (Kelley & Hurst, 2006). Mapping the process of providing healthcare services electronically, in the case of cardio-vascular disease patients, clearly defines those activities that are essential for the smooth patient care and the sharing of information about their condition. Of course, sharing information is followed by electronic medical records data in Heliant Health, as has been said, is the basis for determining the therapy and diagnosis of the patient.

In order to clearly realize the possible "bottlenecks" in e-business of healthcare organizations and improve the efficiency and cost optimization, authors made a list of activities, their duration and the percentage contribution to the process execution for a hypothetical case of cardiovascular disease patients (Table 1). It is necessary to emphasize that activity duration was determined using examples of good practice, in case of Serbian healthcare services on primary, secondary and tertiary level of health protection, after some researches which are conducted by authors in Serbian healthcare organizations. The compressed types of activities within the business process model (there are thirty-one) of treating a patient with the electronic health records support are:

- Calling Call Centre in order to make appointments,
- Scheduling an appointment with their chosen doctor,
- Assessing the state of urgency by the chosen doctor,
- Examination by the chosen doctor,
- Referral to additional diagnostic methods,
- Receiving the patient due to the urgency state out of the ordinary procedure,
- Patient’s hospitalization and their retention in the stationary treatment with possible further clinical intervention and consultative review. After that, it is possible to send the patient to a rehabilitation center or discharge after receiving treatment and return to the selected physician with the arrival of home healthcare and assistance,
- Setting up final diagnosis by the chosen doctor after interpretation of laboratory results and radiology results with the correction of existing therapies and determining the final therapies.

Table 1 Activities and their duration in Heliant Health

Activity name	Sequence of activities	Activity beginning	Activity duration (in days)	Cumulative activity	The percentage share of activity in the overall activities
Calling the call center	-	01/10/17	1.00	1.00	0%
Appointments with the chosen doctor	-	01/10/17	1.00	2.00	1%
Assessment of the patient urgency state	x1,x2	01/11/017	1.00	3.00	1%
Examination by the chosen doctor	x1,x2	01/11/17	1.00	4.00	1%
Referral to other diagnostic methods	x4	01/13/17	2.00	6.00	2%
Laboratory	x5	01/15/17	2.00	8.00	3%
Radiology	x5	01/17/17	2.00	10.00	3%
Emergency state and hospitalization outside the protocol	x3	01/18/17	1.00	11.00	4%
Hospitalization	x8	01/19/17	1.00	12.00	4%
Staying in hospital	x9	01/21/17	3.00	15.00	5%
Carrying out appropriate therapy	x4,x10	01/23/17	2.00	17.00	6%
Return to the chosen doctor	x11	01/24/17	1.00	18.00	6%
Finally diagnosis by the chosen doctor	x11,x12	01/19/17	1.00	19.00	7%
Other analyses in Institute of Public Health	x5	01/17/17	2.00	21.00	7%
Results interpretation	x14	01/18/17	1.00	22.00	8%
Ending of examination and giving final therapy	x15	01/20/17	2.00	24.00	8%
Determining last and final therapy	x16,x4	01/21/17	1.00	25.00	9%
Referral of the patient to a specialist	x14	01/19/17	2.00	27.00	9%
Examination by the specialist	x18	01/20/17	1.00	28.00	10%
Final diagnosis by the specialist	x19	01/21/17	1.00	29.00	10%
Inpatient treatment	x19	01/23/17	2.00	31.00	11%
Implementation of the inpatient treatment	x21	01/29/17	7.00	38.00	13%
Leaving the hospitalization process	x22	02/07/17	10.00	48.00	17%
Approval of the medical commission for treatment at tertiary level	x22	02/11/17	15.00	63.00	22%
Performing conciliar examination at the clinic	x24	02/20/17	10.00	73.00	25%
The implementation of treatment at the clinic	x25	04/19/17	60.00	133.00	46%
Carrying out additional examination and appropriate therapy	x26	04/25/17	7.00	140.00	48%
Referral to the rehabilitation center	x27	07/24/17	90.00	230.00	79%
Activation of the department of home care after the completion of the intervention	x27	06/24/17	60.00	290.00	97%
Return to the selected physician for further follow-up	x27	05/02/17	8.00	298.00	100%

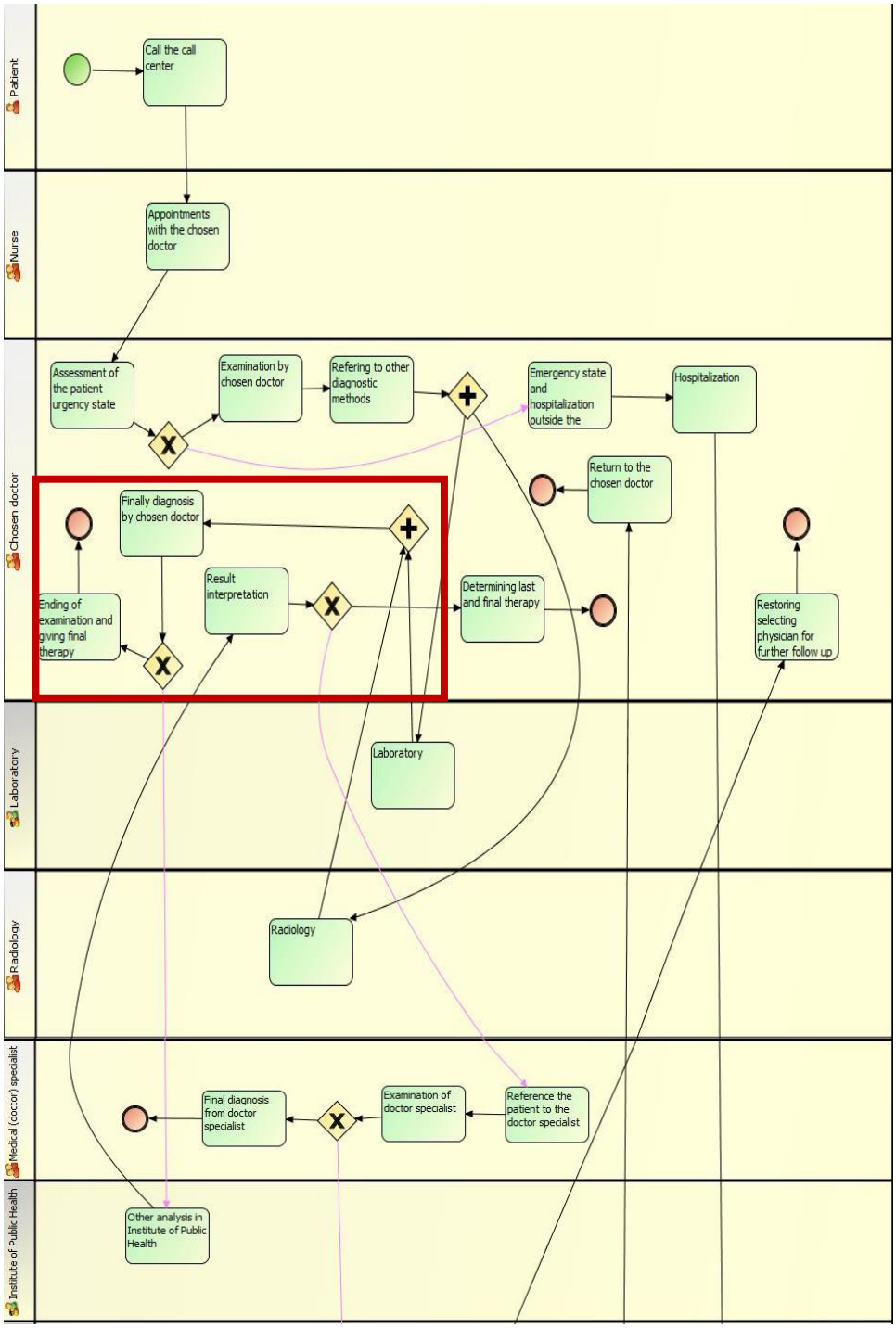
Source: *Authors*

To make the process of e-business health organizations supported by Heliant Health successful, it is necessary to map the current processes and activities and establish a clear categorization of participants in the process and its variables. The participants in the process of electronic healthcare services, supported by Heliant Health are: patient, nurse, attending physician (chosen doctor), specialist, laboratory, radiology, Department of Public Health, medical board (Commission), clinic, hospital, rehabilitation center, home healthcare (nursing at home). In this case the process variables of electronic healthcare services are informational units, which define and determine the direction of unwinding activity based on their type. The variables of Heliant Health in treating a patient from primary to tertiary healthcare, supported by electronic medical records, in case of a cardio-vascular disease include:

- Code of electronic health record- type String.
- Patient name- type String.
- Laboratory results- type Integer: this results are usually in number format such as level of cholesterol, number of blood cells, level of diabetes etc.
- Radiology results- type String.
- Assessment of medical commission- type String.
- Results after the intervention- type String.
- The urgency states- type Boolean: authors choose Boolean type for this variable because the state may be or maybe not be urgent, depending on the patient health condition at a specific moment.
- Working diagnosis- type String.
- Work therapy- type String.
- The final diagnosis- type String.
- The final therapy- type String.
- Discharge list- type String.

The following section (Figure 1) gives a graphical representation of the existing business processes of the patient treatment with the electronic health record support. Before the presentation obtained by the process (before and after improvements), it is necessary to emphasize that this study respected all the principles in describing and graphical representation of the process through a BPMN (Rojo et al., 2010):

- The principle of abstraction - a better understanding of the problem, it must be presented in a simplified form. The problem should be separated from the real environment and the background details which diminish its complexity should be ignored.
- The principle of formality - provides a methodical approach to the problem according to appropriate procedures. It introduces algorithms, rules and laws.
- The principle of modularity - the problem is divided into less complex parts, modules in order to understand them better.
- The principle of hierarchy - the problem is also divided into modules, which are classified according to their complexity, from the simplest to the most complex.


Patient
Call the call center
Nurse
Appointments with the chosen doctor
Chosen doctor
Assessment of the patient urgency state
Examination by chosen doctor
Refering to other diagnostic methods
Emergency state and hospitalization outside the
Hospitalization
Return to the chosen doctor
Finally diagnosis by chosen doctor
Result interpretation
Ending of examination and giving final therapy
Determining last and final therapy
Restoring selecting physician for further follow up
Laboratory
Laboratory
Radiology
Radiology
Medical (doctor) specialist
Final diagnosis from doctor specialist
Examination of doctor specialist
Reference the patient to the doctor specialist
Institute of Public Health
Other analysis in Institute of Public Health

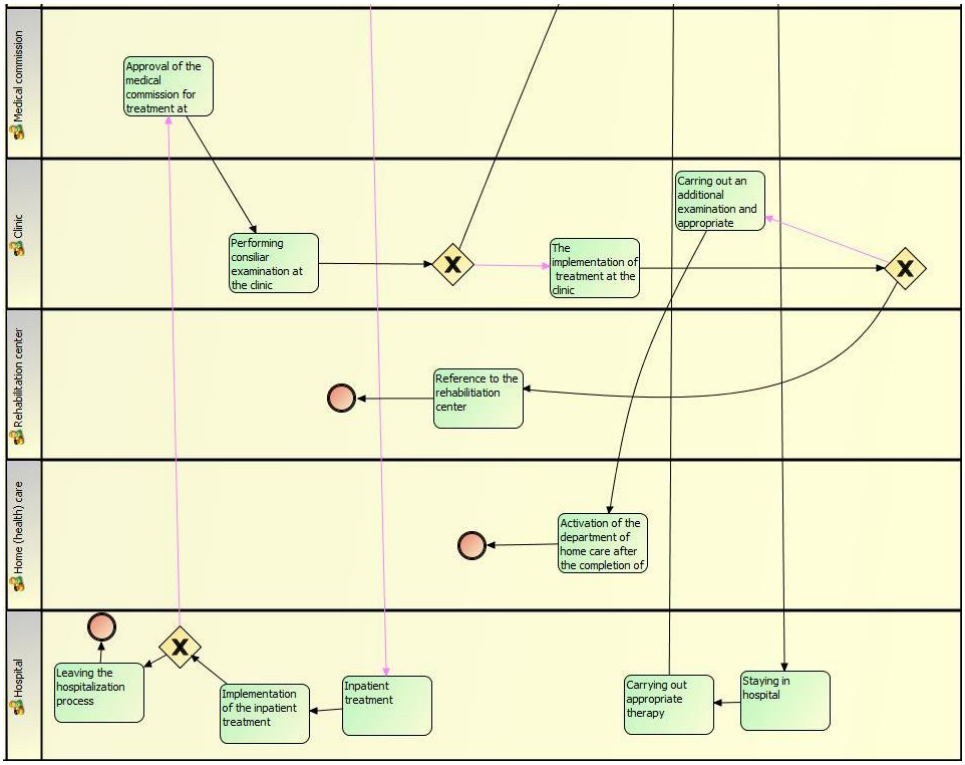


Fig. 1 Current process of providing healthcare services supported by Heliant Health
Source: Authors

After mapping the process of providing healthcare services supported by electronic health record of Heliant Health Information System, using BPMN, we composed Gantt chart based on Table 1 showing:

- Name (type) of activity which is provided by healthcare services through health information system.
- The order in which activities take place and their relationship.
- Duration of activities and their potential overlapping.
- Cumulative realization showing the sum of the duration of these activities and the activities which follow.
- The percentage share of each activity in the provision of healthcare services through the Heliant Health.

Gantt chart is the graphical display (Figure 2), based on Table 1 which documented current activities and their possible overlap in terms of the interdependence of these activities, as it has been seen which activities are "bottlenecks" of the process of providing healthcare services. Specifically, the duration of each activity is perceived in this way and the way it "slows down" and "accelerates" the process of providing healthcare services using electronic medical records. This could reveal key activities, which could be merged into a larger activity, or completely eliminated from the process of providing healthcare services by

Heliant Health, in order to avoid decreased efficiency and interoperability of organization e-health.

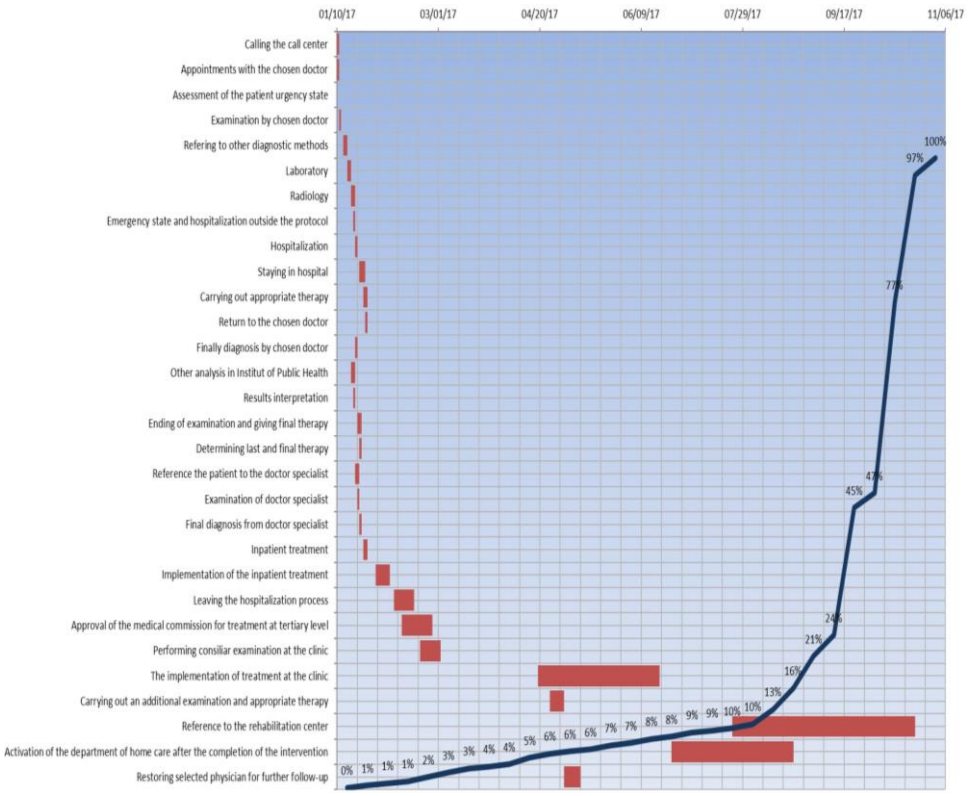


Fig. 2 Gantt chart of activities in Heliant Health
Source: Authors

3.2. Suggestions for electronic business processes improvement supported by Heliant Health

The enhanced version of the treatment process at all levels of healthcare (Figure 3), supported by electronic health record, which indicates the potential drawbacks of the existing business processes, provides a graphical representation of the parts of improved processes or activities. The improvement of the performances of those activities, which lead to delays in the provision of healthcare services, comes to higher efficiency and interoperability of healthcare organizations. This version shows an improved process in which part of the patient treatment at all levels should remove the shortcomings. Namely, according to the research, it proposed improvement treatment process in the following areas:

- Setting the final diagnosis.
- Determination of the results obtained after the treatment.
- Interpretation of laboratory results and other.

The treatment process at all levels of healthcare (primary, secondary and tertiary) supported by the electronic health record increases the efficiency of healthcare organizations by:

- Reducing administrative costs, operating costs and the costs of treatment.
- Reducing the number of required operations in the case of intervention due to the deteriorating health condition of the patient and allowing the provision of adequate and timely therapy.
- Allowing a better insight into the history of the disease and better interaction between the chosen doctor and the patient.

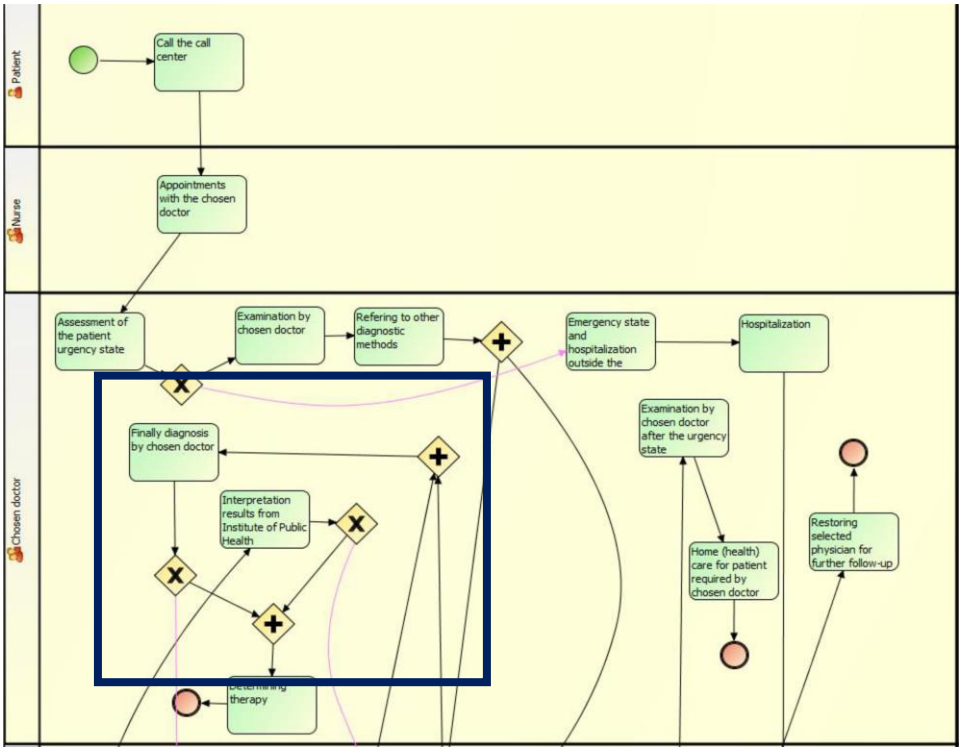


Fig. 3 Suggestions for improving the current process of healthcare services in Heliant Health
Source: Authors

The processes of development and implementation of electronic health records have a long-term strategic significance. Once it reaches the full functionality, most health organizations and health workers and most of the population of healthcare will be included in the system of electronic health records. It provides primarily the availability of relevant and up-to-date health information to all stakeholders (Emanuele & Koetter, 2007). The benefits of the proposed improvement of health information system Heliant Health, supported by electronic medical records, may be the following:

- Health information system based on electronic medical records such as Heliant Health brings benefits in time savings. Namely, healthcare stakeholders could schedule their

own appointments with healthcare staff in some healthcare organization. Also, patients could arrange an on-line consultation using a video link.

- Patients could make a personal healthcare environment which gives them the possibility to share their own medical data with the healthcare provider. It gives them more control over their health condition, but also makes medical staff more efficient in case of faster determining the right treatment in real-time without mistakes.
- Medical staff could share information more securely with colleagues and less paperwork allows them to spend more time and pay more attention to patients' condition and needs.
- Using reliable, high-quality, protected, comprehensive and easily accessible healthcare data brings better quality and safety of healthcare services (healthcare intelligence), management (management intelligence), reporting and evaluation in the health system (public health intelligence), business (business intelligence).

CONCLUSION

The development of information systems and the growing trends in the industry of information technology have enabled their use in health organizations in order to increase the provision of healthcare services. During the development and implementation of information systems to support electronic healthcare is extremely important in order to choose the best alternative among the many that exist in the market. The correct choice of a health information system with respect to standards such as the HL 7 will provide not only the cost and operational efficiency, but also better communication among healthcare organizational units and a higher degree of interoperability, collaboration and coordination. In this way, information systems (with the multi-stakeholder approach) in healthcare organizations provide a higher level of services quality resulting from adequately collected and analyzed information of the patients' health status.

These principles are based on guidelines and concepts of the HL7 standard which also reflect its character. Improving Heliant Health should be based on the recommendations of this standard to maximize the integration and interoperability of healthcare organizations. Consequently, it can be said that based on research, compatibility between Heliant Health and the HL7 standard, using BPMN, and confirmation of the hypotheses and their validity, is proved. In this way, recommendations for process improvement in modelling are given, as well as guidelines for further integration of the participants through electronic health records, especially in communication between institutions and health personnel of primary and secondary healthcare.

Contribution to the improvement of existing provision of healthcare services supported by electronic medical records, based on previously conducted research, is reflected in reduction of administrative work and cost accounting. Also, workflow methodology gives proposals for avoiding unsafe and unnecessary interventions and a faster reaction to some urgency states, using adequate therapy, by targeting inefficient activities of healthcare services. This new generation of information-intensive telemedicine services, with its innovative high-tech tools, embodied in health information systems, causes the setting up of health services to a higher evolutionary level, especially in terms of efficiency.

The cost and qualitative components of health services achieve an enviable level of performance when it comes to electronic healthcare. On the other hand, the timely exchange of information in the virtual mode allows adequate treatment of the patient's disease,

without a time delay. In this way, the costs of introducing digitization into a health organization (based on example of good practice) can be reduced to only 3% of the total cost. The adaptability of users of health information systems has been enhanced by continuous education and the development of skills and competencies for using electronic health software solutions. This way, e-health improves the safety of all participants in the process of providing health services, but also increases the precision in the healthcare decision-making process, using workflow methodology. Improving the interoperability of a health organization and mobility of its members, using telemedicine services through an electronic health card leads to the strengthening of the stakeholders' functional networking inside the health organization.

Consequently, through these workflow software tools, the focus is on long-term economic, and above all the health benefits of using some of the software alternatives. It mainly aims at high personalization, customization and patient-orientation of the electronic health business solutions. On the other hand, the structure of a concrete health organization defines the utilization of software solutions for the implementation of the e-Health concept. Functional and evolutionary-minded hardware and software applicative infrastructure contributes to the consistency of the e-health concept, which provides all users of the system with a "user friendly" attitude towards software solution, which ultimately leads to the provision of timely and quick medical services in real time. In this way, by selecting the appropriate software solution, the health organization makes opportunity for better healthcare, collects and analyzes large amounts of information and monitors patients' medical histories.

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INFORMACIONI SISTEM HELIANT HEALTH KAO PODRŠKA ELEKTRONSKOM POSLOVANJU ZDRAVSTVENIH ORGANIZACIJA U SRBIJI

Elektronsko poslovanje zdravstvenih organizacija predstavlja svojevrsnu tehnološku inovaciju kada je u pitanju adekvatno pružanje usluge zdravstvene zaštite. Proces pružanja usluga zdravstvene zaštite u ovom slučaju podržan je elektronskim zdravstvenim kartonom, koji predstavlja integralni deo zdravstvenih informacionih sistema. Praćenje toka procesa pružanja zdravstvene usluge korišćenjem alata elektronskog zdravstva (e- health) u ovom radu, baziraće se na primeni softvera za grafičko modeliranje koji će targetirati ključne aktivnosti, učesnike i varijable datog procesa, i izvršiti njegovo mapiranje. Ovo zbog toga što se analizom procesa elektronskog poslovanja zdravstvenih organizacija otkrivaju one aktivnosti koje se mogu troškovno optimizovati u cilju efikasnijeg pružanja zdravstvene usluge i brže reakcije na stanje pacijenta. U ovom radu procesna analiza sprovedena je na primeru zdravstvenog informacionog sistema-Heliant Health, koji se primenjuje u većini zdravstvenih ustanova javnog sektora Republike Srbije.

Ključne reči: *elektronsko poslovanje, elektronsko zdravstvo, elektronski zdravstveni karton, procesna analiza, zdravstvene organizacije*

FACTA UNIVERSITATIS
Series: **Economics and Organization** Vol. 14, N° 3, 2017, pp. 281 - 289
https://doi.org/10.22190/FUEO1703281E

Preliminary Communication

CONCENTRATION EFFECT ON THE EFFICIENCY OF BANKING SECTOR IN THE REPUBLIC OF SERBIA

UDC 347.734:65.015.25(497.11)

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Abstract. *For qualitative analysis of the effect of specific activities, such as banking, on other movements in this sector, precise measuring is needed. Due to the transformation of the banking sector in the Republic of Serbia, in a relatively short period of time, there has been a significant reduction in the number of banks and in increasing the concentration. On the other hand, the business efficiency has become a key factor for the survival of banks in the market. In this study, the concentration was measured by Herfindahl-Hirscham Index, while the degree of efficiency was determined by cost to income ratio. A linear correlation and regression analysis examined the relationship between the degree of concentration and the level of efficiency of Serbian banking sector in the time interval from 2008 to 2015, which confirmed the existence of a strong relationship between these variables.*

Key words: *concentration, efficiency, banking sector, Republic of Serbia*

JEL Classification: D40, G21

INTRODUCTION

In the analysis of the market structures, the basic element is the concentration. It is believed that a particular branch, sector or industry is concentrated when a small number of participants control the majority of overall activities or resources. Every company or an individual market participant aims to increase their market share because there is a positive reciprocity between market share and profitability.

Increasing the concentration in certain sectors of the banking market can lead to undesirable market power of banks. Also, the accuracy and stability of the financial sector can variously affect the degree of the concentration and competition. The concentration of

Received February 28, 2017 / Revised April 25, 2017/ Revised July 07, 2017 / Accepted July 13, 2017
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several banks in the market indicates an unsuccessful bank competition and the inability of the market to prevent this phenomenon. This leads to improper functioning of the system and has a negative impact on the normal operation of banks. Today, the protection of the financial system health is one of the key objectives of banking supervision.

Changing business conditions in the market make constant pressure on banks to increase their income and to control their costs. Technological innovation in the form of improved communication and data processing, also, emphasizes the importance of efficiency. Numerous statistical studies have shown that the most efficient banks have significant cost savings and a competitive advantage compared to those with average or below average level of efficiency.

The subject of this research is to determine the relationship level between the concentration and efficiency in the banking sector of the Republic of Serbia, in the time interval from 2008 to 2015. For the purpose of the study, as a concentration indicator, Herfindahl-Hirschman Index was used, and as a measure of efficiency, cost to income ratio.

1. MARKET CONCENTRATION IN THE BANKING SECTOR

"Concentration, as an indicator of the degree to which the total production or sale in the market is in the hands of a small number of market participants, is the measure of the competition intensity. The high level of competition with the low level of concentration is healthy for each branch and the economy in general" (Stojanović et al., 2010, p. 58).

The concept of concentration is one of the basic elements in the analysis of market structure, i.e. market power in a particular industry, sector or branch. The concentration exists when there is a larger part of the total resources or activities under the supervision of a small part of the total number of units that supervise this resource, i.e. this activity. There are two factors of concentration: the absolute number of enterprises, which constitute one industry, and the relative size of companies in relation to the entire industry.

Concentrations can be: horizontal, vertical and conglomerate. In the banking sector, as a rule, concentrations are horizontal. These include connecting of competitors in a market who offer mutual substituent products and services. Affiliation, merging and acquisition of banks by more market-powerful banking institutions are the most visible aspect of concentrations in this area. However, due to strengthening of the banking sector, there has also been bank merging with other types of financial institutions which have offered different products and services, by which the banks expanded their range of products and services. These processes have resulted in a creation of large banks, i.e. "financial institutions that are so big that their activities represent a significant share in the payment system of a country, in the process of granting loans and in other financial services. The result is that any significant disruption in the operations of such institution has a serious impact on the financial market of that country. The consequence of this big to fail factor is that the country protects the business of such institutions and their customers in a way that does not guarantee the other market participants" (Petrović & Ružić, 2001, p. 9).

As in other industries, the level of competition in the banking sector is essential to the production efficiency of banking services, product quality and level of innovation in the sector. Determining the degree of competition and concentrations in the banking sector and the relationship between these concepts represents the analytical and methodological issue.

Numerous empirical studies have been devoted to this topic. Most studies reach the conclusion that the market conditions prevailing in banking sectors can be best characterized as naturally oligopolistic. This means that – in the long term – there is just room for a few viable banks. In this context, a highly concentrated banking sector is the logical outcome of market forces (Bikker & Groeneveld, 1998, p. 3).

A group of authors Claessens, Demirguec-Kunt and Huizinga (2000) investigated the role of foreign banks and indicated that the entry of foreign banks makes the domestic banking system more efficient and reduces interest margins. Using data from the banks of 80 countries, they examined the effects of the bank concentration and their regulation on banks efficiency. They came to the conclusion that the concentration of banks has a negative and significant impact on the efficiency of the banking system, except in rich countries with well-developed financial systems. In addition, they consider that regulatory barriers of new banks entries, especially those relating to foreign banks, as well as implicit and explicit restrictions of the bank activities are associated with the lower level of bank margins. Their measure of bank efficiency, the net interest margin is not necessarily an indicator of the actual level of competitiveness on the market, but it can demonstrate other factors, such as market power and risk appetite. Claessens and Laeven (2003) examined the relationship between the type of market structure and net interest margin. Using data from banks and a customized version of methodology Panzar and Rosse, they assessed the degree of competition in the banking systems of fifty countries. Their results confirm that competitiveness helps determine the degree of efficiency, especially through the entry of foreign banks and the elimination of activity restrictions. Larger presence of foreign banks and smaller number of restrictive measures in the banking sector make the banking system more competitive. Also, the restrictions on entering commercial banks reduce competition, which indicates that the most important element of the competitiveness is the freedom of entry. They have not shown that the concentration of the banking sector is negatively correlated with competitiveness. On the contrary, their research proves that the banking system which is more concentrated is more competitive. The results show that a compromise had not to exist between higher and lower concentrated systems. A competitive system can be more important for ensuring the competitiveness of the system with a low concentration. In the study of rules governing the banking system, including input and output constraints, Barth, Caprio and Levine (2001) have come to the conclusion that stricter entry conditions have a negative impact on the bank efficiency, which results in increase of the interest margin and costs, while restrictions on participation of foreign banks lead to increased fragility of banks.

The theory provides conflicting forecasts about the relationship between regulations, concentration, institutions and bank efficiency. Many of these contradictions are the result of different beliefs about the causes of concentration. One common view holds that regulatory impediments to competition and monopolistic power create an environment in which a few powerful banks stymie competition with deleterious implications for efficiency (Demirguec-Kunt et al., 2003, p. 1). From that aspect, concentration is a useful signal for lack of competitiveness, and therefore for an inefficient market. The theory of "efficiency-structure" claims that more effective banks have lower costs and a higher market share (Demsetz, 1973). With this perspective, the competitive environment can produce concentrated and efficient banking systems. Enlargement, i.e. strengthening the concentration of banks should positively affect the entire economic system (Marinković, 2012). The arguments that support this claim are that big banks have a more efficient organization and management, and thus a greater potential for higher quality services.

One of the most commonly used indicators is Herfindahl–Hirschman Index (HHI). It measures the concentration summing squares of market shares of all companies in an industry. The formula for calculating is:

$$HHI = \sum_{i=1}^{n} (X_i^2)$$

Where is n – the number of companies in the market, a X – a share of i company.

The advantage of Herfindahl-Hirschman Index is that it includes the value of market shares of all the companies of an industry and, by their squaring, it gives greater weight shares of larger companies. The value of HHI, theoretically, may be in the range of 0 to 10 000. In the case of monopoly, the Herfindahl-Hirschman Index value is 10 000, because the offer of the monopoly company equals the entire branch. In perfect competition, the offer of each company tends to 0, so the value of this Index tends to 0.

Table 1 Types of markets according to the values of Herfindahl-Hirschman Index

HHI value	Concentration level
HHI < 1000	Non-concentrated (low concentrated) offer.
1000 ≤ HHI < 1800	Medium concentrated offer.
1800 ≤ HHI < 2600	High concentrated offer.
2600 ≤ HHI <10000	Very high concentrated offer.
HHI = 10000	Monopolistic concentrated offer.

Source: (Begović et al., 2002, p. 35)

By Herfindahl-Hirschman Index, the concentration of the banking sector in the time interval from 2008 to 2015 will be analyzed.

2. EFFICIENCY OF THE BANKING SECTOR

Comparing the financial systems and different countries and regions, Allen and Gale (2001) conclude that there is inherent inefficiency within the monopolistic power of banks, which may also adopt an excessively conservative approach while the competitive nature of markets tends to encourage innovation and growth-enhancing activities (Ferreira, 2012, p. 7). In recent decades, banks have been operating in a very competitive environment, and in addition to size, capitalization, liquidity and other quantitative variables, they have been "forced" to take into account the efficiency as well. However, it should not be concluded that the efficiency is a new asset for the banking system. On the contrary, this variable has always been an asset for the banking system, but it has not been a priority, because the business conditions have been different than today. The structure, performance and function of the banking sector had to adapt to modern conditions, demanding a higher level of efficiency which is crucial for their survival and it can create a competitive advantage for them. An efficient banking sector is able to neutralize negative shocks and to contribute to the stability of the financial system. The performance of each bank is measured relative to what the best performance of a best practice bank on the efficient frontier would be expected to be if it faced the same exogenous conditions as the bank being measured (Berger, 2007, p. 122).

There are three categories of efficiency: productive, cost and profit efficiency (Apergis & Alevizopoulou, 2011, p. 330). The first type refers to the production based on given input parameters. The production plan is effective if there is a way to increase production with the same amount of inputs, i.e. it is not possible to produce the same amount with less inputs. The second type of efficiency measures the ability of banks to reduce costs at a given price of input parameters. In fact, this type of efficiency measures how close or far the costs of banks are from the banks with the best practice, producing the same amount in the same business conditions. If the costs of a bank are higher than the costs of the best bank practice, and that difference cannot be explained by any statistical noise, then, that bank is characterized as cost inefficient. Finally, profit efficiency measures the ability of banks to maximize profits given the prices of inputs and outputs. In fact, it implies maximizing production at a given level of expenditure.

In addition to the traditional way of measuring efficiency, there are two approaches that can be used to assess the efficiency of banks – the parametric approach and non-parametric approach. Both require the specification of a cost or production function or frontier, but former involves the specification and econometric estimation of a statistical or parametric function/frontier, while the non-parametric approaches provides a piecewise linear frontier by enveloping the observed data points (Drake & Hall, 2003, p. 897). In general, both approaches analyze the best practices of production, cost or profit. A serious lack of the non-parametric approach is that it does not allow that there is any error in the data, and therefore assumes that the final assessment is solely because of inefficiencies.

In this paper, the concept of efficiency will be reflected cost to income ratio (C/I ratio). This indicator shows the ability of banks that, by achieved interest margin, as a major generator of profits, and other operating income, covers the part of business expenses arising mainly out of the credit-deposit operations themselves (Ljumović et al., 2011, p. 44). On the cost side, there are non-interest expenses, whose most important elements are gross earnings, depreciation expenses, tangible and intangible expenses and certain categories of expenditures that may arise on the basis of credit-deposit operations. In the denominator, there are incomes that pose a sum of net interest income and other operating incomes.

Based on the cost-to-income ratio investors have a clear picture of how efficiently the firm is being run – if it is lower, the bank will be more profitable. Also, changes in the ratio indicate potential problems: if the ratio rises from one period to the next, it means that costs are rising at a higher rate than income, which could suggest that the company is failing to remain focused on attracting more business.

3. DATA AND METHODOLOGY

The subject of analysis in this study is to determine how the concentration in the banking sector of the Republic of Serbia affects the efficiency of the banking sector of the Republic of Serbia. The starting hypothesis is: higher concentration in the banking sector of the Republic of Serbia contributes to the reduction of efficiency.

In this study, the methods of statistical analysis were: correlation and regression analysis. Using these methods it is possible to determine the nature of the connection, the significance of the connection and influence HHI on C/I ratio.

For the purposes of methodological explanations and analysis, the data from the balance sheet and income statement which commercial banks deliver to the National Bank of Serbia have been used, for the period from 2008 to 2015.

3.1. The results of research and discussion

In the time period from 2008 to 2015 there was a decrease in the number of banks. At the end of 2008, in the Republic of Serbia, thirty-four commercial banks were operating, six of which were large, seventeen medium and eleven small ones[2]. The group of large banks, in that year, had 51.22% of the total assets of all commercial banks. Also, in that year, there were fourteen banks in majority domestic ownership (eight banks in majority state, six of them in majority privately owned), while twenty banks were with majority foreign ownership. At the end of the observed time period, or at the end of 2015, in the Republic of Serbia, thirty commercial banks operated, representing a decrease of 12% compared to the initial year. The structure of commercial banks consisted of six large banks with a share of 60.10% of the total assets of all commercial banks, twelve medium and twelve small banks. Of the total number of banks, seven banks were in majority domestic ownership (six of which were majority state-owned and majority privately owned), and twenty-three banks with majority foreign ownership.

In the observed period, there is a continuous increase in total assets of commercial banks. A decrease is only present in 2013, which is a consequence of decreasing the biggest key categories of assets, with the most prominent decrease in loans and advances. In terms of ownership structure of banks in the Republic of Serbia, foreign-owned banks dominate, whose shares in total assets are around 75% during each year of the period under consideration.

The results of the research on the concentration, according to the Herfindahl-Hirschman Index, show that the banking market of the Republic of Serbia is one of the fragmented markets with a large number of small uncompetitive banks.

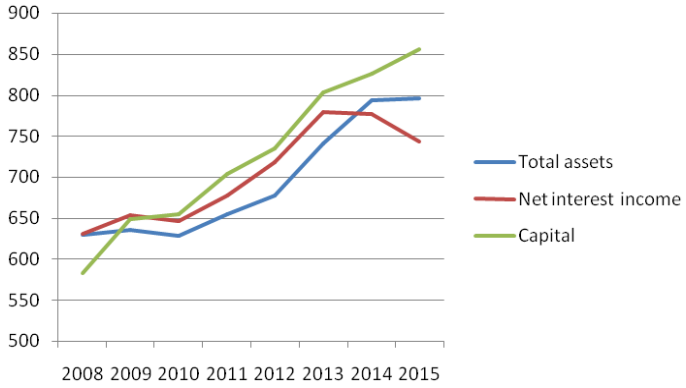

Chart 1 Movement of HHI values in the period from 2008 to 2015.
Source: Author's calculations based on data from commercial banks financial reports of the Republic of Serbia

[2] Small banks have assets of less than 1% of total assets of all banks, medium-sized banks have assets of more than 1% but less than 5% of the total assets of all banks, while large banks are banks with assets exceeding 5% of the total assets of all banks.

Based on Chart 1, it can be seen that the Herfindahl-Hirschman Index has a maximum value for capital. Due to the growth of large banks, there has been an increase in the value of the Index. The Index value of the total assets of all banks rose from 629.58 at the end of 2008 to 796.38 at the end of 2015. Measured by the Index, the higher level of concentration is present in all variables. Also, the highest concentration level was recorded in the capital in 2015 and amounted to 855.34. For the observed period, it can be concluded, that the banking sector, from year to year, is characterized by a higher level of concentration.

In the analyzed period, increasing revenues and reducing costs can be seen, which had a positive impact on the bank efficiency measured by the cost to income ratio. The banking sector was the least effective in 2010 and 2012, which resulted in a considerable increase in costs.

By statistical analysis, correlation, the relationship was examined between the value of cost to income ratio and Herfindahl-Hirschman value Index for total assets, capital and net interest for the period from 2008 to 2015. The degree of quantitative agreement was -0.721; -0.715; -0.716 respectively. The highest degree of linear correlation is between total assets and the level of efficiency, where Pearson's coefficient has a value of 0.043 which indicates a high degree of linear correlation between these two variables.

By applying the regression analysis of the cost to income ratio, which represents the dependent variable and Herfindahl-Hirschman Index for total assets (independent variable), the degree of influence of the independent variable on the dependent was examined. Unit increase in HHI of total assets affects the change in the value of cost to income ratio for the -0.721. The regression model is statistically representative and based on it, it is possible to predict changes in cost to income ratio at HHI increase of total assets. In the regression model, it can be noted that it is possible to predict the movement of the dependent variable values based on the changes of the independent variable.

Table 2 Regression analysis

		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.158	.331		3.496	.013
	$HHI_{\text{total assets}}$	-.001	.000	-.721	-2.551	.043

Source: Author's calculation

CONCLUSION

Concentration in the banking sector is generally horizontal, which means that there is joining of market participants that offer substituent products. The main motives because of which concentration appears are: ratio economy, diversification of credit risk, improving organizational efficiency, lower financing costs and scale economy. However, non-competitive market structures, especially monopolies, generate adverse effects on social welfare. For this reason, it is necessary to create adequate antitrust politics and to establish an effective antitrust institution. The politics of competition protection contributes to the achievement of effective competition that is a prerequisite for economic and social progress (Stojanović & Kostić, 2013).

To demonstrate the state of concentration in the banking sector of the Republic of Serbia, a statistical analysis of the variables has been conducted: total assets, capital and net interest income. Concentration analysis was performed using market Herfindahl-Hirschman Index. The highest level of concentration measured by the Herfindahl-Hirschman Index is in the capital, while the lowest concentration level achieved is in net interest income. In general, the banking sector of the Republic of Serbia can be characterized as fragmented, and the degree of concentration increases from year to year.

How the concentration and efficiency of the banking sector of the Republic of Serbia will change in the future depends on many external and internal factors on the state of the global market, new regulatory requirements and internal strategies of individual banks. Thereby, it should be borne in mind that prevention of monopoly in the banking sector should be imperative.

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UTICAJ KONCENTRACIJE NA EFIKASNOST BANKARSKOG SEKTORA REPUBLIKE SRBIJE

Za kvalitetnu analizu uticaja koncentracije specifične delatnosti, kao što je bankarstvo, na ostala kretanja u bankarskom sektoru neophodno je njeno precizno merenje. Usled transformacije bankarskog sektora u Republici Srbiji, u relativno kratkom vremenskom intervalu, došlo je do značajnog smanjenja broja banaka i povećanja koncentracije. Sa druge strane, ključni faktor za opstanak banaka na tržištu postala je efikasnost poslovanja. U radu je koncentracija merena Herfindahl-Hirscham-ovim indeksom, dok je stepen efikasnosti određen količnikom troškova i prihoda (cost to income ratio). Pomoću linearne korelacije i regresione analize ispitana je povezanost između stepena koncentracije i nivoa efikasnosti bankarskog sektora Republike Srbije u vremenskom intervalu od 2008. do 2015. godine, kojima je potvrđeno postojanje jake veze između ovih varijabli.

Ključne reči: *koncentracija, efikasnost, bankarski sektor, Republika Srbija*

CIP - Каталогизација у публикацији
Народна библиотека Србије, Београд

33+007

FACTA Universitatis. Series, Economics and Organization / editor in chief Dejan Spasić. - Vol. 1, No 1 (1993)- . - Niš : University of Niš, 1993- (Niš : Unigraf-x-copy). - 24 cm

Tromesečno. - Tekst na engl. jeziku. - Drugo izdanje na drugom medijumu: Facta Universitatis. Series: Economics and Organization (Online) = ISSN 2406-050X
ISSN 0354-4699 = Facta Universitatis. Series: Economics and Organization
COBISS.SR-ID 87230727

FACTA UNIVERSITATIS

Series
Economics and Organization

Vol. 14, Nº 3, 2017

Contents