

# Economic Horizons



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## EDITORIAL

Issue 2 Volume 21 Year 2019 of the *Economic Horizons* scientific journal contains four original scientific and two review papers, and the Letter of Appreciation to the reviewers of the manuscripts submitted to the Editorial Board of the Journal to be published in 2018.

Perceiving the advantages of the border and cross-border economic zones for stimulating economic growth and development, the coauthors *Anh Thu Nguyen, Thanh Huong Vu, Thi Thanh Mai Nguyen, Thi Minh Phuong Nguyen* and *Thi Vu Ha Nguyen* have conducted a research study of the potentials of the border areas in the north of Vietnam and their advantages with respect to inclusion in border and cross-border markets, as well as the way to accelerate the economic growth of not only the border regions, but also of the country as a whole. The research study encompasses the regions of Cao Bang, Lao Cai, Lang Son and Quang Ninh, based on which a fact is established that there are big differences in their readiness regarding the establishment of the cross-border zone. In that sense, they indicate the need for improving the connectedness both at the level of the infrastructural potentials and with respect to the compliance of the policies. The advantages of using such greater connectedness with the Chinese market, which offers multiple conveniences not only for the analyzed regions, but also for the country as a whole, are specially emphasized, due to which fact it is necessary that joint strategies and policies should be brought into compliance with one another so as to establish and improve cross-border cooperation.

The effects of the ownership structure of banks on their financial operations are analyzed by the coauthors *Mustafa Keuser* and *Bilge Leyli Elitaş* on the

basis of the quarterly data for the 13 banks listed on the Istanbul Stock Exchange (BIST), which on their part pertain to the period from 2005 to 2017. The independent variables for carrying out this study are family ownership, corporate ownership, managerial ownership, foreign ownership, the ownership of the major shareholder, the ownership of the three major shareholders, and the free fluctuation rate, whereas the indebtedness coefficient, the total assets, and the years of the business operations of the bank are determined as the control variables. As the financial business operations indicators, the following were used: return on overall engaged assets, return on equity, the Tobin Q-coefficient, earnings per share, and the price and pure profit coefficient. Based on the five formed models for analysis, the coauthors have shown that the ownership structure has an impact on the financial business operations of the banks.

The possibilities of gaining access to quality health protection within the framework of the national health insurance scheme in Nigeria have been the subject matter of the research conducted by the coauthors *Joshua Solomon Adeyele, Gbenga Michael Ogungbenle* and *Ogorchukwu Augustine Isimoya* on the example of Jos Metropolis. In spite of the fact that there is an organized health insurance scheme in place, however, the users of these services are not satisfied with the quality of health protection, which is a result of the moral hazard present with the employed in the public healthcare sector, and also due to a lack of drugs in public hospitals. By conducting their research study in Jos Metropolis, the coauthors endeavor to determine the extent to which the non-adherence to ethical standards by doctors and pharmacists, as well as asymmetric information about the national health insurance scheme, cause health risk behaviors of the insured. The research study has confirmed the starting hypothesis that health risk behaviors of the insured are a consequence of moral hazard and

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the asymmetric information provided by the service providers within the framework of the national health insurance scheme in Nigeria.

Pursuant to the attitude that, in contemporary conditions of business doing, it is unimaginable that an enterprise can be managed in a quality manner without an internal control system, *Biljana Jovković* considers the priority goals of internal control and its functioning in the enterprises of the districts of Šumadija and Raška. The research study has been carried out in 15 enterprises from Kragujevac, 14 from Kraljevo, and in one enterprise in Vrnjačka Banja. The research results show that, in the largest number of the enterprises, the significance of the implementation of internal control is recognized, which is of extreme importance for its efficiency. Pursuant to that, control procedures have been established in the majority of the enterprises, which, thanks to the preventive suppression of the deviating phenomena that could endanger the achievement of the defined goals, enables the performance of business activities in compliance with the plan.

As the official or unofficial use of a foreign currency in transactions of a country, dollarization is the subject matter of the research done by *Vesna Martin*, who presents the costs and benefits of its application. The results of the analysis show that, in spite of the lower costs of transactions in international trade, the establishment of macroeconomic stability, and financial integration, dollarization has as a result a loss of seigniorage as the income from printing money of the monetary authorities, and also the limitation of the application of the lender function. At the same time, she indicates the fact that a high degree of dollarization has an influence on the reduction of the efficiency of the monetary and fiscal policy, and simultaneously on the overall effects, as well, which the economic policy has on macroeconomic and financial stability, particularly so in the case of the pronounced volatility of the domestic currency. Because of that, the degree of dollarization should be adapted to each single country individually and applied in compliance with the characteristics of the economy itself.

Pursuant to the significance of information for the successful running and improvement of the business operations of enterprises, the coauthors *Zita Bošnjak*, *Olivera Grljević* and *Saša Bošnjak* consider the concepts, techniques and possibilities of the application of the mining of *web* data and their implications for management. Given the fact that, based on the collected data, we come to know of the indicators of the interests, habits, preferences, and ordinary behavior modalities of individuals, management has a possibility of making more adequate and more quality decision based on the pieces of information that are transformed through mining web data into a more complete and more comprehensive knowledge, which is relevant to the achievement of positive business results. Based on the knowledge gained by using hidden and diverse data available online, management is in the position to create and implement a business strategy that will result in a faster expansion of the enterprise, which is a confirmation of the initial hypothesis that the mining of web data has a heterogenous application, which offers possibilities of achieving benefits in many spheres of business doing.

On behalf of the Editorial Board of the Journal and on my own behalf, I express gratitude to the authors of the contributions published in this issue of the journal, as well as the reviewers, who have significantly contributed to the improvement of the submitted manuscripts through their critical comments and suggestions to the authors.

Issue 2 Volume 21 Year 2019 contains the *Letter of Appreciation to the Reviewers* of the manuscripts submitted to the Editorial Board of the Journal in the year 2018, of which those that were positively rated through the double-blind review process were published in Issues 1, 2, and 3, Volume 20, Year 2018.

The publication of the *Economic Horizons* journal is financially supported by the Ministry of Education, Science and Technological Development of the Republic of Serbia, Decision no.: 4451-03-268/2019-14/2, as of 17.04.2019.

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## CONDITIONS FOR ESTABLISHING CROSS-BORDER ECONOMIC ZONES IN THE NORTH OF VIETNAM

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Thi Minh Phuong Nguyen and Thi Vu Ha Nguyen

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The formation and development of border economic zones (BEZ) and cross-border economic zones (CBEZ) is not only an opportunity for the border regions, but also an engine for developing the supply chain and the production network as a result of border connectivity. The paper focuses on analyzing the conditions for the CBEZ in the border areas in the North of Vietnam, including Cao Bang, Lao Cai, Lang Son and Quang Ninh. There is a big difference in readiness for the establishment of the CBEZ among the four studied sites. However, connectivity needs the most improvement on all the sites, which includes both infrastructure connectivity and policy harmonization.

**Keywords:** cross-border economic zone, North Vietnam, border economic cooperation

JEL Classification: F150, F200

### INTRODUCTION

In the context of globalization, cross-border economic cooperation has been gaining in importance and has developed into many forms over the last decades. The objectives of this cooperation are to utilize the advantages of connectivity in the border areas for economic development. In Greater Mekong Sub-region (GMS), the Asian Development Bank (ADB) and the national governments are engaged in the process of promoting connectivity through building transport and economic corridors. Vietnam is a key

player in this process. The country has the land border exceeding 4500 km in length with China, Laos and Cambodia, with a large number of international and national border gates, border economic zones and border markets.

Border economic zones (BEZ) or cross-border economic zones (CBEZ) are the initiatives supported by the ADB and the national governments in the GMS region in order to fully utilize the advantages of connectivity and resolve the shortcomings of the present cross-border economic cooperation. In this paper, the focus is on analyzing the conditions for the CBEZ in the border areas in the north of Vietnam, including Cao Bang, Lao Cai, Lang Son and Quang Ninh provinces. A CBEZ model based on

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previous studies, especially on those carried out by D. Lalkaka, Q. Nguyen and Y. Xiaohui (2011), M. Lord and P. Tangtrongjita (2014), is being developed. The surveys are then conducted so as to understand the local policy-makers' and practitioners' perceptions of the importance of each component of the proposed CBEZ model and to assess the conditions for the establishment of CBEZs in each province. We expect that each province will have different conditions; the province with a higher level of economic development might be characterized by better conditions; however, the provinces with the connectivity potentials might also demonstrate good conditions for establishing the CBEZ.

The paper is organized into five parts. Following the Introduction, Section two reviews the background of the BEZ and the CBEZ concepts and models. In Section three, the methodology and the data are described. Section four presents the analysis of the results of the conditions in order to develop the CBEZ in the selected border areas, while in Section five the conclusions of the paper are given.

## RESEARCH BACKGROUND

Recent globalization and the economic cooperation trend in the world have accelerated the interdependent relationships among countries at many levels, in which regionalization has led to the development of the relations of border cooperation of the neighboring countries (Krainara & Routray, 2015). This tendency has made scholars increasingly interested in studying cross-border economic cooperation (Fullerton, 2003), including both border and cross-border economic zones (CBEZ). It can be seen that no specific concept of the CBEZ has been presented in a unified manner because it exists in many different forms and has many different names, including Special Economic Zone (SEZ); Export Processing Zone (EPZ); Border Trade Area (BTA); Special Administrative Area (SAA); Special Border Areas (SBA), Special Border Economic Zones (SBEZ), or Cross-Border Economic Zone (CBEZ) (MMN and AMC, 2013). SEZ is often designed in order to promote free trade principles and loosen

regulations on capital flows and market liberalization. The EPZ is similar to or a part of SEZ, but focuses on producing goods for export. The term BTA refers to the border project areas in order to promote cross-border trade. The SAA involves the projects in which local authorities are given more power in deciding the issues related to obtaining business licenses or investment opportunities. The SBA is the term used by the ABD, and has the same meaning as SBEZ or the BTA (MMN & AMC, 2013). This originated from the various goals of the establishment of the zones, as well as each country's different characteristics in terms of its respective history, level of economic development and management mechanism, etc.

The concept of SBEZ put forward by some authors, such as C. Krainara (2008), M. Lord and P. Tangtrongjita (2014), and C. Krainara and J. K. Routray (2015), or is very close to the current vision of the cross-border economic zone. According to C. Krainara (2008) and C. Krainara and J. K. Routray (2015), SBEZ has often been known as Maquiladoras or the export zone along the Mexican and the US borders since 1965. The purpose of these zones is to make use of cheap labor in Mexico and the geographical proximity to large markets, as well as regional production networks in the United States (Weiler & Zerlentes, 2003). This concept is becoming more popular in Asia as these areas help establish in reality economic interdependence among countries with different development levels. When studying the development of the Malaysia-Thailand SBEZ in the Indonesia-Malaysia-Thailand development triangle, M. Lord and P. Tangtrongjita (2014) also introduced the concept of SBEZ. According to these authors, SBEZ is "a network of activities that seeks to promote cross-border trade and investment and encourage the economic and social development of an area along the border between countries". In addition, D. Lalkaka *et al.*, (2011) argued that the characteristics of a CBEZ are very close to that of a "cross-border bonded area". There is the basis to start with a relatively simple model and in a small geographical area, which will gradually develop into a more flexible and larger scale model (Wallack, Zhaohui & Nguyen, 2011). According to D. Lalkaka *et al.* (2011), a CBEZ is said to include six main elements:

- advanced border gate points;
- modern infrastructure linkage;
- trade areas;
- enterprises area;
- preferential policies, and
- common management mechanisms.

The authors did not provide a specific definition of the CBEZ but only mentioned and described the above six components.

In terms of CBEZ models, according to T. Payan (2014), it is necessary to consider the characteristics of the border areas that could be divided into nine groups, including history, culture, a natural resource, demographic trends, institutionalization, the economic development level, the domestic environment of each country, the global context and differences in respective technical levels. Based on these factors, a number of different CBEZ models are proposed for each different area. There are some proposed by the authors such as D. Lalkaka *et al* (2011), and M. Lord and P. Tangtrongjita (2014), which are considered to be very close to how we imagine this zone.

The model proposed by D. Lalkaka *et al* (2011) composes of six components, including: border gate points with advanced technology (including one-stop customs inspection, the harmonization of border documents and the establishment of the electronic data exchange platform, modern bonded areas); the modern infrastructure connecting CBEZs with domestic markets (including highways, railways, waterways and telecommunications and the electricity infrastructure); commercial areas (border markets, duty-free shopping areas, logistic and trade facilitation services; financial service zones); enterprises areas (including appropriate industrial and technology zones, and business incubators with business-support services); preferential policies (public investment policies in developing CBEZs, decentralization policies for CBEZ management, tariff reduction or exemption policies; value-added taxes; the export tax exemption; fee reduction for renting

land, increasing the ability to return profits to foreign businesses); the common management mechanism between two countries, in which the zones on each border side must coordinate and complement each other so that businesses could be equally attracted to both areas.

The model proposed by M. Lord and P. Tangtrongjita (2014) has many similarities to that of D. Lalkaka *et al* (2011). These authors propose that a SBEZ should consist of the six main components:

- the SEZ potential - the companies often enjoy special preferential policies and operate in non-tariff or low-tariff environments with unified management mechanisms and quick procedures;
- the cross-border value chain: SBEZ provides an opportunity to improve the capacity of the companies involved in regional value chains;
- transportation and logistics: this is an important component of SBEZ because the trade costs associated with transporting goods and people along the corridor are an important issue for companies to decide whether to locate themselves in the border area or not;
- the legal and regulatory framework: in order to attract businesses to the border area, the government must simplify the regulatory system associated with the establishment of SBEZ, including the investment approval process, the granting of work permits to foreigners, the abolishment of regulations on import and export licensing, the provision of specialized services, such as commercial and professional services, the application of private or public-private partnerships in order to develop SBEZ, abolish regulations on export content, develop labor and environmental regulations;
- the socio-economic development strategy for the area: the difference between SBEZ and SEZ is the strategic integration of the zone with the development strategy of the surrounding border area. In the long run, the sustainability of SBEZ will be assessed based on the relevance of SBEZ for the regional development strategy; and

- SMEs development: the government will have strategies to support the development of SMEs through preferential policies, knowledge transfer, direct funding from large enterprises; business development services include a high-capacity enterprise mechanism, the development of hi-tech industrial development zones; the establishment of the enterprise development center; linking to Indonesia: the link with Indonesia may include:
  - the import of raw materials and the export of manufactured goods by regional companies;
  - investing in large-scale value chains by Indonesian companies;
  - the provision of skilled and unskilled workers for SBEZ and building supporting industrial zones;
  - training through internships in SBEZ companies or supporting industrial parks outside the zone.

In summary, it can be seen that there are currently several proposed models of CBEZ, but no agreement upon a standard model has been reached yet. When analyzing CBEZ models, many aspects need to be taken into account in order to build the foundation of CBEZs in order to meet the objectives and expectations of the border regions and the countries concerned. In this study, these characteristics and components will be considered in order to develop a suitable CBEZ model in the context of Vietnam and China, which is described in the next part of this paper.

Our research was conducted on the case of the Vietnamese-Chinese border, where there are over 30 pairs of the provinces and the cities in between the two countries that have established close relationships. From 2010 to 2017, the Vietnamese-Chinese import and export turnover of goods reached USD 43.69 billion, thus accounting for 57% of Vietnam's total turnover with the other neighboring countries. The two governments have been developing the idea of building a cross-border economic zone since 2006; however, the components and the model of such a new model of border economic cooperation has not been agreed upon so far.

## METHODOLOGY

### The Proposed CBEZ Model

In order to assess the conditions for establishing CBEZ in the four selected provinces in the north of Vietnam, a CBEZ model based on previous studies, especially on those carried out by D. Lalkaka *et al* (2011), M. Lord and P. Tangtrongjita (2014), and further in A. T. Nguyen and T. T. M. Nguyen (2017), was developed. Moreover, as CBEZ has not been established in reality, the CBEZ components based on several empirical research studies on BEZ, SEZ, SBA, EPZ, etc. throughout the world, especially those in Asia, were developed. These components and indicators were subjected to consultations with experts in the field of border economic cooperation, logistics, trade and investments facilitation.

In this research study, CBEZ includes eight components in each country, namely as follows:

- the advanced border gate;
- modern infrastructure connectivity;
- the trade area;
- the enterprise area;
- the logistics service area;
- preferential policies;
- bilateral cooperation and the management mechanism; and
- the participation of enterprises in the regional value chain and network.

The indicators for each component in our proposed model are presented in Table 1.

### Data

The secondary data and information about each studied site were collated and obtained, respectively, from various sources, including provincial reports, the database of the General Statistical Office of Vietnam and the reports of Vietnam's Ministry of

**Table 1** The components for CBEZ

Component	Indicator	Code
Advanced border gate (AB)	Bonded warehouse	AB1
	A single stop (including the customs, the border, the quarantine and inspection)	AB2
	The electronic customs system	AB3
	The electronic payment of the border-trade-related duties and fees	AB4
	The harmonization of border documents among domestic management agencies	AB5
	The harmonization of border documents between Vietnamese management agencies and the neighboring management agencies	AB6
	The harmonization of the procedures between Vietnam and the neighboring country at the border gate	AB7
	The alignment of the working days and hours between Vietnam and the neighboring country at the border gate	AB8
Modern infrastructure connectivity (MC)	Roads development and a linkage between the border provinces and domestic economic centers	MC1
	Roads development and a linkage between border provinces and domestic seaports	MC 2
	Railways development and a linkage between border provinces and domestic economic centers	MC 3
	Railways development and a linkage between border provinces and domestic seaports	MC4
	The completion of the internal traffic system in the border-gate area	MC5
	The development of and a linkage between Vietnam's road routes and the economic centers of the neighboring country	MC6
	The development of and a linkage between Vietnam's road routes and the seaports of the neighboring country	MC7
	The development of and a linkage between Vietnam's railroad system and the economic centers of the neighboring country	MC8
	The development of and a linkage between Vietnam's railroad system and the seaports of the neighboring country	MC9
Trade area (TA)	The development of border markets	TA1
	The development of banking and financial services	TA2
	The development of duty-free shopping areas	TA3
	The development of the international fair and exhibition areas	TA4
	The development of the cross-border tourism area	TA5
Enterprise area (EA)	The development of export processing zones	TA1
	The development of industrial zones	EA2
	The development of high-tech zones	EA3
	The development of business incubators (focusing on supporting startups)	EA4
	The development of business supporting services (venture capital; seed funding; business consulting, accounting services...)	EA5

Component	Indicator	Code
Logistics service area (LA)	The customs services, complete services for importation and exportation, services regarding the application for import and export licenses at the border gates.	LA1
	Transportation services, the transportation agent, goods loading and unloading at border gates.	LA2
	Warehousing services at border gates (gathering, storing, adjusting, preserving and transferring goods to other trucks, doing customs procedures)	LA3
	The warehouse system meeting requirements in terms of the area and capacity of imported and exported goods at border gates.	LA4
	Integrated logistics services at border gates (transportation, warehousing, goods loading and unloading, the customs services, licensing, C/O application, cargo insurance, import and export documents)	LA5
	Information exchange among logistics service providers and the authorities at border gates.	LA6
Preferential policies (PP)	A reduction in or exemption from the corporate income tax and the personal income tax in priority industries	PP1
	A reduction in or exemption from tariffs and VAT on some selected goods exchanged in the cross-border economic zone	PP2
	Preferential policies related to immigration	PP3
	Preferential policies related to the land and infrastructure use	PP4
	Investment promotion and protection policies	PP5
	Preferential policies related to finance and credit	PP6
	Preferential policies for small and medium-sized enterprises	PP7
Bilateral cooperation and the management mechanism (BC)	A similarity between the trade policies of Vietnam and the neighboring country	BC1
	A similarity between the investment policies of Vietnam and the neighboring country	BC2
	A similarity between the labor movement policies of Vietnam and the neighboring country	BC3
	A similarity between the tourism policies of Vietnam and the neighboring country	BC4
	The establishment of the cross-border agency in order to manage the cross-border economic zone	BC5
	Bilateral cooperation in synchronized supervision and management in immigration inspection	BC6
	Bilateral cooperation in synchronized supervision and management in border security inspection	BC7
	Bilateral cooperation in synchronized supervision and management in the customs activities	BC8
	Bilateral cooperation in synchronized supervision and management in the quarantine activities	BC9
	Bilateral cooperation in synchronized supervision and management in payment activities	BC10
	Bilateral information exchange and the electronic database on the customs activities	BC11
The participation of enterprises in the regional value chain and network (EP)	A linkage between local enterprises and domestic suppliers	EP1
	A linkage between local enterprises and foreign suppliers	EP2
	A linkage between local enterprises and domestic consumers/distributors	EP3
	A linkage between local enterprises and foreign consumers/distributors	EP4
	The cooperation of local enterprises with other enterprises in the same industry/field	EP5

Trade for the period 2015-2017. The primary data were collected through surveying enterprises, provincial and ministerial leaders, and senior experts.

### *Survey of Enterprises*

The main objectives of the survey imply the understanding of the current status of each province in formulating CBEZs. The surveys were conducted in four northern border provinces of Vietnam, including Lang Son, Cao Bang, Lao Cai and Quang Ninh. These provinces were selected as the pilot provinces for the development of the key border economic zones (BEZs) in Vietnam in the period 2016-2020. Moreover, they share the borders with China and have a relatively favorable geographical location and a potentially high transport connectivity with the markets of the neighboring countries and regions.

For the purpose of this study, the primary data were collected through a structured and pre-test questionnaire, which consisted of the general information about the firm, difficulties and favorable conditions when operating in the border zones, a perception about the importance of each component in the CBEZ proposed model, the assessment of the current status of CBEZ development in the given provinces, and the recommendations.<sup>1</sup>

The participants in the survey were the randomly selected enterprises operating in BEZs in the four studied provinces. A total of 600 questionnaires were distributed, and there were 560 usable responses in total, of which 144 responses came from Cao Bang, 120 from Lang Son, 146 from Lao Cai, and 150 from Quang Ninh (Table 2). Limited companies and those operating in the services sector accounted for a large proportion of the surveyed enterprises. More specifically, 319 enterprises are registered as limited, thus accounting for 56.94% of the total enterprises. There are 296 enterprises operating in the services sectors, which accounts for 52.86% of the total number.

### *Survey of Provincial and Ministerial Leaders, and Senior Experts*

The survey of provincial and ministerial leaders, and senior experts was aimed at asking the respondents about their perception of the role of each component of the proposed CEBZ model, and the recommendations for Vietnam. Besides, the provincial leaders were also required to assess the current situation in their provinces with respect to the establishment of CBEZs.

A total of 120 provincial and ministerial leaders were surveyed. A total of 100 provincial leaders were from the agencies involved in managing or operating

**Table 2** The sample description

Enterprises profile	Indicator	Quantity	Proportion (%)
Location	Cao Bang	144	25.71
	Lang Son	120	21.43
	Lao Cai	146	26.07
	Quang Ninh	150	26.79
Type	Private company	59	10.54
	Ltd. company	319	56.94
	Joint stock company	164	29.28
	Partnership company	7	1.25
	Others	11	1.96
Sector	Agriculture	96	17.14
	Industry	132	23.57
	Construction	157	28.03
	Services	296	52.86

CBEZs, such as People's Committees, the Management Committee of BEZs, the Department of Planning and Investment, the Department of Industry and Trade, the Department of Transport, the Department of Foreign Affairs, the Department of Labor, Invalids and Social Affairs, the Border Defense Force, and the Customs Department. Besides, a total of 20 leaders from the ministries involved in making policies of and controlling CBEZs, including the Ministry of Planning and Investment, the Ministry of Industry and Trade, and the Ministry of Foreign Affairs were surveyed. A total of 30 senior experts participating in the survey were from research institutes and universities in Vietnam.

### *Computing the Scores for the Components of the Proposed CBEZ Models*

The scores for each component were computed based on the respondents' assessment of the current status

in each province when the formulation of CBEZs is concerned. The respondents were required to evaluate the current status of each observed variable based on a 5-point Likert scale, ranging from Very bad (1) to Very good (5). The point of each component was then computed as a simple average of all the observed variables belonging to the analyzed component, demonstrating the respondent's assessment of the conditions in each province with respect to the preparation for the establishment of CBEZ. The Excel was adopted for the purpose of analyzing the primary data and computing the scores.

## RESULTS AND DISCUSSION

Table 3 shows our survey results in the four provinces in the north of Vietnam.

**Table 3** The detailed scores of the four provinces

Indicator	Score			
	Cao Bang	Lang Son	Lao Cai	Quang Ninh
Advanced border gates	3.64	3.66	3.61	3.64
AB1	3.51	3.46	3.94	3.12
AB2	3.66	3.76	3.53	3.14
AB3	3.63	4.15	4.52	3.89
AB4	3.49	3.49	3.42	3.92
AB5	3.65	3.55	2.95	3.42
AB6	3.60	3.53	2.92	3.42
AB7	3.78	3.67	3.15	3.52
AB8	3.82	3.69	4.45	4.34
Modern infrastructure connectivity	2.45	3.30	3.80	3.75
MC1	3.54	3.38	4.63	4.69
MC2	3.57	3.39	4.52	4.67
MC3	1.07	3.32	4.21	2.96
MC4	1.07	3.49	4.02	2.87
MC5	3.74	3.63	3.43	4.72
MC6	3.37	3.23	4.37	3.89
MC7	3.55	3.08	2.86	4.25
MC8	1.07	3.18	3.31	2.92
MC9	1.07	3.00	2.81	2.81
Trade area	3.66	3.42	3.15	3.04

Indicator	Score			
	Cao Bang	Lang Son	Lao Cai	Quang Ninh
TA1	3.73	3.47	3.87	2.82
TA2	3.66	3.26	3.95	3.4
TA3	3.58	3.38	3.02	2.56
TA4	3.62	3.56	3.55	3.01
TA5	3.70	3.41	1.37	3.42
Enterprise area	3.52	2.93	2.62	3.47
EA1	3.53	3.19	1.43	3.79
EA2	3.54	3.05	4.12	3.82
EA3	3.47	2.66	1.33	3.04
EA4	3.54	2.79	2.67	3.15
EA5	3.53	2.97	3.56	3.56
Logistics area	3.67	3.50	3.45	3.51
LA1	3.72	3.50	3.26	3.92
LA2	3.76	3.42	4.46	3.42
LA3	3.84	3.63	3.86	3.47
LA4	3.47	3.69	2.86	3.36
LA5	3.62	3.29	2.91	3.95
LA6	3.60	3.45	3.32	2.92
Preferential policies	3.66	3.42	3.47	3.68
PP1	3.70	3.45	3.45	4.33
PP2	3.61	3.54	3.56	3.21
PP3	3.74	3.58	4.21	3.91
PP4	3.72	3.46	4.34	3.95
PP5	3.55	3.28	2.13	3.68
PP6	3.61	3.34	3.52	3.87
PP7	3.70	3.26	3.08	2.83
Bilateral cooperation and the management mechanism	3.10	3.60	2.58	3.55
BC1	2.59	3.47	2.48	3.92
BC2	2.71	3.58	3.22	3.85
BC3	2.49	3.41	2.03	3.85
BC4	2.12	3.65	3.78	3.76
BC5	2.13	3.53	1.18	3.01
BC6	3.79	3.68	2.96	3.35
BC7	3.78	3.76	3.53	3.41
BC8	3.91	3.68	2.51	3.34
BC9	3.62	3.68	1.88	3.42
BC10	3.52	3.53	1.56	3.61
BC11	3.42	3.58	3.29	3.53
The participation of enterprises in the regional value chain and network	3.29	3.63	2.76	2.97
EP1	3.15	3.61	2.92	3.02
EP2	3.21	3.53	2.35	2.93
EP3	3.34	3.71	2.85	2.97
EP4	3.31	3.63	2.34	2.86
EP5	3.45	3.68	3.34	3.02

Source: Authors

## Cao Bang Province

Cao Bang shares the 333 km border with the Guangxi Zhuang Autonomous Region of China, with a lot of pairs of the border gate and clearance points, of which, the Province has two border gates with Baise, which is considered as a trade gateway of China's southwestern region and which the Chinese government planned to develop as an agricultural trade hub between China and ASEAN (K. C. Nguyen, 2017). Despite the recent relatively high economic growth rate, Cao Bang is still facing plenty of challenges in its economic development. The Province has a low income per capita and is substantially dependent on the state budget for its economic development (Cao Bang People's Committee, 2018). Therefore, the establishment of CBEZ is expected to bring about new opportunities for the Province with respect to the development of its economy, especially trade and investment (Provincial Party Committee of Cao Bang, 2016).

According to the survey results, Cao Bang has prepared best the logistics service area, with the score of 3.67, only to be followed by the preferential policies and the trade area, with the score of 3.66 each. The respondents assessed that Cao Bang had done relatively well with the advanced border gates. Cao Bang's lowest preparation relates to the modern infrastructure connectivity (Nguyen & Vu, 2019).

The logistics service area was assessed as the most advanced component in Cao Bang. Among the indicators, the warehouse services, the custom services, and the transportation and handling services ranked the highest. However, the logistics services at the border gates are generally still insufficient to meet enterprises' demand and they are operated at a high cost. The information exchange and the warehouse infrastructure ranked the lowest. The information on the market is limited, and the dissemination of the economic development policies is not paid adequate attention to.

The preferential policies ranked as the second developed activity, with the score of 3.66. The surveyed enterprises said that they had received different incentives when operating in the current

Cao Bang BEZ, such as those related to the labor movement, the land rent, the corporate tax, the value-added tax and credit. However, there is still a lack of the incentives made specifically for the enterprises operating in CBEZ, and the incentives specifically made by Cao Bang Province.

The trade area achieved a score of 3.66, according to which the respondents gave the highest score to the border markets and cross-border tourism development. Cao Bang has completed the construction of the shopping center of the Tra Linh BEZ, and has prioritized for the development of the trade supporting services. One of the striking achievements of Cao Bang is its active cooperation with Guangxi for the purpose of developing the cross-border tourism area and the agreed plan to mutually exploit the Ban Gioc waterfalls. Even though tourism is an advantage of Cao Bang, the number of tourists to Cao Bang is still low because of the limited variety of tourism products and the poor infrastructure and transportation. The challenges for Cao Bang in developing the trade area also lie in the weak performance of the banking and financial services, the low efficiency of duty-free shops and international exhibition centers.

The survey results showed that enterprises were relatively satisfied with the operation of the advanced border gates in Cao Bang. The Province's Customs Department has been implementing the VNACCS/VCIS since 2005, thus substantially facilitating the reduction in the time of the duration of and the procedure for trade activities. The harmonization of the working hours and the procedure between Vietnam and China was also ranked as highly satisfactory by the surveyed enterprises. The lowest point in this component was electronic payment and bonded warehouse.

The enterprises area in Cao Bang was assessed as underdeveloped and achieved a score of 3.52, demonstrating the lowest preparation in the development of high-tech industrial zones. The participation of enterprises operating in Cao Bang in the regional value chain ranked low, revealing a very weak linkage between enterprises and their suppliers. One reason for this low participation lies in the fact

that enterprises in Cao Bang are mainly small and medium-sized, with a low capacity in the capital, technology and human resources.

The common management mechanism is yet another challenge for Cao Bang when speaking about the development of CBEZ. Cao Bang and Guangxi have developed numerous cooperation in the customs, the labor movement and the border security inspections. The two provinces have signed some framework agreements in order to promote trade, investment, transportation, tourism, agriculture and education. However, because the Tra Linh-Long Bang CEBZ has not officially been approved at government level yet, no legal framework for Cao Bang and Guangxi to develop a joint agency and the policies to govern the future CBEZ has been adopted yet. Another difficulty is the fact that Cao Bang has substantially been relying on China's policies and has been trying to keep up with Guangxi's policy changes and development focus, thus leading towards an unsustainable economic development orientation for Cao Bang.

The final assessed component with the lowest score was the modern infrastructure connectivity. The potential to connect Cao Bang, Vietnam, with Guangxi and Baise City, China, in particular, and the ASEAN market, in general, is among the key determinants stimulating Vietnam to establish the Tra Linh-Long Bang CBEZ. In spite of the above potential, the infrastructure connectivity of Cao Bang Province with a score of 2.45 is least prepared in comparison with the other components. Although Cao Bang is expected to become a transshipment point, at present, the only transport channel between Cao Bang and the domestic market is the road, and most of them are bad roads. As a consequence, the infrastructure connectivity of Cao Bang Province is underdeveloped and assessed by the respondents as the one of the lowest quality in comparison with the other CBEZ provinces in Vietnam.

### Lang Son Province

Lang Son is an essential gateway connecting China and ASEAN. It has 12 mainland border gates, including two international border gates with China.

(Lang Son People's Committee, 2018). Lang Son has a low income per capita and has mostly been dependent on the state budget for its economic development.

According to the "Memorandum of Understanding on Building a Chinese-Vietnamese Cross-Border Economic Zone" signed in 2007 by Lang Son Province (Vietnam) and Guangxi (China), the Dong Dang (Vietnam)-Pingxiang (China) cross-border economic zone occupies an area of 17 km<sup>2</sup> (8.5 km<sup>2</sup> on each side). However, the overall project on building a cross-border economic cooperation zone between Vietnam and China has not been approved by the two governments, so this zone does not officially work.

Based on the survey, the advanced border gates was assessed as the most advanced component in Lang Son, achieving a score of 3.66. In this group, the electronic customs system is in the best condition. The Lang Son Customs has been at the forefront of the implementation of the e-customs procedures since 2010.

The participation of enterprises operating in Lang Son in the regional value chain ranked as the second developed component, achieving a score of 3.63. There is a reasonable linkage between local enterprises and domestic consumers/distributors in Lang Son. However, the level of the linkage between local enterprises and foreign businesses is not sufficient. Vietnamese traders were mainly spontaneous, small and fragmented, lacking similar associations, leading to unfair competition and being inferior to the counterparty's trade association. The business plans of Vietnamese enterprises were affected by the Chinese demand during the day.

The common management mechanism ranked as the third developed component, with a score of 3.6. Lang Son has implemented well the conditions of bilateral cooperation in synchronized supervision and management in border security inspection, bilateral cooperation in synchronized control and management in the customs and the quarantine activities.

The respondents are relatively satisfied with the operation of the logistics services area. Lang Son has met relatively well the requirements of the

warehousing services at border gates because it has a cargo transshipment zone in the Dong Dang-Lang Son border gate economic zone. However, the integrated logistics services at the border gate were responded to well by the respondents.

With regards to the trade area component, Lang Son now meets the requirements for duty-free shopping areas and the international fair and exhibition areas, but still has an inadequate response to the development of banking and financial services. In the future, this will be significantly improved as the State Bank of Vietnam issued a Circular 19/2018/TT-NHNN in 2018 in order to improve the border payment policies and promote trade activities between Vietnam and China.

For the preferential policies, enterprises in Lang Son obtained tax and land incentives. However, the preferential policies for small and medium-sized enterprises and incentives for protection and investment are almost absent.

The modern infrastructure connectivity is a component assessed as underdeveloped. It has not been well responded to by Lang Son, especially not so with respect to the internal traffic system in the border gate area. Lang Son is a mountainous province without a favorable ground for investments in construction and comparative advantages for economic development.

The enterprises area in Lang Son was assessed as underdeveloped and received a low score of 2.93. There are no business incubators and no high-tech zones in the border gate economic zone in Lang Son. It is, therefore, a big challenge for Lang Son Province to develop CBEZ in the future.

## Lao Cai Province

Lao Cai and Yunnan share the border in the length of 203 km. Lao Cai is located in the Kunming-Lao Cai-Hanoi-Hai Phong economic corridor and the GMS's North-South Corridor; therefore, it plays the role of a transshipment point between China and ASEAN. Lao Cai's economic growth rate has been maintained

at the level of over 10% in recent years. The trade turnover of Lao Cai follows an increasing trend; however, investment in the Province is still limited despite the high potentials in many industries (T. G. Nguyen, 2017; Lao Cai People's Committee, 2018).

The survey results show that the modern infrastructure connectivity and the advanced border gates are the best components in Lao Cai, achieving the scores of 3.80 and 3.61, respectively. Lao Cai has done relatively well with the preferential policies and the logistics service area. Meanwhile, the enterprises area and the bilateral cooperation and the management mechanism are the components demonstrating the lowest readiness for the establishment of CBEZ in Lao Cai.

The modern infrastructure connectivity is the most advanced component in Lao Cai. The Lao Cai-Hanoi Highway directly connects Lao Cai with one of the biggest domestic economic centers - Hanoi, and the domestic seaports of Hai Phong and Quang Ninh. This highway, together with the Hekou-Kunming Highway, has helped goods from and through Lao Cai to easily access the economic centers of China-Kunming and the southwest markets. Beside the road routes, the Lao Cai-Hanoi railways have facilitated the movement of people and goods between Vietnam and China. However, due to the inconsistency of the rail gauge, the transport has not been smooth between the two sides. At the same time, the Province's internal transport and traffic system at the border gate is poorly developed.

The advanced border gates ranked as the second developed component. Lao Cai implements the VNACCS/VCIS automatic clearance system. The authorities at the border gates of China and Vietnam have agreed upon the working hours at the border gate; and, if necessary, they have coordinated so as to extend the clearance time until 10 pm. The bonded warehouses and the single stop were also rated relatively high. However, a lack of the harmonization of border documents among domestic management agencies and between the Vietnamese and Chinese management agencies has caused many difficulties to Vietnam's enterprises.

The survey results also indicate the fact that enterprises are relatively satisfied with the preferential policies, especially the policies related to the land and infrastructure use and immigration. However, enterprises show low satisfaction with the investment promotion and protection policies, mainly due to a lack of stability and long-term policies. The respondents also expect greater support from the government's preferential policies for SMEs.

The logistics service area partly met the enterprises' expectations. The essential logistics services, such as transportation, goods loading and unloading, and warehousing services are highly appreciated. In the meantime, integrated services still need to be improved. In particular, the current warehouse system did not meet demand in terms of the area and the capacity of imported and exported goods at the border gates.

The trade area is not an advantage of Lao Cai. Despite the potential for tourism, Lao Cai and Yunnan have not established any cross-border tourism area yet, which lowers the average score of the trade area component.

Both enterprises-related components, namely including the participation of enterprises in the regional value chain and network and the enterprises area, are the limitations of Lao Cai. Lao Cai has established no high-tech zones and no export processing zones yet. Also, the linkage among Vietnamese enterprises, as well as that between Vietnamese and Chinese enterprises, is fragmented, leading to a lack of regional value chains needed to take advantage of each other's comparative advantages.

Finally, the bilateral cooperation and the management mechanism is the biggest challenge for Lao Cai in establishing CBEZ. There has been a minor similarity in the trade policy, the labor movement, the quarantine coordination and payment between the two countries. Therefore, the bilateral policy harmonization is amongst the top concerns when establishing CBEZ in Lao Cai Province. It is also necessary the establishment of a cross-border agency needed to manage the cross-border economic zone be considered.

## Quang Ninh Province

Quang Ninh has a strategic position in Northeastern Vietnam, which has a particularly important position in terms of the economy, politics and national security. It is located in the economic triangle of Hanoi-Hai Phong-Quang Ninh and in the area connecting China and ASEAN. It is also a vital traffic gateway, with various convenient border gates and seaport systems. In recent years, Quang Ninh has also been assessed as a locality with fast and dynamic socio-economic development demonstrating outstanding achievements (Quang Ninh People's Committee, 2018). The border economic cooperation between Quang Ninh and Guangxi provinces has increasingly been strengthened. Quang Ninh has always been actively involved in the roadmap planning so as to develop economic zones across the Vietnamese-Chinese border (Quang Ninh Economic Zone Management Board, 2019).

The survey results show that Quang Ninh is most ready to establish the CBEZ concerning the modern infrastructure connectivity component with a score of 3.75, only to be followed by the preferential policies and the advanced border gate, which achieved a score of 3.68 and 3.62, respectively. However, enterprises in Quang Ninh still have a weak linkage with suppliers, customers and other stakeholders in the regional value chain.

The modern infrastructure connectivity is the component assessed as the most developed. Roads are highly developed, which ensures smooth connection from the border area to the economic centers of the Province, of the border provinces and the domestic seaports with the seaports of China.

The preferential policies ranked as the second developed component, with the score of 3.68. At present, investment projects in Mong Cai BEZ are applied by adhering to the current legal mechanisms and policies for border economic zones. The respondents stated they were relatively satisfied with the incentives related to the corporate income tax and personal income tax, immigration, and the infrastructure use. However, the Province does not have preferential policies and support for SMEs.

The survey results showed that the respondents were relatively satisfied with the operation of the advanced border gates in the selected province, with the highest scores in the harmonization of the working hours. However, the status of the “bonded warehouse” ranked the lowest. Additionally, the participants in the survey also ranked the single stop services in Quang Ninh low, which is due to a lack of consistency and uniformity among the ministries and the agencies in the implementation process. Moreover, the specialized inspection is mainly carried out by applying manual methods without widely applying the risk management method, compliance and IT methods.

Regarding the common management mechanism, it still ranks low (the score being 3.55). Although the two sides have many policies pertaining to cooperation in trade, investment, tourism and labor migration, the surveyed enterprises stated that the border, immigration and import-export policies of Vietnam and those of China are sometimes unified, especially at sub-border gates.

The logistics services area is a challenge for Quang Ninh Province in developing CBEZ in the future, as it achieved quite a low score. Quang Ninh is expected to become a logistics center for regional economic development and a bridge connecting the ASEAN with the Chinese market; however, enterprises are still dissatisfied because logistics services companies are still small, with weak competitiveness. The logistics infrastructure has been paid attention to, but has not been synchronized. There is still a small degree of information exchange among logistics services providers and the authorities at border gates.

The enterprises area in Quang Ninh is assessed as underdeveloped and was given a score of 3.47, with the lowest preparation seen in the development of high-tech industrial zones. The development of business incubators and business support services is still at a low level, with a score of 3.15 and 3.56, respectively.

The trade area in Quang Ninh achieved a low score of 3.04. The lowest score in this group is the duty-free shopping area. There are no big shopping malls, but only five duty-free shops quite fragmented and

with small categories of products. Border markets have not been performing effectively since they are mostly located in the mountainous area, with a sparse population. National and international fairs and exhibitions in the Province and the border gate area are often small-scale.

The component assessed with the lowest score is the participation of enterprises operating in Quang Ninh in the regional value chain. Most businesses in the Province and those operating in the Mong Cai border economic zone are of small and medium scale, lacking qualifications, the capacity and experience. Therefore, their knowledge and awareness of participation in regional networks are still limited. Cooperation activities with foreign partners are still mainly carried out in traditional ways, not according to international practices.

### **Overall Assessment of Readiness for BEZ Establishment in the North of Vietnam**

The survey results show that there is a big difference in readiness for CBEZ establishment among the four study sites. In Cao Bang Province, the logistic service area is the best-prepared component, only to be followed by the preferential policies and the trade area. Cao Bang’s lowest preparation is observed in the modern infrastructure connectivity and the bilateral cooperation and the management mechanism with the neighboring country in the development of CBEZ. Lang Son Province is readiest when speaking about the development of an advanced border gate, and provincial enterprises have developed a suitable linkage with domestic consumers and distributors. The biggest challenges Lang Son Province is faced with lie in the modern infrastructure connectivity and the enterprise area. Differently from the provinces of Cao Bang and Lang Son, the remaining two provinces, including Quang Ninh and Lao Cai, have the best preparation with respect to the development of the modern infrastructure connectivity, which is only followed by the advanced border gates and the preferential policies. However, the readiness of Quang Ninh province concerning the component of the trade area, and the component of the participation of enterprises in the value chain is the lowest, while

Lao Cai demonstrates the lowest preparation in the components of the enterprise area and the common management mechanism with the neighboring country in developing CBEZ.

Besides, there are two notable common features among the studied provinces in the context of their preparing for the formulation of CBEZ. Firstly, among the eight components, enterprises in all four provinces are relatively satisfied with the way how advanced border gates operate. This component is assessed as the readiest in the Province of Lang Son, as the second developed in the Province of Lao Cai, and as the third and the fourth developed in the provinces of Quang Ninh and Cao Bang, respectively. Secondly, except for the Province of Lang Son, the preferential policies given to the enterprises operating in BEZ are highly assessed in the remaining three provinces.

## CONCLUSION

The conditions for establishing CBEZ/BEZ range from the economic to the social and security perspectives. In this research, CBEZ includes eight key components, namely as follows:

- the advanced border gate;
- the modern infrastructure connectivity;
- the trade area;
- the enterprise area;
- the logistics service area;
- the preferential policies;
- the bilateral cooperation and the management mechanism; and
- the participation of enterprises in the regional value chain and network.

This model includes the components of CBEZ developed in the studies conducted by D. Lalkaka *et al* (2011), M. Lord and P. Tangtrongjita (2014), and the practices of the border economic cooperation between Vietnam and China, thus providing quite comprehensive conditions for establishing CBEZ. The model, therefore, can be used to assess the

pre-conditions of any CBEZ. However, some other conditions should also be taken into account in order to improve this model, and those other conditions encompass the security conditions and linkages with the main markets. The number of the studied provinces could also be increased in the future so as to see a more comprehensive picture of the CBEZ conditions.

As expected, the analysis shows that there is a big difference in readiness for CBEZ establishment among the four studied sites. Although trade is entirely developed in all of the studied sites, the conditions for the development of CBEZ with all of its functions are still lacking. Lao Cai and Quang Ninh demonstrate a higher score in the infrastructure readiness and the overall scores, whereas Cao Bang still shows a weak connectivity with the domestic market. These findings are in accordance with those in the assessment made by D. Lalkaka *et al* (2011), in which the provinces of Lao Cai and Quang Ninh are selected as the pilot areas for CBEZ. These two provinces also demonstrate higher economic development compared to the provinces of Lang Son and Cao Bang. Cao Bang, however, has a great potential in connecting with the Chinese market. The value chains and the networks in all of the four provinces studied should be formed in order to establish a fully functioning CBEZ. The component needing the biggest improvement is the component of bilateral cooperation and the management mechanism with the neighboring country in the development of CBEZ. Therefore, efforts for joint strategies and policies harmonization need to be made so as to promote the formation and development of CBEZ.

## ENDNOTE

- 1 The reliability of the questionnaire's scale was checked by using Cronbach's Alpha. The results showed that Cronbach's Alpha values of all the 8 components of the proposed CBEZ model and the Corrected Item - the total correlation of all the individual items of the 8 components were satisfactory. Therefore, we kept all the 8 components and the individual items in order to compute the scores for the four studied provinces

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## THE RELATIONSHIP BETWEEN THE OWNERSHIP STRUCTURE OF BANKS AND THEIR FINANCIAL PERFORMANCE: EMPIRICAL RESEARCH FOR TURKEY

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The aim of this study is to analyze the effects of the ownership structures of banks on their financial performance. The quarterly data of the 13 banks listed on the Istanbul Stock Exchange (BIST) were used for the period from 2005 to 2017. In the study, return on assets (ROA), return on equity (ROE), Tobin's Q ratio (TOBIN), earnings per share (EPS) and the price/earnings ratio (P/E) were used for the financial performance indicators. Family ownership, corporate ownership, managerial ownership, foreign ownership, the largest shareholder's ownership, the ownership of the three largest shareholders, and the free-float rate were selected as the independent variables for the study. The leverage ratio, the total assets and the age of the banks were benefited from as the control variables. There are five models formed to analyze the relationship between the variables, and a regression analysis was carried out. The analyses point out the fact that the ownership structures of the banks have an effect on their financial performance. Besides, the results obtained by these analyses are suggested to be coherent for the agency theory as one of the fundamental theories of this subject.

**Keywords:** ownership structure, financial performance, agency theory, banking, corporate management

JEL Classification: G10, G32

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### INTRODUCTION

The financial performances of the economic ownerships operating in the national and international dimensions have become more considerable due to globalization worldwide. As a

consequence of increasing competition, accounting scandals and the uncertainty of the economic policy, financial crises directly affect business activities and financial performances. The economic structures adapted to developments can survive while others stop operating. There are various factors affecting the financial performance of the banks since the effect of the ownership structure concept (which is studied within the corporate management framework and activities) on financial performance is a substantial argument in the developing world economy.

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Corporate management is a set of institutional and market-based mechanisms deciding on business operations beside urging managers to protect shareholders' profits and also to increase the firm's market price (Denis and McConnel, 2003, 1-2).

The ownership structure concept is a substantial tool of the corporate management mechanism for displaying the suppliers of the firm's capital and indicating each size of shares (İzciler, 2014, 6). The mentioned concept is embodied in the two major components, namely those defined as the ownership identity and ownership concentration. The ownership identity concept denotes (a) substantial shareholder(s) who has/have an influence on the firm's management, whereas the ownership concentration concept implies the collection of the major shares by a single investor or several persons (Grob, 2006, 10).

Several classifications related to ownership identities are existent in the literature, but generally speaking, family ownership, corporate ownership, managerial ownership, and foreign ownership are included in ownership identities. The classifications constantly benefiting from the ownership concentration concept are the ownership of the three largest shareholders and the free-float rate.

Certain financial performance indicators are used to analyze the relationship between the ownership structure of the banks and their financial performance. These are return on assets (ROA), return on equity (ROE), Tobin's Q ratio (TOBIN), earnings per share (EPS) and the price/earnings ratio (P/E). The ownership types analyzed in the study demonstrate various effects on the financial performance indicators. Corporate governance implementation and separate forms of legal protection among the states, as well as economic, juristic, social and cultural diversities among them, cause the effects to vary for each country.

The research study on the relationship between the ownership structure and financial performance is based on the fundamental theories known as agency theory, representation theory and stakeholder theory. Agency theory is one of the most important theories, which implies the appointment of another person in

order for such a person to do his/her own business, as well as an analysis of the relationship between them. The relationships between groups, such as shareholders and managers, managers and employers, shareholders and employers, etc. are included within the framework of agency theory although the mentioned theory is based on the maximization of an individual benefit. Hereupon, the principle/agent matter exists between the counterparts of a business and the parties trying to maximize their own profits. Representation theory claims the presence of accordance between the profits of managers and those of shareholders. It denies the agency theory that mentions a differentiation between the profits of managers and those of shareholders, contrary to a consensus existing between them. According to stakeholder theory, mutual benefits are generated between the stakeholders of a business, and the corporate management approach including solely the relationship between shareholders and managers is not sufficient. So, all the groups related to the business should be taken into account by the management.

This study is aimed at determining the effects of the ownership structure of the banks operating on the Istanbul Stock Exchange on their financial performances. In the study, five dependent variables are used as the financial performance indicators. These are: return on assets (ROA), return on equity (ROE), Tobin's Q ratio (TOBIN), earnings per share (EPS) and price/earnings ratio (P/E). Family ownership, corporate ownership, managerial ownership, foreign ownership, the largest shareholder's ownership, the ownership of the three largest shareholders, and the free-float rate are selected as the independent variables for the purpose of the study. The five hypotheses were formed and regression analysis was conducted in order to analyze the relationships between the variables.

The quarterly data relating to the 2005-2017 period pertaining to the banks listed on the Istanbul Stock Exchange (BIST) are applied in the study. The financial reports of all the businesses listed on BIST constantly since the year 2005 are included due to the Turkish Financial Reporting Standards (compatible

with the International Financial Reporting Standards) so that the necessary uniform manner is achieved.

The study is divided into six chapters, namely: The Introduction, The Literature Review, The Aim and the Methodology, The Empirical Results, The Results, and The Conclusion.

## LITERATURE REVIEW

Various results have been obtained by the studies analyzing the relationship between the ownership structure and the performance of a business. The various market conditions of the countries, the periods and the aims of the studies are suggested as the basic reasons for obtaining different results. Furthermore, differences in the economic, legal, social and cultural backgrounds between countries, corporate governance, as well as legal protection levels may cause the mentioned variety.

Besides, the ownership structure is investigated in the context of corporate governance. Agency theory, stakeholder theory, stewardship theory, managerial hegemony theory, myopic market theory and resource dependence theory are the theories explaining corporate governance and the ownership structure. So, some of the studies on the relationship between the ownership structure and financial performance related to these theories are presented hereinafter.

Apart from these, ownership concentration is an important part of the ownership structure. In previous studies, the ownership structure used to be examined under many different types. In the studies presented below, ownership concentration is also brought into relationship with these theories.

The first study relating to the effect of the ownership structure on the financial performance of a firm was conducted by A. A. Berle and C. G. Means (1932), who investigated the relationship between the roles of professional managers/the disorganized ownership structure and a firm's performance. They found a reverse correlation between the disorganized ownership structure and financial performance

in their mutual study. Hence, a rise in ownership concentration may cause a decrease in the manager's role and control, so that a negative relationship emerges between the ownership concentration and the financial performance of a business.

A. Micco, U. Panizza and M. Yañez (2004) investigates the relationship between a bank's ownership structure and its financial performance both for developing and for developed countries. In this study, the differences between developed and developing countries were determined in terms of financial performance. Developed countries are expected to be much more profitable than developing ones. The study applies the data related to 111 banks for the time period from 1995 to 2002, were subjected to analysis within the study and the regression models for the estimation of the relationship between the variables were formed. Return on assets, return on equity, the interest margin and non-performing loans were used as the financial performance indicators. The variables for the ownership structure were selected as follows: foreign ownership, public ownership and private ownership for the purpose of doing the research. According to the results of the study, no significant relationship was found between the ownership of the bank and its financial performance, when developed countries are concerned; however, statistically significant relationships were detected in the cases of developing countries. In addition, the common banks were evaluated to operate at lower profits comparing with the private ones owing to their higher costs and non-performing loans in developing countries. However, the banks with foreign ownership in developing countries operated with lower costs and higher profitability. While no significant relationship was found between the interest margin and the ownership structure, non-performing loans were evaluated to exist at a higher rate for the common banks in comparison with the private sector.

In their study, C. Tanrıöven, İ. Küçük Kaplan and E. S. Başçı (2006) investigate the relationship between ownership and financial performance indicators via variance analysis for the banks listed on BIST, simultaneously trying to find the answer to this question by doing a t test: "If the general manager

is also a member of the Board or an owner of the capital, does that affect the performance indicators?" Therefore, the findings of this study have importance in terms of agency theory. They used the quarterly data for the period between the years 1997 and 2001 in the study. Return on assets, return on equity and Tobin's Q ratio were selected as the financial performance indicators, whereas the independent variables were family ownership, holding ownership, and disorganized ownership. As a result of the study, the financial performance indicators varied due to the different ownership types. While the difference with respect to financial performance was lower between family and holding ownerships, it was evaluated that there was an even greater difference between disorganized capital ownership and the financial performance indicators.

E. Berezneak (2007) investigates the relationship between the ownership structure of the banks and their financial performance within the framework of corporate management. The ownership structure is an important part of corporate governance. Therefore, this study was conducted within the scope of corporate governance. In this study, the direct regression method was used in order to analyze the data pertaining to the period from 2003 to 2005. In the study, the financial performance indicators applied were return on assets, return on equity, the net interest margin, and the non-performing loans ratio. The selected dependent variables in the research study were as follows: ownership concentration, public ownership, family ownership, holding ownership, foreign ownership, and the disorganized ownership structure. The size of the bank and capital adequacy were benefited from as the two control variables used in the study. According to the results obtained, the return-on-assets ratio was higher for the banks in foreign ownership, whereas the return on equity and the interest margin ratios were found to be higher in the common banks.

M. Kosak and M. Cok (2008) investigate in their study the relationship between the bank's ownership structure and its financial performance for six Eastern European countries (Croatia, Bulgaria, Romania, Serbia, Macedonia and Albania). They used the data

for the period from 1995 to 2004 period. The panel data analysis method was benefited from and the relationships between the variables were estimated by the fixed effect regression models. The return on assets, return on equity, net interest margin and total return on assets before tax ratios were used as the financial performance indicators in the study. Foreign ownership and local ownership variables were included in the ownership structure. According to the results obtained, no significant relationship was found between the financial performance and the ownership structure (with respect to both foreign and local ownerships); however, a significant relationship was detected between the net interest margin and foreign ownership, as well as local ownership (the ownership structure).

I. Antoniadis, T. Lazarides and N. Sarrianiades (2010) investigated the relationship between the bank's ownership structure and its financial performance in the context of Greece. The data of the 15 banks listed on the Greece Stock Exchange for the 2000-2004 period were subject to analysis in the study. Panel data analysis methods were used and the relationships between the variables were estimated by applying fixed effect regression models. The return on assets and return on equity ratios were benefited from as the financial performance indicators in the study. The largest shareholder's capital portion was used herein as the ownership structure variable. In this study, whether ownership concentration had a positive impact or not was the subject matter of the examination. A higher concentration was suggested to be causing lower profitability (Berle & Means, 1932). According to the results obtained, a statistically significant, but non-linear, relationship was found to exist between both the return on assets and the return on equity ratios and the ownership structure. Concentration in the ownership structure first caused a decline in the return-on-assets ratio and the return-on-equity ratio as well, which was then followed by an increase in the financial performance indicators due to the concentration rise.

N. Kobiessi and X. Sun (2010) studied the relationship between the ownership structure of a bank and its financial performance. The data pertaining to the 249

banks operating in the MENA region were analyzed for the period between 2000 and 2002. The return on assets and return on equity ratios were used as the financial performance indicators. Besides, foreign ownership, common ownership and local ownership were benefited from as the ownership structure variables in the study. As a result of the research, a statistically significant and positive directional relationship was found to exist between the foreign ownership structure and the return on assets and return on equity ratios. Herein, the mentioned return on assets and return on equity ratios of the local banks were higher than those of the common banks. Another result of the study revealed that the performances of the banks listed on the stock exchange were higher than the performances of the other banks. Additionally, the financial performances of the private banks in foreign ownership proved to be better comparing to the other ownership types. Herein, the common banks demonstrated the least financial performance in the study.

W. Wen (2010) investigated the relationship between the ownership structure and the financial performance of the Chinese banking sector. The data pertaining to a total of 49 Chinese banks were analyzed in the period from 2003 to 2008. The panel data analysis method was benefited from and the relationships between the variables were estimated via regression models. The return on assets and return on equity ratios were used as the financial performance indicators in the study. Common banks, commercial-deposit banks, city commercial banks, and the five largest shareholders' portion were included in the study as the ownership structure types. According to the results of the research study, the ownership concentration of the common banks demonstrated a significant and positive directional relationship with the return-on-equity rate, whereas a significant, but negative directional relationship was revealed with respect to return on assets.

R. M. Kiruri (2013) investigates the relationship between the ownership structure and the financial performance of the banks within the framework of the Kenyan banks. The data of the 43 banks operating in Kenya were analyzed for the period 2007-2011. Linear

regression and correlation analyses were carried out in the study. The return-on-equity rate was benefited from when the financial performance was concerned. Foreign ownership, common ownership, local ownership and the five largest shareholders' portion were included in the study as the ownership structure variables. According to the results obtained, all of the ownership structure variables had a significant effect on the return-on-equity ratio. The five largest shareholders' portion and common ownership affected the return-on-equity rate in a negative direction. However, foreign ownership and local ownership had a positive effect on the return-on-equity ratio.

G. A. Bopkin (2013) analyzes the relationship between the ownership structure and a bank's financial performance. The data belonging to the 25 banks operating in Ghana were studied by applying panel data analysis for the 1999-2007 period. The loan-loss-provision ratio, as well as the return-on-assets rate, were used as the financial performance indicators in the study. Foreign ownership, local ownership and insider ownership were benefited from as the variables of the ownership structure. As a result of the conducted study, a statistically insignificant relationship was found to exist between the ownership structure variables and the return-on-asset ratio. The banks in foreign ownership were found to be operating more efficiently and profitably in comparison with the local banks. Additionally, insider ownership had a negative directional effect on the costs and efficiency, according to the study. Besides, the size of the Board had a significant and positive directional relationship with profitability, efficiency and asset management. Also, the banks with a larger size of capital were found to be more profitable; however, they were suggested to have a lower credit quality.

In their study, H. S. Nguyen, T. T. T. Tran, X. C. Dinh, A. N. Lai and B. K. Pham (2015) investigated the effect of the ownership structure on a bank's financial performance. The data pertaining to the 44 banks operating in Vietnam were analyzed for the 2010-2012 period, and the regression analysis method was applied. Herein, the financial performance indicators

detected were return on assets and return on equity; besides, foreign ownership, local ownership, common ownership and private ownership were benefited from as the ownership structure variables. In addition, the five largest shareholders' portion was also included in the study as the ownership concentration variable. According to the results of the study, capital concentration had a substantial effect on the return-on-assets ratio. Apart from that, a significant and positive directional relationship was found to exist between the variables. Additionally, yet another significant and positive directional relationship was detected between capital concentration and the return-on-equity rate.

In their study, N. M. Tükenmez, A. G. Gençyürek and C. Ç. Kabakcı (2016) analyzed the relationship between capital concentration and financial performance. The data relating to the 11 banks operating in Turkey were analyzed via the panel data method for the 2008-2014 period. Herein, the rates of return on assets, return on equity, and total loans/total assets, and Tobin's Q ratio were applied as the financial performance indicators, while simultaneously the largest shareholder's portion and the free-float rate were benefited from as the ownership concentration variables in the study. The age of a bank was used as the control variable within the analysis. According to the results obtained, only one significant and negative directional relationship was found to exist between the largest shareholder's portion and the return-on-assets ratio. So, this finding was brought into relationship with ownership concentration and agency theory. No relationship was detected between the free-float rate and return on assets, return on equity, and Tobin's Q ratio. The age of a bank as the control variable had a negative directional relationship with the return-on-assets and return-on-equity ratios.

In their study, B. L. Elitaş, M. Doğan and M. Kevser (2017) investigated the relationship between the ownership structure and financial distress. They analyzed the data belonging to the 112 enterprises listed on the BIST Industrials Index for the 2009-2015 period. The study's independent variable, and a financial distress indicator, was the Altman Z-Score. The five largest shareholders' portion, corporate

ownership, foreign ownership, the leverage ratio, the size of a firm and the free-float rate were included as the independent variables. As a result of the developed robust estimator, ownership concentration and the free-float ratio showed to have negative relationships with financial distress; in contrast, however, there is a positive relationship between corporate ownership and financial distress. Additionally, no statistically significant relationship was detected between foreign ownership and financial distress in the study.

## THE AIM AND THE METHODOLOGY

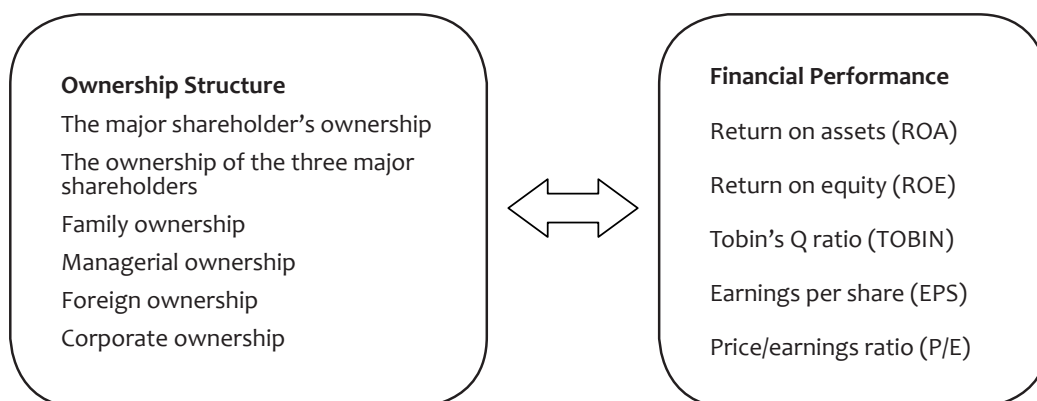
This study is aimed at analyzing the relationship between the ownership structure and the financial performance of the banks listed on the Istanbul Stock Exchange (BIST). The quarterly regular data of the 13 banks listed on BIST are applied relating to the 2005-2017 period; 52 terms were analyzed in total and 676 observations were obtained. The mentioned data pertaining to the banks were obtained via annual reports, independent audit reports, the Finnet financial analysis program, and the Central Securities Depository (CSD) of Turkey.

Regression analysis was carried out in order to analyze the relationships between the variables. Herein, regression analysis was benefited from applying it to detect the relationships between the variables with a cause-result relationship and to estimate the topic by using these relationships or to make conclusions.

The following models and hypotheses were developed so as to reveal the relationship between the ownership structure of the banks and their financial performances within the framework of the aim set, and the content of the study; thus, study has made an effort to explain the effect of the ownership structure on a bank's financial performance (Figure 1).

The following five hypotheses were formulated and analyzed in the study:

H1: The ownership structure has an effect on a bank's return-on-assets ratio.



**Figure 1** The research model

Source: Authors

- H2: The ownership structure has an effect on a bank's return-on-equity ratio.
- H3: The ownership structure has an effect on Tobin's Q ratio.
- H4: The ownership structure has an effect on the earnings-per-share ratio.
- H5: The ownership structure has an effect on a bank's price/earnings ratio.
- A total of 15 variables are used in the study; 5 of them are dependent, and 7 variables are independent, whereas 3 of them are the control variables (Table 1). The dependent variables (the financial performance indicators) of the study are the following ratios of return on assets, return on equity, Tobin's Q ratio, earnings per share and price/earnings. The independent variables are family ownership, managerial ownership, foreign ownership, corporate

**Table 1** The research variables benefited from in the study

Variables	Definitions	Codes
<b>Dependent Variables</b>		
Return on Assets Ratio	Net Profit / Total Assets	ROA
Return on Equity Ratio	Net Profit / Total Equity	ROE
Tobin's Q Ratio	Market Price / Book Value	TOBIN
Earnings per Share Ratio	Net Profit / Number of Shares	EPS
Price / Earnings Ratio	Year-End Market Price of the Shares / Net Profit for the Period/Number of Shares	P/E
<b>Independent Variables</b>		
The Major Shareholder's Ownership	The Major Shareholder's Equity / Total Equity	LARGEST
Ownership of the Three Major Shareholders	The Three Major Shareholders' Equity / Total Equity	LARGEST3
Family Ownership	Family Members' Equity / Total Equity	FAMILY
Managerial Ownership	Managers' Equity / Total Equity	MANAGER
Foreign Ownership	Foreign Shareholders' Equity / Total Equity	FOREIGN
Corporate Ownership	Corporate Shareholders' Equity / Total Equity	CORPORATE
Free-Float Rate	Public Equity / Total Equity	FFR
<b>Control Variables</b>		
Financial Leverage	Total Assets / Total Equity	LEVERAGE
Total Assets	Natural Logarithm of Total Assets	ASSET
Age of Bank	Current Year - Founding Year	AGE

Source: Authors

ownership, the largest shareholder's portion, the ownership of the three largest shareholders, and the free-float rate. Herein, the detected control variables of the study are as follows: the financial leverage, the total assets and the age of the bank.

The data used in the study were analyzed by the SPSS program. Durbin-Watson d statistic, VIF (Variance Inflation Factor) and tolerance values were calculated in order to detect autocorrelation and multicollinearity matters. At the end of the computation, no matter was found to be relating to autocorrelation and multicollinearity (Table 2).

**Table 2** The equations benefited from in the research

$$ROA_{it} = \beta_1 LARGEST_{it} + \beta_2 LARGEST3_{it} + \beta_3 FAMILY_{it} + \beta_4 MANAGER_{it} + \beta_5 FOREIGN_{it} + \beta_6 CORPORATE_{it} + \beta_7 FFR_{it} + \beta_8 LEVERAGE_{it} + \beta_9 ASSET_{it} + \beta_{10} AGE_{it} + \alpha + \epsilon_{it}$$

$$ROE_{it} = \beta_1 LARGEST_{it} + \beta_2 LARGEST3_{it} + \beta_3 FAMILY_{it} + \beta_4 MANAGER_{it} + \beta_5 FOREIGN_{it} + \beta_6 CORPORATE_{it} + \beta_7 FFR_{it} + \beta_8 LEVERAGE_{it} + \beta_9 ASSET_{it} + \beta_{10} AGE_{it} + \alpha + \epsilon_{it}$$

$$TOBIN_{it} = \beta_1 LARGEST_{it} + \beta_2 LARGEST3_{it} + \beta_3 FAMILY_{it} + \beta_4 MANAGER_{it} + \beta_5 FOREIGN_{it} + \beta_6 CORPORATE_{it} + \beta_7 FFR_{it} + \beta_8 LEVERAGE_{it} + \beta_9 ASSET_{it} + \beta_{10} AGE_{it} + \alpha + \epsilon_{it}$$

$$EPS_{it} = \beta_1 LARGEST_{it} + \beta_2 LARGEST3_{it} + \beta_3 FAMILY_{it} + \beta_4 MANAGER_{it} + \beta_5 FOREIGN_{it} + \beta_6 CORPORATE_{it} + \beta_7 FFR_{it} + \beta_8 LEVERAGE_{it} + \beta_9 ASSET_{it} + \beta_{10} AGE_{it} + \alpha + \epsilon_{it}$$

$$P/E_{it} = \beta_1 LARGEST_{it} + \beta_2 LARGEST3_{it} + \beta_3 FAMILY_{it} + \beta_4 MANAGER_{it} + \beta_5 FOREIGN_{it} + \beta_6 CORPORATE_{it} + \beta_7 FFR_{it} + \beta_8 LEVERAGE_{it} + \beta_9 ASSET_{it} + \beta_{10} AGE_{it} + \alpha + \epsilon_{it}$$

Source: Authors

Furthermore, obtaining reasonable results by carrying out the econometric analyses of the data sets would only be possible if the mentioned data sets were stationary. Hence, stationary tests should be applied before analyzing the data set (Table 3).

**Table 3** The results of the panel unit root test

VARIABLES	PP Fisher Test	
	Statistic	Probability (p)
ROA	28.32136	0.000
ROE	93.50836	0.001
TOBIN	99.45728	0.001
EPS	27.07877	0.005
P/E	56.96167	0.002
ASSET	64.09028	0.000
AGE	55.21216	0.001
LARGEST	89.5798	0.000
LARGEST3	59.26537	0.000
FAMILY	53.79758	0.005
MANAGER	34.55004	0.000
FOREIGN	27.9549	0.009
CORPORATE	28.00225	0.001
FFR	30.9971	0.001
LEVERAGE	33.47745	0.004

Source: Authors

Due to the fact that correlations existed between the units, the Fisher ADF Unit Root Test was applied in the study. As is seen in the table, the p-values are lower than 0.05 (the critical value). So, the series have no unit root and that the variables are convenient for econometric analysis is suggested.

### EMPIRICAL RESULTS

The descriptive statistics and the empirical results as well indicating the relationship between the bank's ownership structure and its financial performance are shown in this chapter (Table 4).

The descriptive statistics pertaining to the independent, dependent and control variables within the study are indicated in the table. The return-on-assets ratio of the banks operating on BIST is about 1.30%. Their return-on-equity ratio, as another indicator for financial performance, is 10%. Tobin's

Q ratio, as a market-based financial performance indicator, is 1.45% on average, their earnings per share are about 0.54%, and their price/earnings ratio is 12.38% on average.

While the largest shareholder's ownership ratio representing ownership concentration is 59.09%, the rate of the ownership of the three largest shareholders is calculated as 73.77% on average. The free-float rate of the banks operating on BIST is about 24.48%. the family-ownership ratio is 7.79%, as one of the independent variables representing the ownership identity. Besides, managerial ownership is detected at 0.03% on average. Additionally, the foreign-ownership ratio as yet another ownership type is 24.67%, and the corporate-ownership rate is about 42.02%.

### The Effect of the Ownership Structure Variables on the Return-on-Assets (ROA) Ratio

The results of the analysis indicating the relationship between the banks' ownership structure and their return-on-assets rate are hereinafter accounted for in the Table 5 and Table 6.

$$\text{Model 1: PROFITABILTY (ROA)}_{it} = \beta_1 (.031) \text{LARGEST}Kit + \beta_2 (-.093) \text{LARGEST}3it + \beta_3 (.095) \text{FAMILY}it + \beta_4 (-.116) \text{MANAGER}it + \beta_5 (-.016) \text{FOREIGN}it + \beta_6 (-.157) \text{CORPORATE}it + \beta_7 (-.145) \text{FFP}it + \beta_8 (-.327) \text{LEVERAGE}it + \beta_9 (.197) \text{ASSET}it + \beta_{10} (-.082) \text{AGE}it + \alpha + \varepsilon_{it}$$

According to the results of the analysis, the ROA ratio is affected by managerial ownership, corporate ownership, the leverage ratio, and the total assets. Managerial ownership has a significant (5% level) and negative directional relationship with ROA

**Table 4** The descriptive statistics

Variables	Number of Observations	Mean	Std. Deviation	Min.	Max.
ROA	676	1.3094	1.76692	-10.50	21.51
ROE	676	10.0021	8.03353	-80.37	40.44
TOBIN	676	1.4504	.76856	.00	4.98
EPS	676	.5420	.45151	.00	2.98
P/E	676	12.3868	13.81257	.00	146.13
ASSET	676	10.3817	1.19333	.00	11.56
AGE	676	49.8462	22.38359	8.00	93.00
LARGEST	676	59.0921	24.33004	17.61	100.00
LARGEST3	676	73.8880	16.79675	43.84	100.00
FAMILY	676	7.7977	17.77418	.00	75.00
MANAGER	676	.0336	.14157	.00	.63
FOREIGN	676	24.6708	36.35622	.00	99.88
CORPORATE	676	42.0287	30.57776	.00	99.88
FFR	676	24.4896	16.14770	.00	51.10
LEVERAGE	676	8.3621	2.43755	.00	16.87

Source: Authors

**Table 5** The ROA model sum

Model	R <sup>2</sup>	Adj. R <sup>2</sup>	Std. Dev.	F	Sig.	Durbin-Watson d Statistic
ROA	.128	.115	1.66213	9.780	0.000	1.688

Source: Authors

**Table 6** The ROA regression analysis results

MODEL ROA	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
	B	Std. Dev.	B			Tolerance	VIF
CONSTANT	1.944	.958	-	2.030	.043**	-	-
LARGEST	.002	.006	.031	.377	.706	.191	5.248
LARGEST <sub>3</sub>	-.010	.012	-.093	-.818	.414	.101	9.927
FAMILY	.009	.005	.095	1.802	.072	.476	2.103
MANAGER	-1.448	.615	-.116	-2.356	.019**	.540	1.850
FOREIGN	-.001	.003	-.016	-.294	.769	.448	2.233
CORPOR.	-.009	.003	-.157	-3.395	.001*	.617	1.621
FFR	-.016	.011	-.145	-1.491	.136	-.138	7.221
LEVERAGE	-.237	.033	-.327	-7.171	.000*	.630	1.586
ASSET	.291	.073	.197	4.008	.000*	.544	1.838
AGE	-.006	.005	-.082	-1.328	.185	.344	2.903

\*\*5% level of significance, \*1% level of significance

Source: Authors

(MANAGER  $\beta = -.116$ ; Sig. = .019). Thus, any increase in the managerial-ownership ratio affects ROA negatively. Additionally, the corporate- ownership ratio has a significant (1% level) and negative directional relationship with ROA (CORPORATE  $\beta = -.157$ ; Sig. = .001). Hence, an increase in the corporate-ownership rate affects ROA negatively. While the leverage ratio has a significant (1% level) and negative directional relationship with ROA (LEVERAGE  $\beta = -.327$ ; Sig. = .000), the total-assets rate has a significant (1% level) and positive directional relationship with the ROA rate (ASSET  $\beta = .197$ ; Sig. = .000). So, any increase in the leverage ratio affects ROA negatively, whereas any increase in the total assets positively affects the ROA ratio.

### The Effect of the Ownership Structure Variables on the Return-on-Equity (ROE) Ratio

The results of the analysis indicating the relationship between the bank's ownership structure and the return-on-equity (ROE) ratio are presented in the Table 7 and Table 8

$$\text{Model 2: PROFITABILITY (ROE)}_{it} = \beta_1 (.018)LARGEST_{it} + \beta_2 (-.216)LARGEST3_{it} + \beta_3 (.274)FAMILY_{it} + \beta_4 (-.220)MANAGER_{it} + \beta_5 (0.99)FOREIGN_{it} + \beta_6 (-.058)CORPORATE_{it} + \beta_7 (-.208)FFR_{it} + \beta_8 (-.092)LEVERAGE_{it} + \beta_9 (.219)ASSET_{it} + \beta_{10} (.088)AGE_{it} + \alpha + \epsilon_{it}$$

As a result of the carried-out analysis, all variables such as family ownership, managerial ownership, the free-float rate, the leverage ratio, and the total assets

**Table 7** The ROE model sum

Model	R <sup>2</sup>	Adj. R <sup>2</sup>	Std. Dev.	F	Sig.	Durbin-Watson d Statistic
ROE	.100	.087	7.67685	7.418	0.000	1.840

Source: Authors

**Table 8** The results of the ROE regression analysis

MODEL ROA	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
	B	Std. Dev.	B			Tolerance	VIF
CONSTANT	5.019	4.424	-	1.134	.257	-	-
LARGEST	.006	.028	.018	.220	.826	.191	5.248
LARGEST <sub>3</sub>	-.103	.055	-.216	-1.866	.062	.101	9.927
FAMILY	.124	.024	.274	5135	.000*	.476	2.103
MANAGER	-12.503	2.839	-.220	-4.404	.000*	.540	1.850
FOREIGN	.022	.012	.099	1.795	.073	.448	2.233
CORPOR.	-.015	.012	-.058	-1.235	.217	.617	1.621
FFR	-.103	.049	-.208	-2.101	.036**	.138	7.221
LEVERAGE	-.304	.153	-.092	-1.992	.047**	.630	1.586
ASSET	1.476	.336	.219	4.397	.000*	.544	1.838
AGE	.031	.022	.088	1.400	.162	.344	2.903

\*\*5% level of significance, \*1% level of significance

Source: Authors

have an effect on ROE. The family-ownership rate has a significant (1% level) and positive directional relationship with ROE (FAMILY  $\beta = .274$ ; Sig. = .000), which implies that any increase in family ownership positively affects the ROE ratio. Managerial ownership shows a significant (1% level), but negative directional relationship with ROE (MANAGER  $\beta = -.220$ ; Sig. = .000). Hence, an increase in managerial ownership has a negative effect on ROE. A significant (5% level) and negative directional relationship exists between the free-float rate and ROE (FFR  $\beta = -.208$ ; Sig. = .036). While the quantity of the shares traded on the stock exchange (the free-float rate) increases, ROE is negatively affected. Besides, the leverage ratio, as one of the control variables, has a significant (5% level) and negative directional relationship with ROE (LEVERAGE  $\beta = -.092$ ; Sig. = .047). Finally, a positive directional relationship at a 1% significance level is found to exist between the total-assets ratio,

as another control variable, and the ROE rate (ASSET  $\beta = .219$ ; Sig. = .000). Therefore, any increase in the leverage ratio means a decrease in ROE, whereas a rise in the total-assets ratio reduces the value of ROE.

### The Effect of the Ownership Structure Variables on Tobin's Q (TOBIN) Ratio

The results of the analysis indicating the relationship between the bank's ownership structure and Tobin's Q ratio are shown in the Table 9 and Table 10:

**Model 3:**  $TOBIN'S\ Q\ (TOBIN)_{it} = \beta_1 (.264)LARGEST_{it} + \beta_2 (-.250)LARGEST3_{it} + \beta_3 (.499)FAMILY_{it} + \beta_4 (-.313)MANAGER_{it} + \beta_5 (.021)FOREIGN_{it} + \beta_6 (-.037)CORPORATE_{it} + \beta_7 (-.092)FFR_{it} + \beta_8 (-.132)LEVERAGE_{it} + \beta_9 (.229)ASSET_{it} + \beta_{10} (-.231)AGE_{it} + \alpha + \varepsilon_{it}$

**Table 9** Tobin's Q ratio model sum

Model	R <sup>2</sup>	Adj. R <sup>2</sup>	Std. Dev.	F	Sig.	Durbin-Watson d Statistic
Tobin's Q	.255	.243	.66855	22.707	.000	1.846

Source: Authors

**Table 10** Tobin's Q ratio regression analysis results

MODEL Tobin's Q	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
	B	Std. Dev.	B			Tolerance	VIF
CONSTANT	1.039	.385	-	2.697	.007*	-	-
LARGEST	.008	.002	.264	3.438	.001*	.191	5.248
LARGEST3	-.011	.005	-.250	-2.365	.018**	.101	9.927
FAMILY	.022	.002	.499	10.271	.000*	.476	2.103
MANAGER	-1.699	.247	-.313	-6.870	.000*	.540	1.850
FOREIGN	.000	.001	.021	.429	.668	.448	2.233
CORPOR.	-.001	.001	-.037	-.877	.381	.617	1.621
FFR	-.004	.004	-.092	-1.025	.306	.138	7.221
LEVERAGE	-.042	.013	-.132	-3.134	.002*	.630	1.586
ASSET	.148	.029	.229	5.048	.000*	.544	1.838
AGE	-.008	.002	-.231	-4.058	.000*	.344	2.903

\*\*5% level of significance, \*1% level of significance

Source: Authors

According to the results of the analysis, Tobin's Q (TOBIN) ratio is affected by family ownership, managerial ownership, the largest shareholder's ownership, the ownership of the three largest shareholders, the leverage ratio, the total assets and the age of the bank variables. Herein, family ownership has a significant (1% level) and positive directional relationship with Tobin's Q ratio (FAMILY  $\beta = .499$ ; Sig. = .000); hence, an increase in the family-ownership ratio causes a rise in Tobin's Q rate. Managerial ownership has a significant (1% level), but negative directional relationship with Tobin's Q ratio (MANAGER  $\beta = -.313$ ; Sig. = .000). So, an increase in managerial ownership means a decrease in Tobin's Q ratio. A positive directional relation at a 1% significance level is detected between the largest shareholder's ownership and Tobin's Q ratio (LARGEST  $\beta = .264$ ; Sig. = .001), which means that an increase in the largest shareholder's ownership causes a rise in Tobin's Q ratio. The ownership of the three largest shareholders has a significant (5% level) and negative directional relationship with Tobin's Q ratio (LARGEST3  $\beta = -.250$ ; Sig. = .018). Therefore, Tobin's Q ratio would decrease in the case of an increase in the ownership of the three largest shareholders. As one of the control variables, the leverage ratio has a negative directional relationship with Tobin's Q ratio

at a 1% significance level (LEVERAGE  $\beta = -.132$ ; Sig. = .002). Besides, the total-assets rate, as another control variable, has a significant (1% level) and positive directional relationship with Tobin's Q ratio (ASSET  $\beta = .229$ ; Sig. = .000). Also, as the last control variable, the age-of-a-bank variable has a significant (1% level) and negative directional relationship with Tobin's Q ratio (AGE  $\beta = -.231$ ; Sig. = .000). Thus, an increase in the leverage and age variables causes a decrease in Tobin's Q ratio, whereas an increase in the total assets positively affects Tobin's Q ratio.

### The Effect of the Ownership Structure Variables on the Earnings-per-Share (EPS) Ratio

The results of the analysis indicating the relationship between the bank's ownership structure and the earnings-per-share (HBK) ratio are shown in the Table 11 and Table 12.

**Model 4:** EARNINGS PER SHARE (EPS)<sub>it</sub> =  $\beta_1 (.595)$  LARGEST<sub>it</sub> +  $\beta_2 (-.484)$  LARGEST3<sub>it</sub> +  $\beta_3 (.069)$  FAMILY<sub>it</sub> +  $\beta_4 (-.143)$  MANAGER<sub>it</sub> +  $\beta_5 (.448)$  FOREIGN<sub>it</sub> +  $\beta_6 (-.409)$  CORPORATE<sub>it</sub> +  $\beta_7 (.124)$  FFR<sub>it</sub> +  $\beta_8 (-.011)$  LEVERAGE<sub>it</sub> +  $\beta_9 (.241)$  ASSET<sub>it</sub> +  $\beta_{10} (-.452)$  AGE<sub>it</sub> +  $\alpha + \epsilon_{it}$

**Table 11** The earnings per share (EPS) model sum

Model	R <sup>2</sup>	Adj. R <sup>2</sup>	Std. Dev.	F	Sig.	Durbin-Watson d Statistic
EPS	.480	.472	.32801	61.398	.000	1.758

Source: Authors

**Table 12** The earnings per share regression analysis results

MODEL EPS	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
	B	Std. Dev.	B			Tolerance	VIF
CONSTANT	-.499	.189	-	-2.642	.008*	-	-
LARGEST	.011	.001	.595	9.294	.000*	.191	5.248
LARGEST <sub>3</sub>	-.013	.002	-.484	-5.492	.000*	.101	9.927
FAMILY	.002	.001	.069	1.694	.091	.476	2.103
MANAGER	-.455	.121	-.143	-3.748	.000*	.540	1.850
FOREIGN	.006	.001	.448	10.726	.000*	.448	2.233
CORPOR.	-.006	.001	-.409	-11.491	.000*	.617	1.621
FFR	.003	.002	.124	1.654	.099	.138	7.221
LEVERAGE	-.002	.007	-.011	-.316	.752	.630	1.586
ASSET	.091	.014	.241	6.349	.000*	.544	1.838
AGE	.009	.001	.452	9.490	.000*	.344	2.903

\*\*5% level of significance, \*1% level of significance

Source: Authors

As a result of the analysis, the earnings-per-share ratio is affected by the variables such as managerial ownership, foreign ownership, corporate ownership, the largest shareholder's ownership, the ownership of the three largest shareholders, the total assets and the age of the bank. Managerial ownership has a significant (1% level) and negative directional relationship with earnings per share (EPS) (MANAGER  $\beta = -.143$ ; Sig. = .000). So, an increase in managerial ownership causes a decline in the earnings-per-share (EPS) value. The foreign-ownership variable has a significant (1% level) and positive directional relationship with earnings per share (FOREIGN  $\beta = .448$ ; Sig. = .000). Thus, as the foreign-ownership value increases, the value of earnings per share (EPS) increases as well. Additionally, a negative directional relationship at a 1% significance level is detected between corporate ownership and earnings per share (CORPORATE  $\beta = -.409$ ; Sig. = .000). Hence, an increase in corporate

ownership means a decline in the earnings-per-share (EPS) value. The largest shareholder's ownership, one of the variables representing ownership concentration, has a significant (1% level) and positive directional relationship with earnings per share (LARGEST  $\beta = .595$ ; Sig. = .000). Furthermore, the ownership of the three largest shareholders, as another variable representing ownership concentration, has a significant (1% level), but negative directional relationship with earnings per share (LARGEST<sub>3</sub>  $\beta = -.484$ ; Sig. = .000). Finally, each of the ratios of the total assets and the age of a bank representing the control variables herein has a positive directional and significant relationship at a 1% level with the earnings-per-share (EPS) rate (ASSET  $\beta = .241$ ; Sig. = .000), and (AGE  $\beta = .452$ ; Sig. = .000), too.

### The Effect of the Ownership Structure Variables on the Price/Earnings (P/E) Ratio

The results of the analysis indicating the relationship between the bank's ownership structure and the Price/Earnings ratio (F/K) are shown in the Table 13 and Table 14.

**Model 5:** PRICE/EARNINGS RATIO  $(P/E)_{it} = \beta_1 (.157) LARGEST_{it} + \beta_2 (.140) LARGEST3_{it} + \beta_3 (-.043) FAMILY_{it} + \beta_4 (.013) MANAGER_{it} + \beta_5 (-.166) FOREIGN_{it} + \beta_6 (-.048) CORPORATE_{it} + \beta_7 (.140) FFR_{it} + \beta_8 (-.221) LEVERAGE_{it} + \beta_9 (.117) ASSET_{it} + \beta_{10} (-.378) AGE_{it} + \alpha + \varepsilon_{it}$

According to the obtained results, each of the variables such as the largest shareholder's ownership, foreign ownership, the leverage ratio, the total assets, and the age of a bank has an effect on the price/earnings (P/E) ratio. The largest shareholder's ownership, as one of the ownership concentration variables,

has a significant (5% level) and positive directional relationship with the price/earnings ratio ( $LARGEST \beta = .157; Sig. = .049$ ). A negative directional relationship at a 1% significance level is detected between foreign ownership and the price/earnings ratio ( $FOREIGN \beta = -.166; Sig. = .001$ ). Thus, an increase in foreign ownership within the capital structure causes a decrease in the price/earnings (P/E) ratio. The leverage ratio, as one of the control variables, has a significant (1% level) and negative directional relationship with the price/earnings ratio ( $LEVERAGE \beta = -.221; Sig. = .000$ ). A positive directional relationship at a 5% significance level is found to exist between the total assets and the price/earnings ratio ( $ASSET \beta = .117; Sig. = .013$ ) beside a negative directional relationship at a 1% significance level, which is detected between the age variable and the price/earnings ratio ( $AGE \beta = -.378; Sig. = .000$ ). Therefore, any increase in the leverage and age variables causes a decline in the

**Table 13** The price/earnings ratio (P/E) model sum

Model	R <sup>2</sup>	Adj. R <sup>2</sup>	Std. Dev.	F	Sig.	Durbin-Watson d Statistic
P/E	.197	.185	12.47241	16.285	.000	1.901

Source: Authors

**Table 14** The price/earnings ratio (P/E) regression analysis results

MODEL P/E	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
	B	Std. Dev.	B			Tolerance	VIF
CONSTANT	6.414	7.188	-	.892	.373	-	-
LARGEST	.089	.045	.157	1.972	.049**	.191	5.248
LARGEST3	.115	.090	.140	1.275	.203	.101	9.927
FAMILY	-.033	.039	-.043	-.849	.396	.476	2.103
MANAGER	1.260	4.613	.013	.273	.785	.540	1.850
FOREIGN	-.063	.020	-.166	-3.199	.001*	.448	2.233
CORPOR.	-.022	.020	-.048	-1.090	.276	.617	1.621
FFR	.120	.080	.140	1.504	.133	.138	7.221
LEVERAGE	-1.250	.248	-.221	-5.039	.000*	.630	1.586
ASSET	1.352	.545	.117	2.479	.013**	.544	1.838
AGE	-.233	.037	-.378	-6.376	.000*	.344	2.903

\*\*5% level of significance, \*1% level of significance

Source: Authors

price/earnings (P/E) ratio, whereas the total-assets ratio positively affects the price/earnings variable.

## Results

The relationship between the ownership structure and financial performance in the case of the banks operating on the Istanbul Stock Exchange (BIST) was analyzed in this study. The quarterly regular data of the 13 banks listed on BIST were applied, pertaining to the 2005-2017 period, and 52 terms were included in the study. The financial performance indicators used in the study are as follows: return on assets (ROA), return on equity (ROE), Tobin's Q ratio (TOBIN), earnings per share (EPS), and the price/earnings (P/E) ratio. The selected independent variables of the study are as follows: family ownership, corporate ownership, managerial ownership, foreign ownership, the largest shareholder's ownership, the ownership of the three largest shareholders, and the free-float rate. According to the results obtained after carrying out the analysis, the ownership structure variables affect the financial performance indicators of banks.

While family ownership has a positive directional relationship with ROE (as one of the financial performance indicators), managerial ownership has negative directional relationships with both ROA and ROE. The results suggest that agency theory is supported. The cited theory points out a possible conflict between shareholders and managers, mentioning thus a decision-making problem a firm's managers are faced with due to their own interests. As a result of the performed analysis, an increase in managerial ownership means lower profitability, which is supportive of the mentioned theory. The economic, legal, sociocultural and historical structures are substantial within the countries' corporate governance practices. Legal protection standards are evaluated as satisfactory for developed economies, and ownership spreads across the country. Because of the poor structure of legal protection within developing countries like Turkey, the family ownership and concentrated ownership structures are put forward. Hence, the positive relationship detected between family ownership and ROE is also supportive

of agency theory. Tobin's Q ratio is formulated as a market value/book value in the study; additionally, a positive directional relationship is found to exist between family ownership and Tobin's Q ratio. Banks in family ownership expect to attract foreign investors by raising their market prices. Thus, an increase in Tobin's Q ratio owing to family ownership is reasonable. Similar results were obtained in the literature in the studies by E. Berezneak (2007), and M. R. King and E. Santor (2008). Besides, managerial ownership has negative directional relationships with Tobin's Q ratio and the earnings-per-share (EPS) rate. C. P. Himmelberg, R. G. Hubbard and D. Palia (1999) investigated the topic for developing countries and came to similar results. In spite of the noteworthy relationship revealed between managerial ownership and financial performance, expanding this claim in the context of Turkey's banking sector has not proven to be satisfactory yet. According to the results of the study, corporate ownership demonstrates negative directional relationships between return on assets (ROA) and earnings per share (EPS). Though higher financial performance is expected through a rise in corporate investors' corporate management practices, various results have been obtained based on the recently-conducted studies. Corporate investors' financial performances are related to the legal protection level, regulations, accounting system, etc. of the country they operate in. Hence, the influence of corporate investors on financial performance might probably be expected in the economies with developed corporate management practices. The existence of a poor legal protection level in developing countries like Turkey hinders the expected effect on the financial performance of the corporate investors. A negative directional relationship is detected between the free-float rate and return on equity (ROE), which supports agency theory. Due to an increase in the free-float rate, agency costs arise, and agents could tend to pursue their own interests. Hence, the mentioned situation has a negative effect on financial performance. I. Sakınç (2008), and E. E. Topaloğlu, N. Coşkun and C. Özkan (2016) came to similar results in the study aimed at this topic. It is suggested that corporate management practices should be enhanced and minority rights should be strengthened in Turkey

in order to increase the positive effect of the free-float rate on financial performance. Foreign ownership has a positive directional relationship with earnings per share (EPS), and a negative relationship with the price/earnings (P/E) ratio. Investors expecting to gain share profits from banks are to invest in foreign dominant banks, because banks in foreign ownership are supposed to have higher financial performance due to their better corporate management practices. The findings in the context of Turkey, however, do not support this statement. The corporate management grade and the poor legal protection level in Turkey affect the mentioned situation. Therefore, corporate management practices should be developed in Turkey. Regarding the topic, quite separate results have recently been obtained from the literature. Differences between countries have an effect on the financial performances of foreign investors. The largest shareholder's ownership has positive relationships with Tobin's Q ratio, the earnings-per-share (EPS) and price/earnings rates (P/E). Besides, the ownership of the three largest shareholders has negative relationships with Tobin's Q ratio and earnings per share (EPS). So, concentration increases in the ownership structures of banks (when the ownership structure does not spread to the base) positively affect financial performance. Financial performance increases in the structures characterized by the existence of a single person's or corporation's

dominance. It is suggested that these results support agency theory. The concentration occurring in the ownership structure removes the separation of ownership and control; thus, the main shareholder becomes the manager and the controller. Hereby, this situation could reduce agency costs and losses.

According to the results of the study, each ownership structure has an effect on the financial performances of the banks operating on BIST. These results prove the hypotheses of the research.

## CONCLUSION

This study was conducted for the quarterly time period between 2005 and 2017, for the 13 banks operating on the Istanbul Stock Exchange. A total of 52 terms were analyzed, and 676 observations were obtained. The mentioned banks-pertaining data were obtained through annual reports, independent audit reports, the Finnet financial analysis program and the Central Securities Depository (CSD) of Turkey. These are the basic research limitations of the study.

The mentioned results point out that the corporate governance approach, hence the ownership structure and financial performance relationships, could vary from one country to another. Countries' corporate

**Table 15** The hypotheses statement table

Number of Hypothesis	Hypothesis	Test Applied	Accept/Reject
H1	The ownership structure has an effect on a bank's return-on-assets ratio.	Multiple Regression	Accepted
H2	The ownership structure has an effect on a bank's return-on-equity ratio.	Multiple Regression	Accepted
H3	The ownership structure has an effect on Tobin's Q ratio.	Multiple Regression	Accepted
H4	The ownership structure has an effect on the earnings-per-share ratio.	Multiple Regression	Accepted
H5	The ownership structure has an effect on a bank's price/earnings ratio.	Multiple Regression	Accepted

governance practices lead to a variation in the relationships between their economic structures, regulations, legal protection level, ownership structures and financial performances. Better corporate management practices and an advanced legal protection level are what Turkey needs so as to increase financial performance within the banking sector. Therefore, other foreign investors could be attracted by Turkey, and they could be included in the banking system via ownerships. Herein, it is suggested that ownership concentration within the banking sector represents a barrier for achieving the optimal capital structure. In the case of spreading capital to the base and having more shareholders for banks, it could contribute to the development of corporate management practices.

The results obtained are supposed to be of substantial importance to the top managers of banks, investors, the regulators operating in financial markets, and researchers as well. This study could be a benchmark to form better management models between stockholders regarding ownership structures, managers and other groups in the context of a corporate management approach. So, and especially regarding managers, the key question is: "What is better corporate governance?". The results of the study are supposed to lead to critical decision, such as new partnerships and IPOs, for banks. Besides, they could also contribute to the reforms of bank managers, aiming to optimize their relationships with stakeholders, which means that the banks listed on BIST could benefit from this research study in the sense of their being guided within this framework.

Finally, academics can examine different types of relationships between the ownership structure and financial performance in future studies, which will contribute to achieving better corporate governance.

## NOTE

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## EVALUATION OF PRIORITY OBJECTIVES AND THE FUNCTIONING OF INTERNAL CONTROL IN COMPANIES OF SUMADIJA AND RASKA DISTRICTS

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Without the existence of a internal control system in today's conditions of business operations, managing a company would be unthinkable. The presence of control allows the performance of business activities according to a plan through the preventive suppression of the deviant phenomena that could jeopardize the realization of defined objectives. If the system were not established, the company would potentially be exposed to significant losses, whose final result could be the failure and disappearance of the company. This paper is aimed at indicating the ranking and significance of the individual objectives of the internal control system in our companies' business operations practice and, in this regard, the need for the establishment of appropriate control activities as an additional measure for securing the achievement of the proclaimed business objectives of the company. The research has shown that the best-ranked objective of internal control is the improvement of the accuracy and reliability of bookkeeping and operational data, which indicates that companies see regulators' external responsibility as a priority in their business operations. The lowest-ranked objective - the evaluation of business efficiency, speaks in favor of the secondary position of the needs of internal informing in relation to external report demands. In the paper, an attempt was made to comprehensively analyze the way in which internal control is implemented in a company's most important functions, namely the functions of sales, supply, production, human resources, and the financial function.

**Keywords:** activity control, objective internal control objectives, financial reporting, internal control system

JEL Classification: M40, M41, M42

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### INTRODUCTION

A company's performance of business activities is characterized by a constant exposure to risks.

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The dynamism of the environment, due to which companies are unable to reliably estimate the outcomes of individual activities, may bring into question the achievement of a company's defined objectives. In order to reduce and control the risks they are exposed to on their way towards the achievement of objectives, companies define the internal control

system for the purpose of limiting risk to an acceptable level. "Business management is obliged to establish internal control performed by all the employees as a component part of their regular work duties and to perform supervision of their functioning" (Ljubisavljevic, 2013, 49). Apart from being a suitable mechanism for reducing risks, an adequate control system simultaneously increases a possibility of using favorable external chances and opportunities offered to a company. The responsibility for the establishment of the internal control system and its functioning is borne by the company's management, whereas the auditor is he who is responsible for the evaluation of the existent internal control (Jovković, 2010, 152).

In the paper, the research study is focused on what the measuring of the importance of certain objectives of the internal control system is in the practice of a company's business doing, and which objectives of the company's control system are considered to have a higher priority in the everyday business operations of the company. The effects of internal control are as follows: securing the company's assets from being wasted, embezzled and inefficient; the improvement of the accuracy and reliability of bookkeeping and operational data; compliance with the company's business policy, and the assessments of its business efficiency. The quantifying of the significance of defined control objectives is an important basis for the examination and evaluation of the focus that companies place in the process of achieving the business objectives determined for future business activities. Through empirical analysis, the existence of a positive impact of the internal control system on the successful achievement of the company's business objectives will be examined. The experiences of many companies abroad have shown that the inadequate implementation of internal control has led to an increase in costs and embezzlements. Thanks to the successful evaluation of the functioning of internal control in the companies that are the subject matter of the analysis, a possibility of discerning possible problematic areas is open to improvement in the control procedures implementation process.

The research study begins with the basic hypothesis that the internal control system is established for

the purpose of complying with the company's business policy and assessing of the company's business efficiency. As a segment of supervision, internal control is important to the business of each company irrespective of its size, activity and form of organization. The implementation of efficient internal control is a more economical solution for a company than the carrying out of later analyses, which have the revealing of embezzlements and mistakes as their objective. For the purpose of assessing the success of the achievement of internal control objectives in companies, a comparative analysis of the obtained results among the surveyed companies was applied. The methods of deduction, analysis, synthesis and, especially, the procedures of induction are applied, starting from the basic individual assumptions for the purpose of coming to general conclusions. The paper is supported by a graphic display of the given assessments of the structure of the surveyed companies and a spreadsheet of the obtained research results.

Primarily, internal control regulation is analyzed in the paper and a review of previous research studies conducted in the relevant literature is presented. Upon the presentation of the key regulatory demands, attention is focused on the explanation of the applied research methodology. Furthermore, the results obtained by the examination of the importance of the implementation of internal control as per company functions is then presented. The complete analysis is finalized by a presentation of the conclusions regarding the observed regularities that arise as a consequence of the empirical research into the practice of the business operations conducted by companies and the possibilities of improving the internal control system in the future.

## THEORETICAL ASPECTS AND THE REGULATORY FRAMEWORK OF THE INTERNAL CONTROL SYSTEM

Due to numerous financial frauds followed by great losses on the part of investors in companies, the USA was a leader in the adoption of the law and the

professional frameworks that refer to internal control. At the beginning of the 2000s, the bankruptcy of a few big companies, such as Enron and WorldCom (Knapp, 2010, 46), was certainly a sign that significant changes in the legal regulations related to financial reporting should be made. As a response to the mentioned scandals, what followed was the adoption of the Law on the Accounting Reform of Public Companies and the Protection of Investors, as known as the Sarbanes-Oxley Law (the SOX was adopted in 2002). The importance of the internal control system was especially emphasized as a means of preventing and disclosing materially important wrong statements in financial reports caused by a fraud. Management is required to implement effective internal controls and check their efficiency, as stated in Section 302 of the SOX - Corporate Responsibility for Financial Reports (Public Law, 2002, 33). Section 404 of the SOX - The Assessment of Internal Controls by Management - requires that management and the external auditor should report on the adequacy of internal control. In a report on internal control composed by the company's management, the responsibility of management is confirmed for the establishment and maintenance of an adequate internal control system, and procedures for financial reporting (Nzechukwu, 2017, 75). To determine the internal control system is the key determinant in the work done by the external auditor. Depending on its quality, the scope of the tests and procedures of the essential study that will be carried out in the auditor's evidence collection procedure is determined (Jovković, 2011, 94). The National Commission on Fraudulent Financial Reporting (Treadway Commission) published a report in October 1987, in which they gave a recommendation "that all companies should establish internal controls that will provide reasonable warranty that fraudulent financial reporting will be prevented or discovered on time" (National Commission on Fraudulent Financial Reporting, 1987, 97). The Committee of Sponsoring Organizations of the Treadway Commission (Committee of Sponsoring Organizations of the Treadway Commission - COSO) published a report in 1992, entitled "Internal control - Integrated Framework, in which internal control was defined and the framework on the basis of

which companies could evaluate it was presented (The Committee of Sponsoring Organizations of the Treadway Commission, 2019). According to the COSO framework, the fundamental components of the internal control system are as follows (Regina, Lasse & Lourdes, 2018, 4):

- control environment;
- risk management;
- control activities;
- informing and communication, and
- monitoring activities.

Beside this best known and most widespread model of the framework of the internal control system, there are also the other models without such a dominant role in practice, namely: CoCo in Canada; Cadbury, Rutteman, Hamleli Turnbull model (Bryan & Arnold, 2016, 178).

The term "internal control" implies a set of the policies and procedures established by management for the purpose of providing reasonable assurance that a company's specific objectives will be accomplished (Ljubisavljević and Jovković, 2016, 116). Based on the stated definition, it can clearly be understood that internal control has several objectives, and that reliable financial reporting is not its sole objective. However, since numerous financial frauds in the past were followed by manipulations in financial reports, and since internal control is presented as a mechanism that should prevent such and similar events, the notion of internal control mostly related to the accounting domain. The internal control system consists of all the measures and methods applied in a company for the purpose of (Martić, 1987, 29):

- securing the company's assets from being wasted, embezzled and inefficient;
- improving the accuracy and reliability of accounting and operational data;
- complying with the company's business policy; and
- assessing business efficiency.

There are several categories which the implementation of internal control should contribute to, and they are usually grouped into: operational (business effectiveness and efficiency), informational (the reliability of reporting), and objectives of compliance (compliance with respect to the application of the law and other regulations) (Eilifsen, Messier, Glover & Prawitt, 2014, 176). The first category of the objectives refers to the basic business objectives of a company, such as: the company's business reputation, return on investments, the growth of the market share, the introduction of a new product, and the effective and efficient use of the company's resources. The objectives in the research field concern internal and external financial and nonfinancial reporting, simultaneously including reliability, timeliness, transparency and other demands prescribed by laws, standards or the company's internal acts (Porter, Simon & Hatherly, 2014, 385). The consistent application of valid laws and the other regulations that refer to a certain company, as well as compliance with the company's internal policies, constitute the third category of objectives. The audit profession in the Republic of Serbia is regulated by the Law on Audit adopted in 2013 (Jovkovic, 2014, 48). The professional regulation of the company's external reporting consists of the International Financial Reporting Standards adopted by the International Accounting Standards Board (IASB) (Obradovic, 2018, 230). The extent to which the mentioned objectives are recognized by the surveyed companies is the subject matter of priority of further research in the paper.

## RESEARCH METHODOLOGY

The successfulness of the functioning of internal control in the companies' practice was researched during January 2019, by sampling big and medium-sized companies of different business activities operating in the territory of the cities of Kragujevac, Kraljevo and Vrnjačka Banja. The data were collected by applying afore-prepared surveys distributed to those companies' accounting managers. The questionnaire was defined in such a way to allow for the examination of the perceptions and

attitudes of the surveyed respondents regarding the successfulness of the achievement of internal control objectives by the importance of the implementation of the key control procedures, and the examination of the manner of the implementation of internal control as per respective companies' functions. The respondents were offered an assessment of the attitudes by applying the Likert five-point scale that implies the degree of compliance with the presented attitude. The marks from 1-absolutely disagree to 5-absolutely agree were at the respondents' disposal. The key deficiency of the survey, such as the manner of the collation of the data in the empirical research, reflects in the fact that the respondents provided, and did so very frequently, too optimistic responses regarding the quality of the conducting of their own activities. Due to this fact, caution is necessary in the interpretation of the obtained results. A total of 95 surveys were sent to the e-mail addresses of big and medium-sized companies, and a total of 30 companies responded to them (the response rate of 31.58%). A total of 15 companies from Kragujevac were surveyed, 14 companies from Kraljevo, and one company from Vrnjačka Banja. Out of the total number of the surveyed companies, 21 are medium-sized and 9 are big companies. The distribution of the surveyed companies according to the activity is as follows: 22 companies operate in the field of production (14 medium-sized and 8 big), 4 medium-sized companies operate in the service sector, and 4 companies are engaged in commercial business (3 medium-sized and 1 big). The collected data were analyzed by applying a comparative method; the calculation of the indicators of the statistical descriptive method was done, and the histogram method for displaying the research results was used.

## RESULTS AND DISCUSSION

The first part of the surveyed questionnaire referred to the assessment of the successfulness of the achievement of the internal control objectives for the purpose of discerning the priorities of the company during their implementation. The following results were obtained, namely the average marks of the four

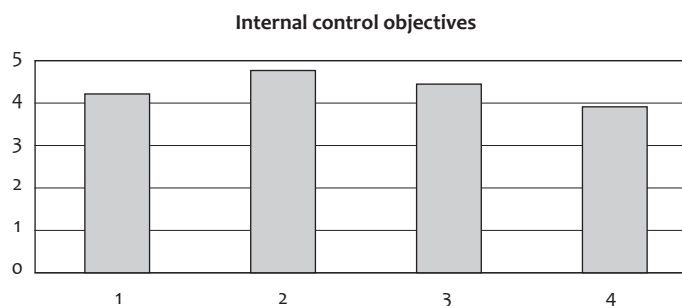
key internal control objectives (Figure 1):

- securing the company's assets from being wasted, embezzled and inefficient (4.20);
- improving the accuracy and reliability of accounting and operational data (4.76);
- complying with the company's business policy (4.43); and
- assessing business efficiency (3.90).

As a statistical measure of the deviation of the given assessments from the average value of the assessed internal control objective, the standard deviation is the highest for the first objective, being 0.761, whereas the same has the lowest value for the second and the third objectives, being 0.504. The standard deviation of the average marks for all 4 internal control objectives is 0.36654, and is of a significantly lower value than the standard deviation of the individual objectives (Table 1).

The average mark for all 4 objectives is 4.32. The biggest deviation from the average mark for the internal control objectives is marked for the objective 2) in a positive direction (10.21% of the average mark), and for the objective 4) - in a negative direction (9.82% of the average mark). The greatest percentage of the surveyed companies, namely 40% of them, assessed the successfulness of securing the company's assets from being wasted, embezzled and inefficient by assigning it the marks 4 and 5, whereas 20% of the companies gave it the mark 3. Over two-thirds

of the companies that gave the marks 4 and 5 are medium-sized, and the biggest percentage of them account for production companies. The question which confirmed that internal control contributed to the improvement of the accuracy and reliability of accounting and operational data was assigned the mark 5 by 80% of the companies, the mark 4 by 16.70%, and the mark 3 by 3.33% of the companies. Out of the companies that assigned the mark 5, 77.78% of them are medium-sized companies and 22.22% are big companies. Observed according to the activity they perform, 83.33% are production companies, 11.11% are the companies engaged in trade, and 5.56% are service companies. The successfulness of the achievement objective of complying with the company's business policy was marked with the mark 4 by slightly over one-half of the surveyed companies (57% of them), and the highest mark was assigned by 43% of the surveyed companies. Out of the companies that gave the mark 5, 73.33% of them are medium-sized, and 26.67% are big companies. Out of them, the largest number are engaged in production 73.33%, whereas 13.33% of the companies are engaged in trade and services, respectively. The highest percentage of the companies assessed the successfulness of achieving the last objective with the mark 4 (70%), only 10% with the mark 5, and 20% with the mark 3. Of the companies that gave the mark 4, 72.22% are medium-sized, and the remaining 27.78% are big companies. Of that, the biggest percentage are production companies - 77.78%, whereas the companies dealing with trade and services account for 11.11% of those companies, respectively. The



**Figure 1** The assessment of internal control objectives

**Table 1** The average mark and the standard deviation of the marks of the objectives of the internal control system

Company	Marks of objectives				$(x - \bar{x})^2$			
	1)	2)	3)	4)	1)	2)	3)	4)
1.	5	5	5	5	0.64	0.054444	0.321111	1.21
2.	4	5	4	4	0.04	0.054444	0.187778	0.01
3.	3	4	4	3	1.44	0.587778	0.187778	0.81
4.	5	5	4	3	0.64	0.054444	0.187778	0.81
5.	4	5	5	4	0.04	0.054444	0.321111	0.01
6.	5	5	5	4	0.64	0.054444	0.321111	0.01
7.	4	5	4	4	0.04	0.054444	0.187778	0.01
8.	3	5	5	4	1.44	0.054444	0.321111	0.01
9.	5	5	4	4	0.64	0.054444	0.187778	0.01
10.	4	5	4	4	0.04	0.054444	0.187778	0.01
11.	5	4	4	5	0.64	0.587778	0.187778	1.21
12.	4	5	5	4	0.04	0.054444	0.321111	0.01
13.	3	5	5	3	1.44	0.054444	0.321111	0.81
14.	5	4	4	3	0.64	0.587778	0.187778	0.81
15.	4	5	5	4	0.04	0.054444	0.321111	0.01
16.	5	5	4	4	0.64	0.054444	0.187778	0.01
17.	4	5	4	4	0.04	0.054444	0.187778	0.01
18.	3	5	4	4	1.44	0.054444	0.187778	0.01
19.	5	4	5	4	0.64	0.587778	0.321111	0.01
20.	4	5	5	4	0.04	0.054444	0.321111	0.01
21.	5	5	4	5	0.64	0.054444	0.187778	1.21
22.	4	4	5	4	0.04	0.587778	0.321111	0.01
23.	3	5	4	3	1.44	0.054444	0.187778	0.81
24.	5	5	4	3	0.64	0.054444	0.187778	0.81
25.	4	5	4	4	0.04	0.054444	0.187778	0.01
26.	5	5	5	4	0.64	0.054444	0.321111	0.01
27.	4	5	5	4	0.04	0.054444	0.321111	0.01
28.	3	5	4	4	1.44	0.054444	0.187778	0.01
29.	5	5	5	4	0.64	0.054444	0.321111	0.01
30.	4	3	4	4	0.04	3.121111	0.187778	0.01
$\bar{x}$	4.2	4.77	4.43	3.9	Sum 16.8	Sum 7.366667	Sum 7.366667	Sum 8.7
Sample variance				$S^2$	0.57931	0.254023	0.254023	0.3
Standard sample deviation				$\sqrt{S}$	0.761	0.504	0.504	0.547
$\bar{x}$ or $\sum 4$ objectives = 4.32				$S^2$ for $\sum 4$ objectives = 0.134352	$\sqrt{S}$ for $\sum 4$ objectives = 0.36654			

Source: Author

achievement of the previously mentioned objectives is enabled by permanent control, whose basis includes the methods of comparison and the examination of realized and planned assignments, with the help of which certain deviations in the process of performing defined business activities in a company are observed and ascertained.

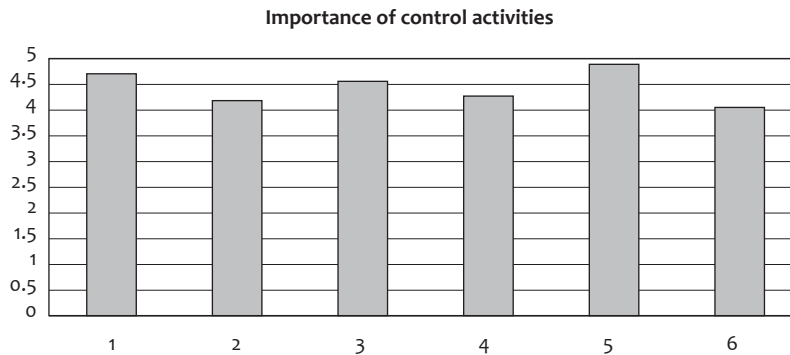
The results obtained by the analysis of the answers of the surveyed companies imply that internal controls in a larger number of these companies successfully achieve their objectives. Based on the high average mark for each of the internal control objectives, it is concluded that the design and functioning of these controls are satisfactory. The review of the respondents' marks with respect to the priority of the internal control basic objectives challenge the acceptance of the basic research hypothesis given the fact that the objective "the assessment of the company's business efficiency" achieved the lowest average mark 3.90. The highest average mark for the second internal control objective implies that, in the first place, the companies emphasized the extreme responsibility on the part of regulators. "Accounting regulation always prescribes: truthfully and honestly, as the most important qualifications for financial reports" (Singh & Doliya, 2015, 64). Given the fact that the fourth objective rates the lowest, it is implicitly concluded that internal information and business efficiency are in an inferior position. The question of whether the internal control system is the aim of or the means for achieving an objective imposes for some future research? In other words, how to affect internal control, whether the internal control system in companies can be improved by improving the regulation? "The consistent quality of the audit of financial reports at a global level as a precondition of the equal application of the IFRSs is impossible to achieve without unique global audit standards" (Obradovic, 2014, 240). Management have to constantly engage themselves in the assessment of the effectiveness of internal control since, due to change in business conditions in a future period, the system may become inadequate, which will certainly reflect on the degree of the achievement of an objective and the quality of created reports. "False financial reports have been existent since is the beginning of financial

reporting because management's or owners' certain short-term material objectives are possible to achieve" (Dimitrijevic, 2015, 139).

In order to implement the recognized objectives, it is necessary that the control activities that enable it should be in place. The importance of the implementation of the basic control procedures was explored by the surveyed respondents, who the statements related to the basic control procedures were offered to for the purpose of their assessment on the Likert scale (Figure 2). The average marks of the obtained responses were as follows:

- the delimitation of duties is a necessary control activity reducing the risk of the employees' conspiracy, mistakes or the bypassing of the procedures (4.73);
- the approval of the transactions provides the validity of transactions and agreement with management upon the objectives (4.17);
- adequate documentation and records provide the evidence and trace of transactions (4.57);
- access controls protect the company's property and records from their unauthorized use (4.30);
- independent check is the most efficient control activity in the company (4.90); and
- the internal controls integrated in the information system are more significant than physical controls (4.07).

The "independent evaluation" is the best assessed control activity, with the mark 4.9, and the "internal control integrated in the information system" is the worst assessed control activity, with mark 4.07. The comparison of the existent and recorded assets, the auxiliary reports with the control reports represents a useful aspect of the independent check and control of incorrect recording. The biggest percentage of the respondents evaluated independent rating with the highest mark, 90% (67.11% being medium-sized, and 32.89% being big companies), and the mark 4 (10%), which is implicative of the domination of a traditional understanding of internal control in a company's



**Figure 2** The assessment of the importance of certain control activities in the internal control system

Source: Author

practice and of the need for checking by some third party as the most expensive form of control. The low rating of internal controls in the information system leaves room for the development of internal controls based on IT possibilities (Hall, 2011, 68). The second-rated control activity is the “delimitation of duties”, which, along with the third-rated “documentation and records” control activity, is in accordance with the previously obtained results of the research regarding the best-rated objectives of internal control (the company’s external reporting obligation). Internal controls should primarily serve the internal needs of companies, and then those of regulators. By delimiting duties, a possibility of the occurrence of mistakes, a procedure violation by and secret agreements of and among employees decreases. The issue of the delimitation of duties requires the existence of corresponding organizational solutions which would not allow an employee to perform business operations from the beginning to the end, thus being in the position to do or hide an irregularity. When the question confirming that the regular delimitation of duties is an important concept of control is concerned, the greatest percentage of the companies gave the mark 5 (86.67%), whereas the mark 3 was given by 13.33% of the companies. Out of the companies that gave the mark 5, 81.25% are medium-sized companies, and 18.75% are big companies, the biggest percentage of them being engaged in production (93.75%), whereas only 6.25% of the surveyed companies are engaged in trade. The average mark for all the

control activities is 4.45. The greatest deviation from the average value was noted with the control activity of “independent check”, namely 10.15% of the average, and with the internal control integrated in the information system, accounting for 8.54% of the average. According to the foregoing, it follows that a large majority of the surveyed recognize the importance of the implementation of the basic control activities given the fact that the mentioned attitudes were marked with 4 or 5.

Previous control procedures are decomposed as per individual business functions in the company. The manner in which the companies included in the research study implemented internal control within the basic functions will be perceived, namely the functions of sales, supply, production, personnel, and the financial function. The control procedures that were offered to the respondents to declare themselves were but certain potential procedures that could be applied to the certain functions of the company. In studying the internal control implemented within the sales function, the following responses were obtained:

- the functions of product shipment, recording customers’ orders and invoicing are delimited (in 26 of 30 companies, i.e. 86.67%);
- a record of sold products is based on adequate documentation (in 30 of 30 companies, i.e. 100%);
- the documents regarding products sale were

previously numbered in most surveyed companies (in 30 of 30, i.e. 100%);

- the data about products sold are periodically brought into compliance with customers (in 28 of 30 companies, i.e. 93.33%); and
- the credibility of potential customers is examined before the establishment of cooperation (in 27 of 30 companies, i.e. 90%).

A large number of the companies recognize the importance of the implementation of the mentioned control procedures within the sales function. The respondents predominantly (86.67%) confirmed that the duties concerning product shipment, the recording of customers' orders and invoicing were delimited, by which the delivery of products was disabled without indebting customers and the discount approval unconfirmed with a valid pricelist. Along with the delimitation of the duties of the mentioned functions in order to avoid the underestimation of customer demand and the overpricing of stocks, sales have to be supported by adequate documentation, which all companies confirmed. Both control procedures, the compliance of data with customers and checking the credibility of potential customers, are implemented in the majority of the surveyed companies. The compliance of data with customers is an important aspect of control because it enables the establishment of the differences that should be the subject matter of a further analysis so as to discover the causes of their occurrence, whereas by checking potential customers prior to the establishment of cooperation, possible problems of the collection of claims are discovered.

The questions referring to the implementation of internal control within the supply function were answered by the respondents as follows:

- the possibility of ordering is only limited to the authorized persons (28 of 30 companies, i.e. 93.33%);
- for the authorized persons, the amount of an order is limited and an additional approval is necessary for an amount exceeding that amount ( 23 of 30 companies, i.e. 76.67%);

- there is delimitation between the functions of initiating supply and the functions of recording and the payment of obligations towards suppliers in almost all the companies (29 of 30, i.e. 96.67%);
- a qualitative and quantitative review of goods is done and the minutes of the reception of ordered goods are made (in 25 of 30 companies, i.e. 83.33%); and
- a comparison of purchase orders with delivery notes and invoices is carried out (in 29 of 30 companies, i.e. 96.67%).

Based on the respondents' responses, a conclusion can be drawn that the control procedures within the supply function are in most companies adequately implemented, whereas in but a small number of the companies, certain omissions were observed. It was noticed that in certain companies a possibility of ordering is delegated to the authorized persons provided that the amount of the order is not limited or conditioned by obtaining an additional approval. Such companies protected themselves from doubling orders, but they did not protect themselves from the orders coming in in larger amounts that could bring a certain commission to the authorized persons in an agreement with suppliers. The importance of the last two mentioned control procedures reflects in finding out the deviations and responsibilities that could negatively affect and cause an interruption in the continuity of performing the business activities of the company. The companies in which these control procedures are not applied may face the problem of the inadequate quality of the ordered goods, even with the impossibility of establishing "the main culprit" if there are no records that will provide the data regarding whether the goods were received in that particular condition or a damage or a loss occurred later.

The control activities in the production function were only evaluated in the production companies (22 production companies from within the sample) in the following manner:

- the production plan is based on the sales plan (21 of 22 companies, i.e. 95.45%);

- production operations proceed in the manner prescribed by the company's internal acts (in 21 of 22 companies, i.e. 95.45%);
- work orders are exclusively created by the authorized persons in all of the surveyed companies;
- products are protected from an accidental/deliberate damage or theft (in 19 of 22 companies, i.e. 86.36%); and
- the compatibility of the real and the accounting states of the stocks of finished products is periodically checked in almost all the companies (21 of 22 companies, i.e. 95.45%).

Plans and internal acts represent the important instruments of control since they enable the obtaining of a timely signal of the deviations that may emerge during the performance of production operations. In 95.45% of the observed companies, production operations occur in the manner prescribed by respective internal acts (instructions, orders and so forth), and in the same number of the companies, the production plan is based on the sales plan by which the production of the products that, either by their respective scopes or by types, deviate from the product whose realization is predicted, is prevented. Unlike the previous forms of control, the delivery of work orders exclusively by the authorized person is performed in all of the surveyed companies, so that there is no possibility of their doubling. The research results imply that a large number of the surveyed companies takes care of product safety (in 86.36% of the companies, products are protected from an accidental or deliberate damage or theft, whereas in 95.45% of the companies, the comparison of the state of the real and the accounting stocks is carried out for the purpose of discovering differences and establishing the fact of their cause).

The answers to the questions about the activities of the personnel imply the implementation of internal control in the following manner:

- there is delimitation between the billing function and the functions of earnings payment in 21 of 30 surveyed companies (i.e. 70%);
- the employees are obliged to use the annual leave in 25 surveyed companies (i.e. 83.33%);
- the rotation of employees in sensitive workplaces is conducted in 18 companies (i.e. 60%);
- the neutralization of irreplaceable workers is present in 19 of 30 companies (i.e. 63.33%); and
- disciplinary procedures or court disputes are initiated in the case of the violation of a labor obligation, the legal procedures or the general acts in most companies (28 of 30, i.e. 93.33%).

Due to a possibility of falsifying the pay rolls or committing similar frauds by the persons in charge of the calculation and payment of earnings, it is necessary to implement the mentioned control procedures. The previous results reveal that, in almost three-fourths of the surveyed companies, the delimitation of the duties between the calculation function and the function of earnings payment was not done. The person who is at the same time in charge of the calculation and payment of earnings can state bigger amounts of earnings for a few employees, justifying his/her such doing by the overtime work that has actually not been realized, and then, share that amount with those employees, or falsify the pay roll in the way that he/she will add nonexistent workers and keep fictitious earnings for him-/herself. When the protection of the companies from employees' frauds is concerned, the research study has showed that many of the surveyed companies did not implement some of the significant protection measures. So, in 16.67% of the companies, the employees are not obliged to go on the annual leave; in 40% of them, the rotation of employees in sensitive workplaces does not exist, whereas a total of 36.67% of the companies do not strive at all to avoid situations in which nobody is capable of replacing certain workers. The risk of workers' too high an impact can be limited by imposing a request demanding that employees must use up their annual leave every year. The rotation of employees is significant due to a possibility of discovering the mistakes that previous employees made in a given workplace. The question of the existence of general acts and initiating disciplinary procedures or court disputes was positively answered

by the highest percentage of the surveyed companies (i.e. in 93.33% of the companies, there are general acts by which responsibility initiation is regulated).

By analyzing the collected answers concerning internal control in the financial function, the following results were obtained:

- the financial plan/the money flow plan is created in 25 surveyed companies (i.e. 83.33%);
- payment is only initiated by the authorized person in all 30 companies;
- The compliance of the account balance with the bank is periodically performed in all 30 surveyed companies;
- the cash balance in the cash desk is controlled on a daily basis in most companies (28 of 30, i.e. 93.33%); and
- access to cash is only enabled for the authorized person in all 30 companies.

Given the role and importance of the financial function in the total business activities of the companies and the susceptibility of the activities within this function to frauds, the companies' commitment to fraud prevention and the prevention of similar events by defining preventive controls is understandable. Precisely for the reason of the fact that the conducted research study has shown that in certain companies all other control procedures were carried out, but the money flow plan was not in place, it is important that the significance of defining it should be indicated. The financial plan allows for the prediction of cash inflows and outflows, so that having a plan discourages potential embezzlements of the collection of claims, double payments or falsifying entries of cash outflows.

By comparing the answers received from the big and the medium-sized companies to the questions regarding the implementation of control procedures within the said functions, more precisely by observing the structure of all the negative answers, a fact is established that, in comparison with the big companies, the medium-sized companies circled significantly more negative answers to the questions

posed. So, the size of the company can be one of the factors that affect the possibility and manner of the implementation of certain control procedures, and thus the quality of internal control. A smaller number of employees and more difficult cost financing caused by those control procedures are mentioned as the most frequent reasons why medium-sized companies are not able to implement certain control procedures.

## CONCLUSION

Internal control policies and procedures are established for the purpose of providing security for the achievement of defined objectives. They are a powerful instrument in the hands of management. What makes internal control an irreplaceable aspect of supervision is the fact that internal control enables everyday monitoring of all the activities in the company, thus providing a possibility of quickly eliminating all noticed irregularities and avoiding harmful consequences.

Adequately designed and implemented internal control contributes to efficient business performance, the protection of the company's assets from an unauthorized or inadequate use, the compliance of business operations with a valid legal regulation and the consistent application of the company's policies. Internal control plays a significant role in providing reliable accounting records and in the preparation of authentic accounting information for internal and external users. In the paper, a study of the attitudes was performed by surveying 30 big and medium-sized companies with respect to the priority of internal control objectives by the importance of the implementation of the key control procedures and the examining of the manner in which internal control is implemented as per company's functions. According to priority, the respondents rated the best the objective of improving the accuracy and reliability of accounting and operational data (4.76), and the objective of efficiency assessing the last (3.90). The research results indicate that the second-priority objective is the objective of complying of the business policy of the company (4.43), and is the objective of

securing the company's assets from being wasted, embezzled and inefficient ranks as the third priority (4.20). The average mark for all 4 objectives is 4.32. The key hypothesis which the research study presented in the paper began from was not confirmed by the analysis of the respondents' assessment of the priority of the basic objectives of internal control given the fact that the objective of assessing the business efficiency of the company was assigned the least average mark 3.90. The obtained highest average mark for the second objective of internal control implies that the companies emphasized external responsibility towards regulators as the first-ranked. Also, the lowest mark was received by the fourth objective, which implicitly confirms the conclusion that internal informing and business efficiency are of a secondary character in relation to legislative requirements.

Bearing in mind the fact that the defining of internal control is not a warranty that it will function successfully, it is extremely important that a company's employees should understand the importance of the implementation of internal control. By examining the companies' attitudes towards the basic control activities and by their analysis, we came to the conclusions implying that, in the largest number of the companies, the importance of the implementation of control is recognized, which is very important when speaking about the effectiveness of internal control. The best assessment of the control activity - independent checking by a third party (4.9), and the delimitation of duties amongst employees (4.73) - confirm the results obtained by examining the priority of internal control objectives and the companies' focus on satisfying the external reporting obligation.

The analysis of the responses regarding the implementation of control procedures within certain business functions implies that control procedures have been established in most companies at a satisfactory level, although omissions were noticed in some companies. The omissions identified mostly in the medium-sized companies refer to the nonexistence of the limitation or irregular delegation of authorization, the inadequate delimitation of the duties, the poor protection of the company's assets

and records, the nonexistence or noncompliance of the defined policies, plans and acts, the non-implementation of the measures by which frauds by employees are prevented. The noticed omissions were mostly justified by the employee shortage.

The basic contribution of this paper reflects in the comprehensive analysis of the companies' attitudes and the forming of the conclusion that, out of the key internal control objectives recognized in audit theory, companies accentuate in their everyday business. This analysis enables the defining of the control activities that lead to the accomplishment of the priority objectives and the neutralization of the noticed gaps and deficiencies in the functioning of internal control in practice.

The basic limitation of the paper refers to the analysis of a small number of the companies operating inside only two districts and the poor response rate of only 31.58% of the 95 questionnaires that were sent. A solution to the observed problem of noncooperation of the companies in scientific research could be directed towards the obtaining of tax reliefs for responsive companies; thus, a larger number of them would be willing to take time and answer the questions from the questionnaire. Given the fact that only the companies engaged in production, trade and service were surveyed, future research should be oriented towards the examination of the accomplishment of internal control objectives in the companies belonging in the private sector and the public sector as the two strata, and drawing conclusions from the comparisons of the results obtained in both such strata. Also, based on the lowest mark assigned to the internal control integrated in the information system, the subject matter of research could be oriented towards the examination of the existence of correlation between the age structure of the respondents in companies and the existence of internal controls in the IT environment due to the rigidity of older workers when the adoption of new technological solutions is concerned.

Given the fact that the nature and circumstances of each individual company condition the specific internal control system, each company should

implement those controls that are in accordance with its own needs. In order for internal control to be effective, it is necessary that employees at all levels in the company should understand the importance of the application of internal control and that there be external support in the form of regulation and the professional organizations that encourage its further improvement and development.

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## ASYMMETRIC INFORMATION AND HEALTH-RISK BEHAVIOR IN THE NATIONAL HEALTH INSURANCE SCHEME IN JOS METROPOLIS, NIGERIA

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Access to quality healthcare is the primary purpose for which the National Health Insurance Scheme (NHIS) in Nigeria was introduced. It is believed that the introduction of the NHIS for workers will reduce their engagement in health-risk behavior. Despite the existence of the NHIS, its enrollees (i.e. insured workers) are still complaining of the poor healthcare delivery by the service providers. As a result, some of them are still engaging themselves in a detrimental health-risk behavior due to public health workers' moral hazard and a short supply of drugs in public hospitals. This study was undertaken in Jos metropolis so as to ascertain the extent to which moral hazard and the disclosure of partial information about the NHIS lead to a health-risk behavior among civil servants. The research has shown a moderate level of the moral hazard demonstrated by the NHIS service providers since, within the measurement range from 1 to 7, the overall average significantly falls to 4. Contrary to the moderate moral hazard demonstrated by the NHIS service providers, the majority of the NHIS enrollees were found to averagely demonstrate a low health-risk behavior.

**Keywords:** NHIS service providers, moral hazard, asymmetric information, health-risk behavior

JEL Classification: D82, I11, I13

### INTRODUCTION

Civil service is often associated with a poor service delivery because of the assumption that whether civil servants do well on the job or not, they will still

receive their salaries. This assumption has made some civil servants demonstrate a nonchalant attitude towards a quality service delivery in their place of work. For many years, civil service in Nigeria has been characterized by poor performance. Countries around the world have carried out reforms in civil service in order to improve the quality of the public service delivery. However, while demand for improved services is a common factor, the spectrum

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of expectations varies from one country to another. In Nigeria today, things are expected to work well in the health sector, just like in other developed countries in the world.

As one of vital tools available to human societies in the 21<sup>st</sup> century for achieving economic goals (Berman, Pallas, Smith, Curry & Bradley, 2011), the health system requires continuous research in order to determine how it affects patients' satisfaction. In other words, the satisfaction of patients is seen as a critical indicator of the quality of healthcare (Laschinger, Hall, Pedersen & Almost, 2005) and has been viewed as an integral ingredient for measuring the health outcome and the quality of care all over the world.

Prior to the introduction of the National Health Insurance Scheme (NHIS) in Nigeria, the health insurance contract had depended on copayments and deductibles used to reduce health consumption amongst the insured public. According to M. C. Albert and M. H. Riordan (2002), these control instruments force the insured to reduce their demand for expensive healthcare, thereby taking advantage of low premiums. This restriction, however, exposes healthcare seekers at large to uninsured risks. On the other hand, the introduction of the NHIS empowers accredited hospitals as service providers to give specific treatment and limit expensive treatment to all enrollees.

The NHIS was established in Nigeria primarily in order to make healthcare accessible to all the Nigerians at an affordable cost. Contrary to this expectation of the scheme, some workers do not receive correct treatment as they are not attended to when visiting hospitals. One of the reasons why some insured workers cannot access the NHIS scheme is partly due to the misplacement of their records by health workers and partly due to long queues, with but few health workers who need to attend to patients. The extent of the moral hazard demonstrated by healthcare providers with a larger number of clients and equipped with the facilities and the manpower in place to do the job gainfully accounts for the reasons for long queues experienced in the NHIS accredited hospitals.

Where insured workers are unable to access their NHIS scheme, they attempt to minimize the cost of health and sometimes engage in unethical health-risk practices endangering their own lives. Where a particular service has been promised, but not delivered due to an inadequate facility in place to meet such needs, that leads to dissatisfaction among enrollees. Healthcare personnel often allege that capitation is not made available by the Health Maintenance Organization (HMO), which receives the bulk of capital from the government or employers. This also suggests that moral hazard is demonstrated by the service providers that tend to meet minimum requirements for the accreditation of their hospitals, but there is no demonstration of the professional responsibility to match the competence and an expectation beyond this limit. These trends have led to the two main issues: the first, asymmetric information about NHIS services available to those insured workers, and the second, moral hazards among NHIS primary healthcare providers in public hospitals. Not many studies on the NHIS in Nigeria have considered these two important variables in the health sector. Consequently, the present study attempts to investigate whether moral hazard and asymmetric information are present in the selected NHIS hospitals in Jos metropolis or not. The study has the following specific objectives: to determine the effect of healthcare providers' moral hazard on the NHIS enrollees' health-risk behavior; and to examine the effect of asymmetric information on enrollees' health-risk behavior. The hypotheses to be tested include the following:

- H1: Healthcare providers' moral hazard does not have any significant effect on the NHIS enrollees' health-risk behavior.
- H2: Healthcare providers' asymmetric information does not have any significant impact on the NHIS enrollees' health-risk behavior.

The scope of the study is restricted to the outpatients who visit hospitals for the examination and medication purposes. The patients who have already been admitted to the hospital facilities are excluded from this study. The study does not extend to the

organizations in the public and the private sectors that are yet to be accredited by the NHIS, either. The outcome of the study will help healthcare providers manage and reduce long queues in their organizations. This will, in turn, reduce enrollees' worries and their involvement in health-risk behavior, too. Also, it will help the government to achieve the objectives set out for the NHIS in Nigeria.

## LITERATURE REVIEW

The characteristics of the healthcare service such as monopoly, ethical concerns, and asymmetric information such as adverse selection or moral hazard influence the healthcare delivery (Carlstrom, 1994). Healthcare economists prove that, due to these characteristics, organized private competitive markets are inefficient when the provision of healthcare services is concerned although many nonmarket institutions and the official interventionist approach have been arranged so as to remediate the alleged market failures. S. Shmanske (1996) observes a kind of information asymmetry that exists in a situation when a medical doctor has a prior knowledge that is not available to the patient. In order to save patients from quacks, governments impose licensing provisions in order to control medical associations. It is observed that many of the alleged market declines in the provision of health services rarely elicit economic scarcity and are consequently treated best by market institutions, but not government interventions.

A critical assumption of a perfectly competitive model is that both buyers and sellers are well informed. As a matter of fact, insurance is a complex business, with neither buyers nor sellers appearing to have as much information as they need. An information imbalance creates hydra-headed problems in insurance and undoubtedly the industry's most critical market imperfections (Black & Skipper, 2000). The two major information problems are the problems of asymmetric information and nonexistent information. According to U. Black and H. D. Skipper (2000), the asymmetric information problems which drive the largest number of the insurer's operations arise where one party to an

insurance contract has the relevant information that the other does not have, and also are the bane of the majority of life and health insurance customers.

Basically, there are four classes of asymmetric information. There are lemons, moral hazard, adverse selection and the principal-agent. However, the first two are used in this study as they relate to the NHIS service providers. "Lemons" in health economics is used to describe a situation where policyholders know less than insurers and their offerings. An insurance transaction is a contract including the current present promise of future performance following the occurrence of insured events. Although efforts have been made to simplify insurance contracts and enhance their readability, life and health insurance contracts remain technically complex documents (Black & Skipper, 2000).

Individuals buy insurance policies in good faith by relying on insurers' integrity to honor their contract in the future, when insured events occur. Even if it is assumed that policyholders could be influenced to take an interest in the financial condition of their insurers, few of them are knowledgeable enough of how to do so. The lemons problem for policyholders provides a justification for many insurance regulations. Insurance companies, as well as their representatives, have insignificant incentives when the disclosure of adverse information to potential policyholders is concerned. On the other hand, the moral hazard problem is the tendency of individuals to alter their behavior because of the subsisting insurance.

Moral hazard problems are concerned with both life and health insurance, but the nature of problems differs to some extent. Life offices are not overly bothered about a possibility that the insured possessing a life insurance coverage will engage themselves in a behavior that could shorten their lifespan just because they are insured. Neither are they particularly concerned about the possibility that those who purchase life annuities will engage themselves in a behavior implying the elongation of their lifespans just because of the fact that they own such annuities. For most of us, the desire to continue

living is not influenced by whether we are insured or not. Moreover, insurance companies are greatly concerned about the possibility that the beneficiary under a life insurance policy might try to shorten the life of the person insured. They are also greatly concerned about the selling of a disability income policy whose benefit payment would provide more than the insured could earn from employment. Doing so would mean that the insurance company itself has provided an incentive for the insured to try to collect the benefit. It would create moral hazard (Black & Skipper, 2000)

Moral hazard was adopted in the health economic literature in the 1960's in order to describe the difficulty of contracting overusing healthcare as a result of the insured paying less than the service rendered by a healthcare provider (Zeckhauser, 1970). The main aim of health insurance is to distribute a risk of incurring high medical costs. The authors observed that the provision of insurance introduces uncontrollable incentives towards over-expenditure if, as is usually the case: the insured has control over the circumstance, and the level of being recompensated by the insurance plan is a positively related function of the expenses incurred by the insured. Moral hazard refers to the possibility of the insurance protection to alter an individual's behavior so as to present a loss (Shavell, 1979).

In the context of health insurance, moral hazard is seen as additional healthcare used as a result of the availability of the insurance scheme in place for the insured. At this point, there is a need to differentiate between *ex post* moral hazard and *ex ante* moral hazard in order to appreciate how they manifest in a long-term care insurance context. According to R. T. Konetzka, D. He, J. Guo and J. A. Nyman (2019), *ex ante* moral hazard refers to an increased possibility that a person will become sufficiently ill or dependent to be eligible for a payment under the policy because he/she has insurance, whereas *ex post* moral hazard is the type that is most often associated with health insurance and refers to the increased consumption of long-term care services by those who are eligible for a payment relative to those who are not (Konetzka *et al*, 2019).

In the long-term care context, it is clear that *ex post* moral hazard will be demonstrated by the scheme holder who may likely spend more time in a nursing home or receive a formal home healthcare service in comparison with the one who does not have a health insurance coverage. *Ex post* moral hazard will also surface in the person who elects to receive care in a preferred setting since that person's preference has been broadened due to the availability of the insurance payoff (Konetzka *et al*, 2019). Growth in formal home healthcare, as compared to no care or care at home by informal caregivers, such as close relatives, or growth in private nursing home care in comparison to either medical aid nursing home care or the varieties of possibly informal care at home, is a good instance of this type of moral hazard.

Prior to the proliferation of managed care, the health insurance scheme significantly relied on deductibles, copayments and other coverage limitations to manage care provision. These "demand management" tools cause the insured to limit their demand for healthcare and hence review downward premiums by restraining healthcare costs, on the one hand, but on the other, they may expose enrollees to a severe uninsured peril (Albert & Riordan, 2002). However, managed care plans encourage healthcare providers with explicit financial incentives, such as prospective payments, remuneration for healthcare providers, where providers enroll patients as permanent clients, receiving a periodic payment on each enrollee and cost sharing contracts to limit costly treatments. Clearly, these "supply management" tools are now more important. Economic theory interprets the emergence of institutions as a response to market failures (Albert & Riordan, 2002).

In the health industry, the market's poor performance derives from the problems of contracting illness *ex ante*. Because of this failure, real insurance, which protects enrollees from the expenditures of efficiently-provided treatment, does not seem to be possible. The second-best insurance pays only part of the treatment expenses or limits coverage in other ways (Albert & Riordan, 2002). However, the patients who do not fully bear the cost of medical care may demand treatment inefficiently since the cost of treatment at times is more

than the benefit (Albert & Riordan, 2002). This failure is known as moral hazard. Also, in health insurance markets, when an underwriter acting as a third party pays for the service received by the patient, moral hazard may arise. Patients tend to continue to enjoy services when an additional cost incurred is much greater than the additional service they are enjoying. When a third party either partially or fully bears the cost of additional care, the client may request more care than he/she would demand if he/she bore all of the costs on his/her own. In mathematical econometric analysis, the overconsumption of healthcare service results in a shift down the demand curve to a quantity higher than that corresponding to the equality of the demand cost and the marginal price.

The gross inefficient overconsumption of health services constitutes a problem. In view of S. Shmanske (1996), moral hazard represents the inequities of commission and the transgressions of omission. Moral hazard may occur if the insured bearing a partial or not bearing any marginal cost of services intentionally embarks on unhealthful risk behavior. The health of the insured deteriorates and, consequently, the insured requests more healthcare.

S. Shmanske (1996) argues that increased healthcare costs borne by a third-party payer will be borne by the insured in the form of taxation or an insurance premium in the end. An incentive to limit a request for healthcare service can restore the system when the underwriter reviews premiums upwards in order to force high-volume consumers to bear an additional cost of medical care. Cautionary measures, though, which will enhance efficiency are also meant to force an insured to avoid the inequity of commission and omission, and stop consuming alcohol if the value of the premium decline seems to be higher than the forgone alternatives. When the premium cost is set at an average cost or below it irrespective of the attitudes of the policy holder, then there is a tendency that cautionary measures will not be taken.

The condition of moral hazard will be severe when all policyholders are included in the same pool and every life is billed an average cost of cover. S. Shmanske (1996) believes that a market approach in solving a moral hazard problem is the establishment of a health

maintenance organization where a third-party payer and the provider of healthcare services are one and the same entity. This approach is intended to monitor and forestall the overconsumption of healthcare services; however, a big issue here is observers' contrasting views since a medical doctor is he who dispenses healthcare and, simultaneously, is the residual claimant.

There is little legislation enacted to control the abuse of healthcare services and include, but not limit to, the prioritization of permissive procedures (Fox & Leichter, 1991; Iversen, 1993). Dealing with the unbearable costs and overconsumption of healthcare services, but overlooking the issue of information asymmetry occurring between a sick person and a third-party payer, official interventions cover the problem of the economic scarcity that may both inhibit and delay an efficient understanding and solving of the problem. An uncivilized simple approach solution to moral hazard is to do away with third-party payers as the sick individuals who will bear the cost on their own; however, the approach may contrast with the desire of the insurance market to spread risks.

Naturally, people will not willingly bear the cost for their healthcare out of their own pocket due to the risk of the uncertainty of the amount of the cost of their healthcare and, consequently, an insurance cover will be requested so as to smoothen the expenses of the healthcare services. S. Shmanske (1996) assumes that market participants such as HMOs, copayments, and deductibles should make the arrangements that will reduce abuse emanating from moral hazard provided that expected gains outweigh expected costs. Despite the fact that the insurer may be eager to bear actual unexpected healthcare costs, the insurer is not obliged to pay for healthcare costs emanating from any abuse provoked by any payment arrangement. The health insurer and the policyholder request a risk transfer without the existence of any moral hazard; however, economic scarcity imposes an inherent cost on the insurer's part so as to differentiate between the expenses which are desirable and those which are undesirable in order to care for the insured; hence the inherent cost on the insured forces the insured to credibly avoid the abuse of services.

J. R. Garven and M. F. Grace (2007) carried out a critical investigation posed by an adverse selection problem suggested by theoretical prediction and found out that the result was consistent with the theoretical projections of E. L. Jean-Baptiste and A. M. Santomero (2000). Nonetheless, each of these two works clearly focused on a part of the asymmetric information issue, simultaneously ignoring the existence and the effects of the other part. A critical assumption by N. A. Doherty and K. Smetters (2005) is that moral hazard remains a significant effect of the asymmetric information, whereas J. R. Garven and M. F. Grace (2007) concluded that adverse selection was the effect(s) of asymmetric information.

By linking asymmetric information and moral hazard in the context of health insurance to the NHIS, many studies have looked into how moral hazard by customers (insured patients) affects the performance of the NHIS. In this study, asymmetric information associated with NHIS services used by service providers in order for them to gain an undue advantage over the NHIS enrollees is considered as moral hazard. Although NHIS enrollees visit hospitals' different departments, there are a high percentage of outpatients referring to the NHIS for their needs pertaining to healthcare. Long queues affect a pharmacy's efficiency, which subsequently results in patients' dissatisfaction (Marquez-Peiro & Perez-Peiro, 2008). The findings of a certain number of studies dedicated to the queuing system in the health sector indicate a strong relationship between patients' satisfaction and their satisfaction with respect to the drug services (Ndukwe, Omale & Opanuga, 2011; Al-Arifi, 2012). However, accompanied by inadequate drugs and medical facilities of the largest number of the accredited hospitals, long queues have been brought into connection with health-risk behavior among the scheme users.

A. Steptoe and J. Wardle (2004) describe health-risk behavior as any human activity engaged in by people in the density or with the force that increases the chance of a risk of sickness or an injury. A. Baban and C. Craciun (2007) observes that health-risk behaviors can cluster together into a risky lifestyle. J. S. Adeyele

(2014) observed that many civil servants die due to a lack of access to good medical facilities. The author further noted that certain factors related to health-risk behavior emanating from religion, culture and education had been attributed to sudden death among civil servants. In some studies it was discovered that health-risk behaviors could wield some level of influence on cognitive performance, emotions, and a quality lifestyle.

## METHODOLOGY

The study population comprised all the public hospitals in North Central Nigeria. A questionnaire was used to collate data from the enrollees about the NHIS services and the possibility for any one of them to engage him-/herself in health-risk behavior if the services required are not readily available. The data were collected from the NHIS enrollees in public hospitals by obtaining a permission from the management of the selected hospitals. The simple random sampling technique was used to distribute 350 copies of the questionnaire to the respondents in five public hospitals located in Jos metropolis, of which 319 copies were completed and returned. The details of the selected hospitals, as well as the distribution of the respondents by the gender, are shown in Table 1.

Descriptive, correlation and multiple regression statistics were used to analyze the data collected. The criteria used to determine the level of information asymmetry (INFAS), moral hazard (MORHAZ) and health-risk behavior (HRBehv) amongst the primary healthcare providers and the enrollees range from 1 to 7, namely as follows: 1 = *extremely low*, 2 = *very low*, 3 = *low*, 4 = *moderate*, 5 = *high*, 6 = *very high*, and 7 = *extremely high*. Based on this scale ranging from 1 to 7, if the mean weight (MW) > 1.5, it means *extremely low*; if the mean weight is  $1.5 \leq MW \leq 2.49$ , it means *very low*; if the mean weight is  $2.5 \leq MW \leq 3.49$  it implies *low*; if the mean weight is  $3.5 \leq MW \leq 4.49$  then it means *moderate*; if the mean weight is  $4.5 \leq MW \leq 5.49$ , then it means *high*; if the mean weight is

$5.5 \leq MW \leq 6.49$ , it means it is *very high*, whereas if the mean weight  $MW \geq 6.5$ , it means it is *extremely high*. These mean weights consisting of INFAS, MORHAZ and HRBehv in Tables 2, 3 and 4, respectively, were obtained by the application of the SPSS software.

*Model Specification* - In order to test the significance of the impact of asymmetry information and moral hazard by healthcare practitioners on the NHIS enrollees' health-risk behavior, multiple regression was used to jointly test the two hypotheses. The required testing model in order to achieve the specific objective of the study is formulated as follows:

$$HRBehv = \gamma_0 + \gamma_1MORHAZ + \gamma_2INFAS + \varepsilon \quad (1)$$

where:

*HRBehv* - Health risk behaviour,

*MORHAZ* - Moral hazard,

*INEAS* - Information asymmetry.

The coefficients of  $\gamma_1$  and  $\gamma_2$  are expected to be positive. Hence, it is expected that the model will exhibit health-risk behavior due to the presence of moral hazard and information asymmetry.

**Table 1** The distribution of the NHIS primary healthcare provider by the enrollees' gender

	Gender		Total
	Male	Female	
Airforce Military Hospital	19	31	50
Plateau Specialist Hospital	17	49	66
Jos University Teaching Hospital	47	73	120
University of Jos Health Centre	24	19	43
General Hospital, Pankshin	12	28	40
Total	119	200	319

Source: Authors

## RESULTS

This study was carried out in public hospitals due to the observed moral hazard and the perceived information asymmetry. The descriptive results in terms of the disclosure of the information to customers, moral hazard and health-risk behavior are presented the first, only to be followed by the test of the hypotheses.

Table 2 shows the non-disclosure of information about the NHIS services in the public sectors. Out of the five criteria against which the nondisclosure of information was assessed, some respondents extremely disagreed, whereas the others extremely agreed with all of these items. As far as the first and the second criteria are concerned, many respondents were indifferent to whether the NHIS operators disclosed the services covered by their scheme to the enrollees until the enrollees needed such services or not (INFAS1: mean/std dev. = 4.2163/1.40314, Coeff. of Var = 0.3327883,  $p < 0.000$ ), and the NHIS providers did not disclose the specific services excluded from the NHIS to enrollees (INFAS2: mean/std dev. = 4.2351/1.39334, Coeff. of Var = 0.3289981,  $p < 0.000$ ). Also, many respondents were indifferent as to whether the NHIS providers did disclose the risks covered by their scheme to them or not (INFAS3: mean/std dev. = 4.0313/1.48545, Coeff. of Var = 0.3684747,  $p < 0.000$ ). Additionally, many respondents were neutral with respect to whether the NHIS enrollees were, or were not, educated on the need to get a referral form from their service provider whenever they need to refer to another hospital of their primary healthcare providers (INFA42: mean/std dev. = 3.8621/1.57209, Coeff. of Var = 0.4070602,  $p < 0.000$ ). The respondents could not ascertain, either, whether they were made to pay the full cost of the medical bills in the hospital they were being referred to, or not (INFAS5: mean/std dev. = 4.0596/1.40738, Coeff. of Var = 0.3466828,  $p < 0.000$ ). All of these responses to the criteria are significant and are brought into agreement with the overall weight of the measurement for the purpose of assessing the disclosure of information by the NHIS (INFAS: mean/std dev. = 4.0809/0.88202, Coeff. of Var = 0.2161359,  $p < 0.000$ ). Based on the respondents' score on the scale from 1 to 7, it can be concluded that the

**Table 2** The disclosure of information to customers by the NHIS service providers

CODES	Criteria for information disclosure	N	Mean	Std. Deviation	Minimum	Maximum	Coeff. Of Var	Monte Carlo Sig.
INFAS1	The NHIS operators do not disclose information about the services covered by their scheme to the enrollees until enrollees need such services.	319	4.2163	1.40314	1.00	7.00	0.3327883	.000 <sup>g</sup>
INFAS2	They do not disclose the specific service excluded from the NHIS to enrollees.	319	4.2351	1.39334	1.00	7.00	0.3289981	.000 <sup>g</sup>
INFAS3	They do not disclose to enrollees the risk covered by their scheme.	319	4.0313	1.48545	1.00	7.00	0.3684747	.000 <sup>g</sup>
INFAS4	When enrollees need to be referred to another NHIS hospital, they do not disclose to them whether they need a referral form or not.	319	3.8621	1.57209	1.00	7.00	0.4070602	.000 <sup>g</sup>
INFAS5	They make enrollees pay the full cost of the medical bills in the hospital they are referred to.	319	4.0596	1.40738	1.00	7.00	0.3466828	.000 <sup>g</sup>
INFAS		319	4.0809	.88202	1.80	6.60	0.2161359	.000 <sup>g</sup>

Source: Authors

disclosure of the information about the NHIS services to the enrollees is moderate. This means that the NHIS service providers partially disclose information to their clients with respect to the services needed.

Table 3 is the moral hazard demonstrated by the enrollees of the NHIS in the selected hospitals. By using the Likert scale ranging from 1 to 7 based on which the enrollees could be assessed, many respondents were indifferent as to whether they were made to pay the full cost of the medical bills if they visited another NHIS hospital in a situation of emergency or not (MORHAZ1: mean/std dev. = 3.6897/1.52369, Coeff. of Var = 0.4129619,  $p < 0.000$ ). Many NHIS service providers were alleged not to have sufficient drugs in their pharmacies and that

simultaneously they failed to refund the cost incurred by enrollees in an emergency situation from other NHIS hospitals. However, many respondents were indifferent to the non-refund of the cost incurred in a situation of emergency (MORHAZ2: mean/std dev. = 4.0909/1.52996, Coeff. of Var = 0.3739893,  $p < 0.000$ ) and insufficient drugs in their NHIS hospitals (MORHAZ3: mean/std dev. = 4.2602/1.50826, Coeff. of Var = 0.3540367,  $p < 0.000$ ). Additionally, the level of the out-of-pocket expense the respondents were exposed to was moderate (MORHAZ4: mean/std dev. = 4.3041/1.67623, Coeff. of Var = 0.389453,  $p < 0.000$ ) as a result of their primary healthcare providers not having the necessary equipment or service in place. In order to verify the level of moral hazard amongst the medical doctors and pharmacists in the enrollees'

**Table 3** The demonstration of moral hazard among the NHIS service providers in the selected hospitals

CODES	Criteria for moral hazard	N	Mean	Std. Deviation	Minimum	Maximum	Coeff. Of Var	Monte Carlo Sig.
MORHAZ1	If the enrollees visited another NHIS hospital in a situation of emergency, that hospital which they are referred to does make them pay the full cost of the medical bills.	319	3.6897	1.52369	1.00	7.00	0.4129619	.000 <sup>g</sup>
MORHAZ2	The NHIS usually declines to refund the medical bills received in an emergency service from another hospital.	319	4.0909	1.52996	1.00	7.00	0.3739893	.000 <sup>g</sup>
MORHAZ3	The NHIS service provider does not have drugs in its pharmacy each time you visit it.	319	4.2602	1.50826	1.00	7.00	0.3540367	.000 <sup>g</sup>
MORHAZ4	Most time, the enrollees are exposed to an out-of-pocket expense by having to pay their medical bills as a result of their having received the basic services provided by the NHIS service provider.	319	4.3041	1.67623	1.00	7.00	0.389453	.000 <sup>g</sup>
MORHAZ5	The NHIS normally recommend patients to their private hospitals for a specific treatment.	319	4.1034	1.75512	1.00	7.00	0.4277193	.000 <sup>g</sup>
MORHAZ		319	4.0897	1.06947	1.40	6.60	0.2615055	.000 <sup>g</sup>

Source: Authors

NHIS hospitals, many respondents also indicated a moderate level (MORHAZ5: mean/std dev. = 4.1034/1.75512, Coeff. of Var = 0.4277193,  $p < 0.000$ ). These responses clearly imply the fact that the level of moral hazard demonstrated by the NHIS service providers was on average moderate since the overall average out of the measurement range significantly fell to 4 (MORHAZ: mean/std dev. = 4.0897/1.06947, Coeff. of Var = 0.2615055,  $p < 0.000$ ).

Table 4 shows the health-risk behavior expected to be demonstrated by the NHIS enrollees if certain services are not readily available. As can be seen within the scope of the assessment, many were indifferent if they sometimes felt reluctant to visit hospitals when sick, knowing that their NHIS pharmacies do not have drugs (HRB1: mean/std dev. = 3.8025/1.80021, Coeff. of Var = 0.4734265,  $p < 0.000$ ), and regarding their opting for buying drugs from a nearby pharmacy rather

**Table 4** Health-risk behavior among the NHIS enrollees in the selected hospitals

CODES	Criteria for health-risk behavior	N	Mean	Std. Deviation	Minimum	Maximum	Coeff. Of Var	Monte Carlo Sig.
HRB1	The enrollees sometimes feel reluctant to visit a hospital when they are sick since their NHIS hospitals do not have drugs in their pharmacies.	319	3.8025	1.80021	1.00	7.00	0.4734265	.000 <sup>g</sup>
HRB2	The enrollees would rather buy drugs from a nearby pharmacy than waste their time visiting a hospital.	319	4.2257	1.84608	1.00	7.00	0.4368694	.000 <sup>g</sup>
HRB3	The enrollees would rather resort to self-medication than go and waste their time in a hospital.	319	2.4451	1.75082	1.00	7.00	0.7160413	.000 <sup>g</sup>
HRB4	The services rendered to the enrollees are not better than what they can receive in a nearby pharmacy.	319	3.1975	1.72346	1.00	7.00	0.5390031	.000 <sup>g</sup>
HRB5	It is a waste of time visit NHIS hospitals when you know there are no drugs in their pharmacies.	319	3.2915	1.70450	1.00	7.00	0.517842	.000 <sup>g</sup>
HRB		319	3.3737	1.14188	1.33	6.33	0.3384626	.000 <sup>g</sup>

Source: Authors

than wasting time visiting the hospital (HRB2: mean/std dev. = 4.2257/1.84608, Coeff. of Var = 0.4368694,  $p < 0.000$ ). In other words, this means that there is a moderate possibility that the enrollees will not visit a hospital and that they will resort to self-medication. Regarding whether the enrollees would rather resort to self-medication than go and waste their time in hospitals due to moral hazard among their NHIS service providers, many enrollees disagreed upon this particular statement (HRB3: mean/std dev. = 2.4451/1.75082, Coeff. of Var = 0.7160413,  $p < 0.000$ ). This means that, irrespective of any form of moral hazard that may be observed among health workers, this will not discourage the enrollees from using their NHIS scheme. Similarly, many respondents disagreed

upon the statement that the services rendered by their NHIS scheme were substandard to what they could receive in a nearby pharmacy (HRB4: mean/std dev. = 3.1975/1.72346, Coeff. of Var = 0.5390031,  $p < 0.000$ ). In respect of the HRB5 criteria, many respondents disagreed that it was a waste of time visiting the NHIS hospitals when you knew that there were no drugs in their pharmacies (HRB5: mean/std dev. = 3.2915/1.70450, Coeff. of Var = 0.517842,  $p < 0.000$ ). Invariably, the fourth and the fifth criteria indicate the fact that the medical facilities in the selected hospitals are very adequate and that the enrollees' willingness to visit these facilities is very high. However, the overall weight of the health-risk behavior among the enrollees is low (C: mean/std dev. = 3.3737/1.14188,

Coeff. of Var = 0.3384626,  $p < 0.000$ ) since the overall mean weight obtained from the scale is within the range of  $2.5 \leq MW \leq 3.49$ .

### Hypotheses Test

It is often noted that many studies on how information asymmetry and moral hazard by healthcare providers affect service utilization stop at a descriptive level and the evidence of inferential tests are lacking. In this section, the relationships between these variables and the impact as well are tested.

Table 5 shows the relationship between information asymmetry and moral hazard and the health-risk behavior of the NHIS customers. Considering the percentage in which each independent variable contributes to health-risk behavior, the entry of information asymmetry accounts for a 27.3% increase in health-risk behavior amongst the NHIS enrollees

(INFAS: ( $R^2 = 0.273$ ;  $F = 118.758$ ,  $p < 0.05$ ). This means that the failure of the healthcare providers to fully disclose information that the NHIS enrollees need to know actually accounts for 27.3% of why some customers actually engage themselves in health-risk behavior. Also, the moral hazard demonstrated among the healthcare providers, such as a failure to make drugs available to customers, and referring them to their personal hospitals instead, accounted for 1.5% of the health-risk behavior amongst the NHIS customers ( $R^2 = 0.015$ ;  $F = 6.836$ ,  $p < 0.05$ ), thereby increasing the total explained factors from 27.3% to 28.8%. This means that the combined moral hazard and failure of the NHIS service providers to fully disclose information to customers significantly contributed 28.8% of the factors leading to health-risk behavior among the enrollees.

Table 6 reveals the direction in which the independent variables of health-risk behavior move. As can be

**Table 5** The relationship between moral hazard and information asymmetry and health-risk behavior

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	Change Statistics			Sig. F Change	Durbin-Watson
						F Change	df1	df2		
1	.522 <sup>a</sup>	.273	.270	.97547	.273	118.758	1	317	.000	
2	.537 <sup>b</sup>	.288	.283	.96661	.015	6.836	1	316	.009	2.049

a. Predictors: (Constant), MORHAZ; b. Predictors: (Constant), MORHAZ, INFAS; c. Dependent Variable: HRBehv

Source: Authors

**Table 6** The impact of information asymmetry, moral hazard and satisfaction with the service on health-risk behavior

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.094	.216		5.061	.000
	MORHAZ	.557	.051	.522	10.898	.000
2	(Constant)	.588	.289		2.038	.042
	MORHAZ	.511	.054	.479	9.531	.000
	INFAS	.170	.065	.131	2.615	.009

a. Dependent Variable: HRBehv

Source: Authors

seen in the table, both moral hazard (MORHAZ: Beta = 0.511,  $t = 9.531$ ,  $p < 0.05$ ) and information asymmetry (INFAS: Beta = 0.170,  $t = 2.615$ ,  $p < 0.05$ ) have a positive and significant impact on health-risk behavior, which implies that, as the NHIS service providers engage themselves in moral hazard and fail to disclose information, their respective customers are encouraged in one way or another to engage themselves in health-risk behavior. This health-risk behavior is manifested in the form of using alternative means, such as self-medication and the use of non-scientifically proven means to treat themselves, since they know that even if they went to hospitals, their medical needs might not be met well.

## Findings Discussion

The disclosure of information by healthcare providers to clients affects the extent to which clients can utilize health services. This study has examined the influence of information asymmetry and moral hazard on health-risk behavior.

*Information disclosure* - In order to determine whether information asymmetry is present in the health service providers or not, the five criteria were used to ask for information from the NHIS patients, where the healthcare providers were found to fairly disclose information to their clients and educate them on various services contained in the NHIS, too. Although many clients revealed that their NHIS service providers sometimes made them pay the full cost of the medical bills in the hospital they had been referred to.

*Moral hazard* - Moral hazard is demonstrated by both the clients and the NHIS service providers. In terms of the incentive to obtain accreditation for participating in the scheme and also for engaging in unethical practices such as requiring that the enrollees should use particular hospitals in a situation of emergency and failing to make drugs available in their respective pharmacies. In order to assess this in the selected hospital, the level of moral hazard in connection with the payment of the full cost of a medical bill and the refunding of these bills in the primary NHIS scheme is moderate. The level of moral hazard in terms of

drugs availability and an out-of-pocket expense is also moderate as clients are made to pay for the other services they need outside their respective NHIS. There are mixed responses among the clients to whether medical doctors do recommend them to their personal private hospitals instead of providing such services in the state hospitals they work in.

*Health-risk behavior* - As far as health-risk behavior following the significant partial disclosure of information and moral hazard is concerned, the implication of this on clients' health-risk behavior was examined. Using the five criteria, it was found that many enrollees of the NHIS sometimes felt reluctant to visit their NHIS hospitals when falling sick due to the observed lack of adequate drugs and vaccines in their NHIS pharmacies. However, according to the information gathered, health-risk behavior following moral hazard and information asymmetry can be said to be low. Also, moral hazard demonstrated among the healthcare providers, such as a failure to make drugs available to customers and referring them to their personal hospitals instead, accounted for merely 1.5% of health-risk behavior among the NHIS enrollees, thereby increasing the total explained factors from 27.3% to 28.8%. This means that the combined moral hazard and failure of the NHIS service providers to fully disclose information to the enrollees significantly contributed 28.8% to the factors leading to health-risk behavior among the enrollees.

## CONCLUSION

Access to quality healthcare is the primary purpose for which the NHIS was introduced. It is believed that the accessibility of the scheme will reduce the enrollees' engagement in health-risk behavior. Due to increasing the non-availability of drugs in most accredited hospitals, particularly so in the public ones, it was speculated that this could lead to the NHIS enrollees' engagement in health-risk behavior. The study shows a pathway to how health insurance can be used to ascertain the excellent treatment seeking behavior of the insured without their engaging themselves in health-risk behavior. The main finding

shows that 28.8% of the enrollees' engagement in health-risk behavior is due to moral hazard and asymmetric information demonstrated by the NHIS primary healthcare providers.

Our study is confined to Jos, the capital city of the Plateau State, out of the Nigerian 36 states, which suggests the findings may not adequately reflect the general experience of the NHIS in the country. The study did not establish, either, how the NHIS operational efficiency, asymmetric information and moral hazard affect enrollees' satisfaction. All of these are essentially the limitations of the current study, and there is a need for conducting further studies in order to focus on these limitations. However, the findings of this study contribute to the existing literature in that they investigate the link between the enrollees' health-risk behavior and the moral hazard of the service providers. The findings can also be used to understand the existing bottlenecks in the public hospitals in the studied area and they can be used by the other states of the Federation as well in order to understand how a similar study can be carried out to address the observed health-risk behavior emanating from the moral hazard and asymmetric information of the NHIS primary healthcare providers.

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## IMPLICATIONS OF THE APPLICATION OF DOLLARIZATION FOR MACROECONOMIC STABILITY

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The aim of this paper is to present the costs and benefits of applying dollarization. The most common reason for accepting, in whole or in part, a foreign currency is the presence of a high and volatile inflation rate, which is followed by the significant volatility of the exchange rate, as well as a distorted confidence in its own currency. Likewise, highly dollarized countries most often characterized by a lower level of the development of the financial market. Dollarization contributes to lowering the costs of transactions in international trade and to achieving the price and financial stability, as import inflation is lower than domestic. On the other hand, the presence of full dollarization means a loss of seigniorage as the monetary authorities' revenue from the printing of money, as well as the limitation of the implementation of the lender's function in the last instance. The results of the analysis indicate that, in the dollarized countries, there was a decrease in the inflation rate, macroeconomic stability was established, and financial integration was present as well. The analysis also showed that the loss of income from seigniorage, measured as a share in the gross domestic product, is not negligible, while the lender's function in the latter instance can be compensated through the formation of stabilization funds and the conclusion of contracts with financial institutions.

**Keywords:** dollarization, lender of last resort, seigniorage, integration of financial markets

JEL Classification: E42, E44, E58

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### INTRODUCTION

Dollarization can be defined as the official or unofficial use of a foreign currency in a country's transactions. Most often, higher trust in a foreign currency in comparison with the domestic currency is mentioned as the reason for the application of dollarization.

This has a direct impact on the limited effect of the monetary policy through a greater influence of the transmission of the exchange rate channel compared to the interest rate channel, which should have a dominant influence in the inflation targeting regime in those central banks that have chosen to target inflation as a monetary strategy. At the same time, foreign interest rates, such as Euribor and Libor, have a greater impact on the cost of borrowing compared to interest rates related to borrowing costs in domestic currency.

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The aim of the paper is to present the costs and benefits of the application of dollarization. Benefits from the application of dollarization are a reduction in transaction costs in trade exchange, the presence of import inflation, which is usually lower than domestic inflation, as well as the absence of the volatility of the exchange rate due to the acceptance of a foreign currency as its own. On the other hand, it should be noted that there are shortcomings in the use of dollarization, such as seigniorage, which basically represents the central bank's income from printing money, as well as the impossibility of applying the lender of last resort function last resort.

Dollarized countries and the implications that dollarization, either full or partial, has on the functioning of the economies of these countries are the subject matter of the research study done in this paper. The most common reasons for the application of dollarization are the presence of long-term instability

at the macroeconomic level, which is reflected through a high and unstable inflation rate, then a significant exchange-rate volatility, as well as a lack of confidence in the domestic currency. In such circumstances, a foreign currency takes over the primacy and is used as a means of payment, a unit of measure, but there are also higher foreign currency savings compared to savings in the domestic currency.

The following both inductive and deductive research methods are used in this paper: the analysis and synthesis methods, the classification method, and the comparison methods. These methods are used in order to conduct a comparability analysis and make comparisons between the different countries applying dollarization, and also in order to understand the reasons for using a foreign currency as the domestic one, and gain an insight into the results after accepting a foreign currency (lower inflation, the absence of the volatility of the exchange rate due to the

**Table 1** Historical overview of the application of dollarization

Country	Period	Country	Period
American Samoa	?-currently	Dominica	1938-1951
Albania*	1912-1925	Dominican Republic*	1899-1947
Andorra*	?-currently	Ecuador*	2000-currently
Angola	1938-1951	Egypt*	1856-1898
Bahrain	1920-1965	El Salvador	2001-currently
Bhutan*	1968-1974	Gambia	1800-1969
Botswana*	1950-1976		1902-1913
Brunei*	1945-1951	Ghana	1896-1913
Cameroon	1910-1916	Gibraltar	1888-1927
Cayman Island	?-1972	Grenada	1838-1951
Cuba*	1902-1934	Honduras*	1912-1950
Cyprus	1880-1914	Indonesia	1974-1807
Kuwait	1942-1961	Iraq	1917-1932
Liechtenstein*	?-currently/Israel		1917-1927
Libya	1912-1943	Jordan	1917-1927
Malta	1903-1939	Kenya	1896-1898
Monaco*	1865-currently	Nigeria	1891-1913
Montenegro	1999-currently	Peru	1887-1914
Marocco	1897-1907	Qatar	1949-1966
	1800-1969	Tunisia*	1873-1904
San Marino*	1897-currently	Uganda	1906-1920
Saudi Arabia*	1918-1952	United Arab Emirates*	1946-1973
Singapore	1840-1849	Vatican City*	1929-currently
Switzerland	1921-1974	Vietnam	1862-1876

Note: The asterisk (\*) indicates the countries that were independent in some or in all of the dollarization episodes, and the question mark (?) indicates that the author did not specify the beginning of the dollarization in the specified countries.

Source: Schuler, 2005, 121-123

application of full dollarization). Such an analytical approach constitutes a good basis for observing the countries of the varying levels of economic and financial development, which allows a possibility of giving recommendations to the domestic monetary authorities regarding the continued application of measures in order to increase the level of dinarization in the Republic of Serbia (RS).

The hypothesis we proceed from in the analysis is

H: There is high interdependence between the dollarization scope (in the case of the Republic of Serbia, the euroization) and the inflation rate, measured as the index of consumer prices on a year-on-year basis.

These variables were selected because a high degree of dollarization should be linked to the lowering of the inflation rate due to the presence of import inflation, which is usually lower in comparison with the domestic inflation rate. In order to test this hypothesis, a correlation coefficient is used, and the calculation is based on data in RS.

Monetary authorities should be aware of the fact that the process of restoring confidence in the domestic currency is long, bearing in mind the fact that the roots of dollarization are deep. Any attempt to reduce the level of dollarization should be accompanied by the maintenance of financial and price stability, and applied deduction measures are long-term sustainable and adapted to the characteristics of the domestic economy (economic and financial development phases, the degree of the development of the financial market, the exchange-rate regime, etc.). Solving the dollarization problem should be permanent and sustainable, and monetary and fiscal policy holders, including the representatives of the non-financial sector, should be included in finding a solution to it. This would provide a comprehensive strategy based on micro- and macroprudential measures.

The paper is structured as follows: in the first part, the concept and the types of dollarization are presented, which is followed by the presentation of the dollarization measuring method and the advantages and disadvantages of the application of dollarization,

the focus of the analysis being on the role of the lender of last resort, seigniorage and the stability and integration of the financial market. In this paper, euroization in RS is also given an account of, and the dinarization strategy implemented in order to promote a higher use of the dinar in the economy is demonstrated. In conclusion, the main results of the analysis carried out in this paper is summarized, the key contributions of the research study are pointed out, and recommendations are given for further research into this highly empirical topic. In conclusions, the recommendations are given to the monetary authorities in RS how to increase the level of dinarization.

## DOLLARIZATION DEFINITION AND TYPES

Dollarization is the introduction of the dollar or some other foreign currency into the domestic economy, such a currency operating in parallel with or instead of the domestic currency. Table 1 shows the selected historical episodes of the application of dollarization.

The literature offers a possibility of analyzing a large number of the definitions of the concept of dollarization, which indicates that the research potential of this topic is really important. A large number of the definitions of dollarization points to the existence of different forms of this strategy in different countries. This part of the paper is focused on the presentation of the dollarization forms and their definition.

According to S. Heysen (2005), dollarization can be viewed as either full, i.e. official dollarization, or as partial dollarization. Full, i.e. official dollarization exists in a situation when a foreign currency, usually the dollar, is accepted in a country as a legal tender. Partial or *de facto* dollarization exists in the country that keeps its local currency in circulation, simultaneously enabling payments and transactions making freely in dollars.

A. Ize and A. A. Powell (2004) made a distinction between the four types of dollarization in their analysis. The first type is the so-called macroeconomic

hedging dollarization, which is the ability of investors to limit the exposure of their portfolio to the volatility of inflation and the exchange rate, where portfolio is simultaneously invested in a foreign and the domestic currencies. The second type is the market imperfections dollarization, which occurs when there is a less efficient regulation of the domestic foreign-exchange market, which makes the possession of the domestic currency more expensive than the possession of foreign currencies. The third type is default dollarization, which occurs in a situation where there is a high likelihood that the holder of income (such as earnings) will not ensure the payment of its obligations, and this dollarization type is existent in a situation when there is the dominant ownership of a foreign currency relative to the domestic one. The fourth type is moral hazard dollarization, which is present in a situation where there is a possibility that the lender will not pay its obligations, which may consequently lead to the same behavior pattern being transferred to the bank. If depositors are protected by the application of a deposit insurance scheme, the conclusion of a contract in dollars provides banks and their borrowers with a possibility of recording lower borrowing rates if there is no devaluation of the domestic currency.

According to L. I. Jácome and A. Lönnberg (2010), there are several prerequisites that need to be met in order to apply full, i.e. official dollarization. These prerequisites are as follows:

- a prudent financial system and strong financial supervision in order to reduce the likelihood of reporting a banking crisis in the event it does not exist or the effect of the lender of last resort function last resort is diminished;
- regulating the public finance that give sufficient confidence to market participants that the fiscal policy measures will be applied; and
- a regulated labor market, which will be an absorber of external shocks and which will achieve a macroeconomic adjustment.

It is very important to distinguish between the three types of dollarization:

- payment dollarization, which occurs when the dollar or another foreign currency is predominantly used as a means of payment;
- financial dollarization, which happens in a situation when residents hold their financial assets in dollars or in some other foreign currency; and
- real dollarization, which exists when domestic prices and/or earnings are denominated in dollars or some other foreign currency.

According to G. Ortiz (1983), the dollarization concept is very frequently linked to the currency substitution concept. The said author opines that a monetary policy will be inefficient in the country where a foreign currency is a good substitute for the domestic currency. That substitutability between the domestic currency and a foreign currency will increase in the period of a rise in the exchange-rate fluctuation, and an increase in the currency risk based on that, too, is a very important consequence arising from this view. According to K. Forbes, V. Sebastian, C. Mapingure, M. Charity, M. Kumbirai, C. Felistus and M. Rumbidzai (2013), in addition to currency substitution, the notion of dollarization is also associated with the substitution of assets. Ž. Bogetić (2000) draws our attention to the fact that it is necessary a distinction between currency substitution, which, according to him, implies the primary use of a foreign currency and foreign currency deposits as a means of payment, on the one hand, and the substitution of assets, which involves the primary use of a foreign currency in the function of storing value, on the other, should be made. On the other hand, K. Schuler (2005) considers that dollarization is another form of the fixed exchange rate. According to this author, dollarization is used to indicate the wide use of a foreign currency as a means of payment or a unit of measure.

A distinction should be made between the three forms of dollarization, which include unofficial, semi-official and official dollarization (Makochekanwa, 2010). Full, i.e. official dollarization arises in a situation where a particular country begins to use a foreign currency as a means of payment and consequently reduces the use of the domestic currency. According to Ž. Bogetić (2000), there is no currency risk in such

a currency system, nor is there any risk of a currency crisis, either. There are variations in the application of full, i.e. official dollarization, which are called semi-official dollarization or the bi-monetary system. The bi-monetary system occurs when a foreign currency (or foreign currencies) is (are) used as a means of payment and has (have) a dominant role in the currency structure of bank deposits, but has a secondary role in comparison with the domestic currency that is primarily used for transactions, such as salaries and taxes, and daily transactions, such as transport services. The countries that apply semi-official dollarization have their own central bank or monetary authorities that implement their own monetary policy. Unofficial dollarization occurs when the residents of a given country hold a large part of their assets in a foreign currency, even though the foreign currency is not an official payment instrument according to the monetary or financial regulations of that country. In this case, the dollar (or the euro, or yet another foreign currency) will be used largely in private transactions as the unit of measure, the means of exchange and the measure of value. Ž. Bogetić (2000) points out the fact that the concept of unofficial dollarization may take several forms, namely:

- the possession of foreign-currency deposits in domestic banks;
- the possession of foreign-currency deposits in foreign banks;
- the holding of bonds denominated in a foreign currency or other non-monetary assets; and

- the holding of a foreign currency regardless of whether the same is held in a legal or illegal manner.

Once the different forms of dollarization have been defined, the manners of measuring the dollarization degree in the remainder of this paper will be presented. While in the simplest manner dollarization can be defined as a greater share (full or partial) of a foreign currency in relation to the domestic currency, the identification of the actual dollarization level is not easy. Certainly, the method of measurement depends on the available data, as well as on the form of dollarization in a particular country.

### DOLLARIZATION LEVEL MEASURING

Since there are a large number of dollarization definitions, numerous studies also differently measure the degree of dollarization. The most common degree of dollarization is measured through deposit dollarization, which is accounted as the amount of foreign-currency deposits against the money supply or the total deposit level. The central bank most often publishes and keeps records of data on foreign-currency deposits, as well as monetary aggregates. In contrast to monetary aggregates published in a local currency, foreign-currency deposits are expressed in various foreign currencies, and by applying corresponding inter-currency relations, they can be converted into the national currency. This conversion of foreign-currency deposits from the original foreign

**Table 2** The types of dollarization

	The share of foreign currency debt of the private sector in the total public debt is 10% or more	The share of foreign currency debt of the private sector in the total public debt is less than 10%
The share of foreign currency government debt in public debt is 10% or more	Type 1	Type 2
The share of foreign currency government debt in public debt is below 10%	Type 3	Type 4

Source: Reinhart, Rogoff & Savastano, 2003, 9

currency into the domestic currency may lead to a large oscillation of the value of deposit dollarization, especially if there is a significant depreciation of the domestic currency. For this reason, the authors like N. Mwase and F. Kumah (2015) suggest that the level of dollarization should be measured in real terms by using the so-called custom foreign-currency deposit, which is converted into a deposit in the domestic currency by using appropriate inter-currency relationships.

On the other hand, the authors like A. Ize and E. L. Yeyati (2003) differently define the indicator of real dollarization, which represents the level at which prices and wages are denominated in foreign currencies, and this indicator shows the pass-through effect of the exchange rate. This analytical approach is also present in the paper by M. Garcia-Escribano and S. Sosa (2011), who use the ratio between foreign-currency deposits (loans) and the total deposits (loans) at the current exchange rate instead of displaying these variables at a constant foreign-exchange rate.

After defining deposit dollarization, it is necessary to explain loan dollarization. The authors like L. Cattao and M. Terrones (2000) point out the fact that it is imperative to simultaneously observe the dollarization of both deposits and loans so as to concurrently analyze the currency and maturity structure of the balance sheet positions of the bank, as well as of other economic entities with a currency and maturity mismatch between generating revenue and payments of expenditures. According to these authors, the degree of the dollarization of deposits and loans depends on the interconnection between banking costs, the credit market structure, and macroeconomic shocks.

On the other hand, C. Reinhart, K. Rogoff and M. Savastano (2003) developed the following dollarization indicators:

- The composite dollarization index for each country in the sample that was analyzed. The analyzed sample is divided into a shorter and a longer series of data. The short series includes 90 countries with annual observations in creating the composite dollar index in the period 1996-2001.

The longer series of data is based on the analysis of 48 countries with annual observations in creating the composite dollar index in the period 1980-2011.

- Each analyzed country is grouped into one of the four categories, depending on the type of dollarization it belongs to. The above-mentioned authors defined the composite index of dollarization as a share of the public debt in the gross domestic product, then as a share of the total bank foreign-currency deposits in some monetary aggregates, and as a share of the government debt denominated in a foreign currency in the total debt of the government. All of the three aforementioned components constitute the composite index that takes a value ranging from 0 to 10. The calculated composite index gives us a possibility of measuring the degree of dollarization for each analyzed country from the sample, and has a value ranging from 0 to 30.

Based on the following two criteria, the type of dollarization is defined by:

- the level of domestic dollarization, and
- by the level of a foreign-currency borrowing by the private sector.

In this analysis, domestic dollarization is defined as the participation of the government's foreign-currency debt in the total public debt. Based on this participation, the analyzed countries are divided into two groups: those with a participation below 10%, and those whose participation exceeds 10%. The indicators of the foreign-currency indebtedness of the private sector are divided into two groups: those with a participation below 10%, and those whose participation exceeds 10%. These two criteria allow the dollarized countries to be divided into four categories, i.e. four types of dollarization, as shown in Table 2. The countries with a similar level of dollarization from both domestic and foreign sources (above 10%) are classified as Type 1; the countries in which dollarization is predominated by foreign sources are classified as Type 2; the countries where the source of dollarization is predominantly a domestic source are classified as Type 3; finally, the countries where dollarization is low (i.e. below 10%)

and based on domestic and foreign dollarization are classified into Type 4.

According to the above-mentioned authors, the advantages of this approach in measuring the degree of dollarization reflect in the ability to measure the level of domestic and foreign dollarization for each analyzed country. The benefits of this approach are also the easiness of calculating these quantitative indicators and the legerity of their understanding.

## BENEFITS AND COSTS OF THE APPLICATION OF DOLLARIZATION

### Lender of Last Resort

If a country renounces the use of the national currency, it also simultaneously renounces a possibility of pursuing an independent monetary policy, i.e. there is a risk in this case that a common monetary policy (in the case of a monetary union) or a foreign monetary policy (in the case of dollarization) will not correspond to the interests of the observed country at a given moment (Stanisic, 2012). The full dollarization concept eliminates the risk of the volatility of a foreign-currency exchange rate and a rapid devaluation and appreciation of the domestic currency against a foreign currency. The full dollarization convention signifies the elimination of the lender of last resort function last resort, whereby the central bank loses the ability to react to disruptions in the domestic and international financial systems by providing short-term liquidity to the financial system.

G. Calvo (2002) points out the fact that it is a mistake to link the lender of last resort function last resort to the capability of the central bank to issue money. According to this author, there are alternative ways through which a central bank can provide liquidity. First of all, it is for example thought that the central bank and the ministry of finance can: create a stabilization fund, or make contracts for credit lines with private banks.

On the other hand, A. Berg and E. Borensztein (2000) emphasize the need to make a distinction between the role of the central bank to provide short-term liquidity to commercial banks from its role as the ultimate guarantor of the stability of financial and payment transactions in the event of a banking crisis. Dollarization should not greatly impede the ability of the monetary authorities to provide short-term liquidity to the entire banking system or to individual banks faced with business problems. These decisions are available if the central bank pre-secures necessary assistance funds or concludes credit lines with international financial organizations. The country that applies full dollarization may have a problem with a rapid withdrawal of deposits, as well as the ability to guarantee the full operability of the payment system. The appropriate reaction of the central bank to the withdrawal of bank deposits in a dollarized economy depends on the cause for this withdrawal. If a withdrawal implies a transfer of a deposit from one bank to another, the withdrawal of liquidity from banks with stronger liquidity and the provision of liquidity to weaker institutions could be the appropriate action of the monetary authorities. However, if a withdrawal of deposits arises at the level of the entire banking system, the monetary authorities should have a fair amount of liquid assets. In this case, there is a need for a deposit insurance scheme, which would mean a certain degree of security for depositors. In their further analysis, the above-mentioned authors point out the fact that, in a dollarized economy, it is less likely that a withdrawal of deposits is due to the fact that all banking assets are denominated in dollars (or expressed in some other currency other than the dollar) and that the currency match of the balance sheet positions has been reached by the banks. Consequently, the risk of a weakened role of the lender of last resort function last resort is diminished.

In a situation where confidence in the banking system and in the overall financial system is reduced, a withdrawal of deposits may be significant in terms of amounts, which directly threatens the liquidity of the entire system. In the event that the central bank has the ability to exercise the lender of last resort function last resort, this liquidity crisis can be

avoided. According to C. Broda and E. L. Yeyati (2002), the very existence of the lender of last resort function gives an opportunity to provide an elastic supply of reserves that can preventively act in impeding a liquidity crisis. In addition, these authors emphasize the importance of the preventive role of the existence of a deposit insurance scheme. In analyzing the lender of last resort function last resort, the level of stress or instability in the banking system should be taken into account. According to C. Garcia-de-Andoain, F. Heider, M. Hoerova and S. Manganelli (2016), the degree of the stability of the banking system directly affects the level of the funds banks are willing to borrow on the interbank market, as well as the level of demand for the central bank's funds. In the case of instability, potential lenders may be less willing to provide liquidity, either because of the counterparty risk or because they want to keep liquidity for themselves for precautionary purposes.

The authors like O. Jeanne and C. Wyplosz (2001) consider the role of the lender of last resort in two ways: as a possibility of preventing a banking crisis, in the case of a significant outflow of deposits, on the one hand, and as a way of preventing a currency crisis, on the other. These authors offered two arrangements in order to prevent the emergence of a liquidity crisis: the one implying that by using the lender of last resort function last resort at an international level the central bank ensures liquidity on the international financial market, and the other implying restoring the security of and confidence in the domestic financial system through the implementation of the lender in the last instance. Both proposed arrangements entail a change in the financial architecture on a global scale: the first arrangement recommends the establishment of a global central bank, which will be able to issue an international currency, whereas the second arrangement could function as an international banking fund that would supervise the domestic banking system.

Of course, the other measures available to the central bank in order for it to deal with the withdrawal of deposits, such as a higher level of reserves requirements, improvements in the system of supervision and control of banks' operations and a ready set of measures for the preservation and improvement of financial stability, should be pointed

out. Of course, the listed measures should not only be isolated in order to apply to a fully-dollarized economy, but also to those at a lower dollarization level.

## Seigniorage

Seigniorage is essentially an income of the central bank generated from printing money. According to M. J. M. Neumann (1992), there are three concepts of seigniorage: opportunity-cost seigniorage, monetary seigniorage, and extended monetary seigniorage. The opportunity cost of seigniorage observes seigniorage as an overall opportunity cost of the money holder. This approach stems from the question that additional real income would be generated for individuals if they had assets on the basis that would earn interest, instead of holding money that does not generate interest. The real opportunity cost of the seigniorage is calculated on the basis of the following calculation:

$$s_o = rB/P$$

where:

$r$  - the nominal rate of return on other assets other than money,

$B$  - the total amount of the money an individual owns, and

$P$  - the level of consumer prices measured by the consumer price index.

The presented concept of defining seigniorage is adequate from the aspect of theoretical analysis. The analytical advantage of this approach is that the value of seigniorage is calculated based on the values that money functions have for the individuals who own it. At the same time, this concept does not identify a seigniorage with the interest income that such individuals could achieve if they had some other assets that would generate some form of income instead of having money. In order for this concept to be adapted for the purpose of an empirical analysis, M. J. M. Neumann (1992) points to the possibility of using the yield rate instead of using the nominal rate of return to other assets other than money,

simultaneously suggesting in his paper that this may be an average yield on government bonds or the rate of return on shares. Depending on the selected rate of yield, the level of seigniorage will be different. It should be noted that this concept of measuring seigniorage contains in itself a conceptual problem because the opportunity cost of the seigniorage is not equal to the real income of the monetary authorities from the printing of money because the structure of the portfolio owned by such monetary authorities significantly differs from the structure of the assets held by individuals, and consequently the opportunity cost of seigniorage does not provide a measure of revenue for the monetary authorities on the basis of money creation.

The concept of monetary seigniorage is defined as the ratio of the net change in money and the consumer price levels:

$$sM^* = AB/P$$

where:

$AB$  - the net change in money supply, and

$P$  - the level of consumer prices, measured by the consumer price index.

Monetary seigniorage in the definition of seigniorage starts from the measurement of the value of the transactions of the non-monetary assets used by money holders to trade in order to achieve the desired increase in the money supply level ( $AB$ ). This approach to measuring seigniorage is a clear model from the aspect of theoretical analysis and the data necessary for his calculation are easy to collect. However, the very concept of monetary seigniorage does not provide a complete calculation of the value of the revenues which the monetary authorities derive from printing money. The two components constitute the total income from seigniorage. The first component is the real value of the non-monetary assets that the central bank generates in exchange for an increase in money supply. This component is measured by the traditional concept of monetary seigniorage, which has previously been defined. The second component of income from seigniorage is the interest earned by the central bank on the basis of the

possession of a non-government debt, i.e. the debt relating to domestic and foreign debtors. The central bank may occasionally realize capital gains (losses) by selling assets on the market at a higher (lower) price than the price it paid for the given asset.

Expanded monetary seigniorage is calculated in the following manner:

$$sM = sM^* + (dD + fF + GR) / P$$

where:

$sM^*$  - monetary seigniorage,

$dD$  - interest on the debt held by domestic debtors,

$fF$  - interest on the debt held by foreign debtors,

$GR$  - a capital gain (loss), and

$P$  - the level of the consumer prices measured by the consumer price index.

S. Fischer (1982) distinguishes between active and passive seigniorage. Active seigniorage refers to the countries that have a high inflation rate, whereas passive seigniorage is present in fast-growing countries. In the case of passive seigniorage, this revenue is realized by the fact that money issuing is associated with a high level of economic growth, without any simultaneous occurrence of a high inflation rate.

According to G. N. Mankiw (1987), actual revenue seigniorage can be calculated as follows:

$$\dot{M}/P = \dot{M}/M * M/P = (\pi + g)kY$$

where:

$\pi = \dot{P}/P$  inflation rate,

$g = \dot{Y}/Y$  rate of output growth (the author does not specify which output is being analyzed), and

$k$  - the constant.

G. N. Mankiw (1987) explains the theory of optimal seigniorage by the fact that the rate of an increase in money supply, inflation and nominal interest rates are

determined on the basis of the required revenues that the government of one country needs to realize. The theory of optimal seigniorage tries to test whether a higher tax rate is associated with a higher inflation rate and a higher nominal interest rate over time. The author carried out the above-mentioned testing on the data in the United States in the period 1951-1985, in which the three-month Treasury Bill Rate was taken so as to approximate the nominal interest rate, whereas when the average tax rate is concerned, government revenues were used as a percentage of the gross national product (GNP). The gross national product in the USA was used to determine the total economic activity until 1991, when the gross domestic product started being used. The conducted analysis showed that, in the mentioned period, the increase in the federal tax revenues of 1% had caused an increase in the nominal interest rate of 1.43%. The author thus showed that the influence of the growth of federal revenues, hence the tax rates, was positive and significant at the nominal interest rate. J. H. Haslag (1998) used data in the period 1965-1994 and calculated that, in the US economy, income from seigniorage measured as the ratio of earnings from seigniorage and the gross national product averaged about 2%, while income from taxes had a share of 22% in the gross national product. Thus, this author demonstrated that, when the US economy is concerned, the share of income from seniors in the gross national product is not negligible.

## STABILITY AND INTEGRATION OF FINANCIAL MARKETS

When dollarization as a phenomenon in which a country accepts another currency as its own is concerned, it is necessary that analysis should be focused on the stability and integration of financial markets. In their work, R. Rennhack and M. Nozaki (2006), as well as I. Asel (2010), showed that, at the beginning of the 2000s, transition economies began to use more foreign exchange instead of the domestic currency due to general macroeconomic instability. The authors analyzed financial dollarization and

pointed out the fact that there had been a significant reduction in the inflation rate in the countries that had accepted a foreign currency. In the analyzed African countries (Angola, Ghana, Nigeria, South Africa, and Zambia), the average inflation rate in the period 1995-1999 decreased from 127% to 37.6% in the period 2000-2003; in the analyzed Asian countries (Indonesia, Laos, Korea, The Philippines, Thailand, and Vietnam), the average inflation rate decreased from 11.2% to 4.4%, respectively; in Latin American countries (Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Paraguay, Peru, Uruguay, and Venezuela), it decreased from 14.8% to 9.3%, respectively, whereas in the transition countries, that rate decreased from 44.1% to 10.4%, respectively. Since the year 2001, the level of financial dollarization has been reduced in some Latin American countries. For example, Argentina has affected its residents to convert their foreign currency deposits into pesos, which significantly lowered the level of dollarization. Bolivia, Peru and Uruguay have experienced a modest decrease in the share of foreign currency deposits in the total deposits, while the level of financial dollarization in Paraguay has been considerably reduced.

When inflation reduction due to the growth of financial dollarization is in question, further analysis should indicate the fact that the rational decision made by residents will be to have their deposits converted from the national currency to a foreign currency in order to protect their assets from the risks of a possible further inflation growth and loss of the value of these deposits. This analytical approach was applied by A. Ize and E. L. Yeyati (2003), who pointed to the importance of relative volatility in inflation in determining the degree of financial dollarization. The authors point out the fact that residents prefer to hold foreign-currency deposits especially if there is a high risk of developing a high inflation rate. If the inflation rate and the exchange rate are more volatile, residents hold the bulk of their foreign-currency portfolio and perceive the volatility of inflation in the context of a change in the real exchange rate. In this situation, the real value of foreign-currency-denominated assets

measured by domestic purchasing power shows a higher level of stability than in a situation in which a property is expressed in the domestic currency. If, on the other hand, the domestic inflation rate and the real exchange rate are stable, it will affect residents to consider domestic-currency assets as a better value guard. A. Ize and E. Parrado (2002) indicate that real and financial dollarization tend to increase due to the growth of the volatility of domestic inflation (which further affects the volatility of earnings and the rate of return on investments in the domestic currency), but they also decrease due to the growth of the foreign-exchange rate volatility (which increases the volatility of earnings indexed in the dollar, or the rate of return).

When speaking about the level of dollarization, it is necessary to point out the credibility of the monetary policy and the strength of institutions' operations (Jakšić, 2013; Jakšić & Jakšić, 2013). The institutions that are weak may just endanger the credibility of the work done by the monetary authorities because in this situation residents fear that the government, by their decisions, will endanger the value of their financial assets by implementing high inflation rates in the country. A. De la Torre and S. Schmukler (2004) point out the fact that weak institutions can increase uncertainty about the consistency of the application of a contract, thus encouraging residents to prematurely disclose their deposits or carry out such transactions in the countries that have a more secure legal system. In order to analyze the success of the work, institutions may use the World Bank's analysis for 215 countries in the framework of the Worldwide Governance Indicators (WGI) Project for the period 1996-2014. The subject matter of the analysis is the six dimensions that measure the level of global management indicators for each country, namely: the voice and accountability; political stability and the absence of violence; the government effectiveness; the quality of the regulatory bodies; the rule of law; and control of corruption.

Previous studies indicate that financial dollarization is a rational response to uncertainty about the level of the inflation rate. Financial dollarization will be at a high level in the countries with unstable and

high domestic inflation, in which institutions may also endanger confidence in the future movement of inflation. L. Chițu (2012) dealt with the analysis of the impact of unofficial dollarization on the major global financial crisis in the period 2007-2009 on the example of developing countries. The study showed that loan dollarization was a good indicator that could have predicted a reduction in the real gross domestic product (GDP) between 2007 and 2009, on a sample of about 60 developing countries. On average, it is estimated that the fall in the real GDP amounted to about 0.84 p.p. in those economies where the level of loan dollarization was higher than 10 p.p.

When speaking about the integration of financial markets on the example of the Russian Federation, the level of the integration and stability of financial markets within the framework of the existing financial dollarization, M. Brown, R. De Haas and V. Sokolov (2013) measure it by applying the following three indicators: the participation of domestic banks in the total number of banks in the country; the participation of the branches of domestic banks in the total number of the branches of the entire banking sector; and the participation of the foreign liabilities of domestic banks in the total liabilities of the banking sector. In this manner, the authors try to measure the extent to which the domestic banking sector is integrated with the rest of the financial sector. In a further analysis, this study seeks to find out whether the impact of domestic inflation on financial dollarization depends on whether the banking sector is integrated into the overall financial sector or not, and to what extent this integration is existent. If the banking sector is less integrated into the overall financial sector, banks cannot allocate their foreign assets to external markets or to international capital markets. This means that if a bank wants to neutralize the currency mismatch of its balance sheet position, it must necessarily use domestic-currency deposits for domestic-currency placements. When full dollarization is in question, reducing costs of borrowing is an additional advantage to financial integration. The use of the US dollar eliminates the risk of devaluation in the domestic currency zone, and should lower the level of interest rates on borrowing.

**Table 3** The correlation of the inflation rate and euroization in Serbia

Year	Consumer price index in December of the observed year (in%)	Share of foreign currency placements in total placements of corporate and household (in%)	The share of foreign currency deposits in total corporate and household deposits (in%)
2011	7.00	70.70	78.50
2012	11.90	72.00	80.70
2013	2.20	73.20	76.70
2014	1.70	68.80	75.40
2015	1.50	71.40	72.80
2016	1.60	68.80	71.20
2017	3.00	67.00	69.20
2018	2.00	67.00	67.80
Koeficijent korelacije		0,38	0,72

Source: Author

Other studies, however, suggest that the integration of financial markets should take place before dollarization. For example, V. Bencivenga, E. Huybens and B. D. Smith (2001) have shown that dollarization has a different impact, which depends on the degree of the integration of the financial markets of the two economies. These authors have shown that dollarization has its benefits when markets are well-integrated, and this utility depends on the degree of dollarization. Otherwise, dollarization can be a source of instability in an economy.

## EUROIZATION IN THE REPUBLIC OF SERBIA

In the literature, dollarization is the term more frequently used than the term euroization because pegs to the dollar are more widespread than pegs to the euro. This is why the term dollarization was used in the previous parts of this paper, whereas in the case of RS, the term euroization will be used. Only through a greater share of the dinar and the improved currency and the maturity match of the sources and the placements of the banking and non-banking sector could the level of currency risk be decreased, which would lead to the improvement of financial stability and an increase in the efficiency of the monetary policy.

The Serbian financial sector is euroized, with the high levels of both deposit and credit euroization. According to the data presented in the Report on the Dinarization of the Serbian Financial System from December 2018, at the end of the fourth quarter of the year 2018, the participation of the total receivables of the corporate and household sectors in the total receivables in dinars amounted to 33%, and this indicator increased by 0.2% compared to the previous quarter (National bank of Serbia, 2018a). The share of the dinar deposits in the total deposits of the corporate and household sectors at the end of the fourth quarter of the year 2018 was 32.2%, which was an increase by 1.2% compared to the end of the previous quarter. The dinar savings of households (residents and non-residents) deposited with banks in RS amounted to RSD 61.1 billion at the end of December 2018, which was an increase by RSD 4.6 billion compared to the end of September. The share of the dinar savings in the total savings amounted to 4.9% (at the end of September, they were 4.7%) at the end of 2018, which has been the highest level of participation so far.

In order to either accept or reject the initial hypothesis, correlation analysis will be applied on the data from the period between the years 2011 and 2018. The data contained in the Report on the Dinarization of the Serbian Financial System have been available since 2011. The data to be used for the purpose of the analysis is the inflation rate in RS measured

as the consumer price index, whereas the annual inflation rate in December in each of the observed years will be taken for the purpose of this analysis. In order to measure the degree of euroization in RS, two indicators will be used: the participation of foreign-exchange placements in the total placements to the corporate and household sectors, and a share of the foreign-currency deposits in the total deposits to the corporate and household sectors. For both indicators of the degree of euroization, their value as of December in each analyzed year will be used.

A correlation analysis is applied in order to determine whether there is a quantitative agreement between the above indicators or not, and if there is one, to what degree such agreement is. In the case of the two variables, simple correlation is in question, and in the case of multiple variables, there is multiple correlation. The simple linear correlation problem is to show that there is a simple straight-line relationship between the two variations. The correlation coefficient represents an indicator of the degree of the quantitative relationship between the variables. The coefficient of simple linear correlation is denoted by  $\rho$  in the population of the data, and in the sample with  $r$ , it can take values only in the interval from -1 to 1, i.e.  $-1 \leq \rho \leq 1$  and  $-1 \leq r \leq 1$ .

Based on the data presented in Table 3, it is possible to conclude that there is a low correlation between the movement of the inflation rate and the participation of foreign-exchange placements in the total placements of the corporate and household sectors, which is 0.38. On the other hand, the degree of the correlation between the inflation rate and the share of the foreign-currency deposits of the corporate and household sectors in the total deposits is high, amounting to 0.72. This result can be explained by the fact that there is a higher prevalence of foreign currency deposits in comparison with foreign-currency placements in the total deposits/placements of the corporate and household sectors. On the basis of the presented results of the analysis, the hypothesis that there is a high interdependence between the rate of inflation and euroization measured as a share of foreign-currency deposits in the total deposits of the corporate and household sectors, whereas this interdependence

is low if the indicator used for euroization is a share of foreign-currency placements in the total placements of the corporate and household sectors, can partially be accepted.

In an environment characterized by a high euroization level, the National Bank of Serbia prevents the excessive short-term volatility of the exchange rate by intervening on the foreign-exchange market, bearing in mind the effects of the dinar exchange rate fluctuations on debtors' ability to repay their foreign-exchange liabilities. At the same time, inflation is within the target tolerance band, the financial system as a whole is stable, as well as the dinar exchange rate is, while the key policy rate is at its lowest level since inflation targeting was introduced (3% at this moment), leading to a stronger decrease in dinar lending rates and an increase in demand for dinar loans.

Bearing in mind the fact that macroeconomic stability and enhanced financial stability had been maintained since the introduction of the strategy of dinarization in 2012, a new Memorandum on the Strategy of Dinarization was signed between the Government and the National Bank of Serbia in December 2018 (National bank of Serbia, 2018b). The new Memorandum examined the results of the implementation of the dinarization strategy so far and proposed new measures so as to increase the use of the dinar in the financial system of RS, which is related to encouraging banks to use more funds in the domestic currency in order to increase the lending activity in dinars, working on a further development of the dinar securities market, as well as a further promotion of instruments for protection against foreign-currency risk (hedging instruments such as forwards, options, swaps).

## CONCLUSION

Dollarization most frequently occurs in the countries exposed to a high inflation rate, a volatile exchange rate, and a reduced confidence in the domestic currency over a longer period of time. In such

circumstances, the acceptance of a foreign currency, either in whole or in part, implies that the foreign currency is used as a means of payment, a unit of measurement and savings. In addition to the said, wages and prices, as well as assets of greater value, such as apartments, houses and cars, are expressed in the foreign currency.

The overview of the main costs and benefits of applying dollarization is the key contribution of this paper. This is reflected in the lowering of the inflation rate, as import inflation is present, which is lower in comparison with the rate within the domestic frameworks. By lowering the inflation rate, the price and financial stability are achieved, which is an important prerequisite for the growth and development of an economy. In addition, dollarization contributes to the integration of financial markets and a reduction in transaction costs in trade. On the other hand, it should be noted that in the event of full dollarization, there is a loss of seigniorage, which in general can be defined as the monetary authority's revenue generated from printing money. Likewise, there is a possibility of losing the implementation of the lender of last resort function last resort, which limits the central bank's ability to provide liquidity in the short run. However, the other ways of securing liquidity to the banking sector and the entire financial sector should be highlighted through the creation of stabilization funds, as well as the conclusion of credit lines with international financial organizations.

By using the correlation coefficient between the year-on-year basis inflation rate measured as the consumer price index and the indicators of euroization in RS, that there is a high correlation between the rate of inflation and euroization measured as a share of foreign-currency deposits in the total deposits of the corporate and household sectors (0.72) has been proven. This interdependence is low if a share of foreign-currency placements in the total placements of the corporate and household sectors (0.38) is used. This means that the initial hypothesis is partially accepted, which can be explained by the fact that, in RS, there is a higher degree of euroization on the deposits side than on the placements side.

The paper also provides a brief overview of the current situation in the implementation of the dinarization strategy in RS, whose goal is to increase the use of the dinar in Serbia's financial system. Foreign-exchange risk, which is often materialized through a high level of non-performing loans based on foreign-exchange risk spreading to credit risk, will be reduced through a greater representation of dinar sources and placements. In order to prevent this, it is necessary for the monetary authorities, together with the representatives of the fiscal policy, to work in order to reduce the level of euroization in Serbia and to actively promote dinar savings, dinar loans and investments in dinar securities. In order to restore confidence in the national currency, it is necessary to maintain the achieved macroeconomic stability measured through low, stable and predictable inflation, maintain the relative stability of the foreign-exchange rate of the dinar against the euro, and promote dinar savings, which have a more favorable tax treatment in relation to savings in a foreign currency. The process of restoring confidence in the domestic currency is not an easy task to do, nor is it possible to do in a short time, because euroization in RS is deeply rooted.

As the topic of dollarization or euroization is actual and present in many countries not only inside our region, but also globally, this fact opens a possibility of the further analysis of this issue. The analysis may be aimed at showing the causes of dollarization and the reasons why highly dollarized countries have accepted a foreign currency as their own, measures in a struggle to reduce the level of dollarization (market, regulatory), as well as the sustainability of the results of these measures in the medium and long run. When the domestic frameworks are concerned, further analysis could be aimed at presenting the efficiency of the measures having been taken by the National Bank of Serbia and the Government of the Republic of Serbia so far, presenting the current situation regarding the level of dinarization by various indicators (the dinarization of deposits, the dinarization of loans, savings in dinars), and offering future measures.

A high degree of dollarization affects the efficiency of the monetary and fiscal policies, thus influencing the overall effects of economic policies on macroeconomic and financial stability, especially when the volatility of the domestic currency is expressed. The countries with a high level of dollarization also have a high passthrough effect of the exchange rate on inflation, i.e. the depreciation of the domestic currency is assumed to be spilling faster on the inflation rate. In such circumstances, the role of the monetary authorities is hampered to achieve and preserve the price and financial stability. For this reason, the representatives of the monetary authorities are aware of the fact that joint efforts with the representatives of the fiscal policy and the non-financial sector should resolve the high level of dollarization, and that the proposed solution is sustainable and efficient in the long run. This solution should be customized to each country individually and should be in line with the characteristics of the economy itself.

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## TRANSFORMING WEB DATA INTO KNOWLEDGE - IMPLICATIONS FOR MANAGEMENT

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Much of one's online behavior, including browsing, shopping, posting, is recorded in databases on companies' computers on a daily basis. Those data sets are referred to as web data. The patterns which are the indicators of one's interests, habits, preferences or behaviors are stored within those data. More useful than an individual indicator is when a company records data on all its users and when it gains an insight into their habits and tendencies. Detecting and interpreting such patterns can help managers to make informed decisions and serve their customers better. Utilizing data mining with respect to web data is said to turn them into web knowledge. The research study conducted in this paper demonstrates how data mining methods and models can be applied to the web-based forms of data, on the one hand, and what the implications of uncovering patterns in web content, the structure and their usage are for management.

**Keywords:** unstructured data, web mining, customer segmentation, on-line behavior modelling, collaborative filtering

JEL Classification: O33, L190, D85, Z13

### INTRODUCTION

The World Wide Web (the web) emerged in the 1990s and has experienced an immense expansion thanks to the widespread use of microcomputers, the development of hardware (primarily microprocessors, memory elements and data storage technologies), the development of user-oriented and easy-to-use software tools, and the incredible possibilities the

web, as a global information system, has created in the business domain. The second-generation web technology has enabled users to create their own content on the web, so the web we witness today is the confluence of the web pages, images, videos and other online materials that can be accessed through a web browser, as well as the confluence of interactive media (social media) and user-generated content. In order to find information about their clients, companies are no longer forced to collect information through interviews, questionnaires or some other kind of interaction with their users as these pieces of

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information are already voluntarily provided on the web. However, a constant increase in the volume of generated data and the diversity of their sources have made the procedures for selecting adequate metrics and gaining actionable insights into data in order to improve a business more challenging. Huge amounts of data and information have made it difficult to search and find specific information, and more time is even needed to collect and transform data, whereas less time remains for strategic planning (Markov & Larose, 2007, 4). This has led to the development of the intelligent techniques and tools that provide support in carrying out an increasingly complex task of analyzing web data and extracting information and knowledge from them.

Knowledge Discovery in Data (KDD) is an area relying on the achievements of machine learning as part of artificial intelligence, with the aim of extracting potentially useful and interesting knowledge from large quantities of data. The KDD process has several phases, which include data preprocessing (i.e. data cleaning, integration, filtering and transformation), data mining (i.e. the identification and analysis of patterns), and the implementation of the extracted knowledge. Traditionally, data mining (DM) techniques have been applied to the data collected over time in relational or transactional databases or an enterprise's data warehouses, but they can in principle be applied to any type of the data repository, including web data.

The concepts, techniques and application possibilities of web mining, the discipline rapidly developing thanks to its great potentials for business, especially e-business, are described in this paper. As web mining can be carried out through different approaches and by using different technologies, its implementation is not uniform and clearly defined, but varies depending on the tasks, the scope of application, and the purpose of analysis.

Therefore, the main subject matter of this research is the key aspects that need to be taken into account when defining the application of new technologies and during web data analysis. Furthermore, the research deals with the most common types of

tasks which this relatively new discipline can be successfully applied to, and describes the specificities of different approaches used in their solving.

In this paper, an assumption is made that web data mining has a very heterogeneous application that brings benefits to many spheres of business doing, thanks to the discovered knowledge that would otherwise stay hidden in an abundance of web data. In order to confirm the starting assumption, the relevant literature is examined, the applications are looked for, and the results of web mining in different industries and tasks are reported.

The advantages of web mining in different spheres of business doing compared to the other analytical approaches, as well as the possibilities for management to incorporate these new technologies in business doing, are investigated. Accordingly, we first wanted to provide a systematic overview of the different ways of web data mining depending on their source (e.g. website visits, the interconnection of web pages, the key issues relevant to web documents, etc.) and the type of the knowledge one would like to reveal (e.g. whether we want to find out the profile of the visitors of a website who made an online product purchase during a visit, derive a model for the automated classification of large quantities of documents into specified categories, or the pieces of information about which products should be recommended to the visitor of the website in order to maximize the opportunity for a potential online purchase, etc.). Furthermore, we wanted to collect some practical examples of web data mining from relevant sources. Our research study is focused on the applicability and benefits of web content mining, the structure and the usage in a business environment, on the one hand, whereas on the other, information retrieval technologies themselves and their efficiency are not within the scope of this paper.

The paper is structured as follows: in the second part, a review of the literature on the theoretical and methodological aspects of the transformation of web data into knowledge is presented. The third part is a description of the three key aspects of web data mining:

- web content mining by means of clustering, information retrieval systems, collaborative filtering and special approaches to non-textual data analysis;
- the web structure mining and the analysis of the structure by page ranking;
- web usage mining.

The possibilities of applying the described approaches in different business spheres are described in the fourth section, along with several examples of the best practice. The final considerations of and the future directions for web mining are given in the fifth section of the paper.

## A LITERATURE REVIEW OF THE THEORETICAL AND METHODOLOGICAL ASPECTS OF TRANSFORMING WEB DATA INTO KNOWLEDGE

Knowledge in Data Discovery is a process of the extraction of the valuable information and knowledge hidden in large quantities of data and documents. The generic methodology most frequently used for the KDD, which assumes the role of the standard methodology, is the CRISP-DM (Cross Industry Standard Process for Data) methodology (Shearer, 2000; Jiawei & Kamber, 2001; Guandong, Yanchun & Lin, 2011). This methodology consists of the continuous, iterative, domain-independent steps applicable in any industry and in all business domains. According to CRISP-DM, it is essential to have a good insight into the business processes themselves, thus transforming business questions into data mining goals. At the next step, relevant data should be collected, understood, and prepared for subsequent analysis. The data preparation step, the so-called preprocessing, depends on the form and quality of the source data and on the goal of data analysis. It consists of data integration, cleansing and filtering, and their transformation into an adequate form. Data preprocessing is followed by data modelling, i.e. the extraction of hidden patterns - relations, rules or behavioral schemes. At this step,

scientific methods and data mining techniques are applied. The evaluation and validation of the developed model represents the third step, which should answer the question of whether the model is compliant with the business goals or not. If the said is the case, the extracted patterns should be interpreted and a plan for the revealed knowledge deployment should be developed. There is no fixed sequence of the mentioned steps; it is, however, a common practice to return to the previous steps from the consecutive ones if the obtained results are not satisfactory. The discovered knowledge is used for defining more specific business goals to which better solutions could be found based on the experiences of the previous iterations.

In 2015, the IBM Corporation presented a new methodology, ASUM-DM - Analytics Solutions Unified Method for Data Mining/Predictive Analytics, which is an extension and improvement of the CRISP-DM methodology (IBM Analytics, 2016). This methodology covers the infrastructural and operational aspects of data mining and predictive analytics and managerial activities in the deployment phase to a greater extent.

E. Yoneki, J. M. Tirado, Q. Guo and O. Serban (2016) have described an expert-centric methodology for knowledge discovery in web data. According to their methodology, the overall task of knowledge discovery is tightly bounded to experts and experts' knowledge, implying that an expert is he who is involved from the very beginning - from the first, data-collecting step throughout the process, all the way to a pattern extraction and knowledge deployment. A broad set of software products is at the disposal of experts as a support in the iterative knowledge-discovery process and only minimal interventions are needed by the development team.

When applying the data mining methods of clustering, classification, prediction or regression to the large amounts of web data in order to leverage the business, the web mining discipline, which has three different aspects (Markov & Larose, 2007; Liu, 2007; Palau, Montaner, Lopez & de la Rosa, 2016) is implied, namely:

- Web Content Mining - This task consists of finding relevant content on web pages for a user query. Each website is so designed to provide some pieces of information to the visitors of the website. However, information is not limited to the textual form, but can also be in the form of images, graphic elements or tables, which makes a search for content more complex.
- Web Structure Mining - The task is to analyze the hyperlink structure, i.e. the way documents are linked together. The in-page structure explains the organization of HTML (Hypertext Markup Language) or XML (Extensible Markup Language) tags on the page. The information about the external connection of a web page with other web pages is in the form of a network of hyperlinks.
- Web Usage Mining - The task is to analyze web page visitors' navigating paths. The data that provide information about the web-page access scheme are most frequently stored in the Extended Common Log Format in log files on servers and contain information such as the Internet Protocol (IP) address, the website reference, the access time and the access point.

The steps in preparing and modeling web data are specific to each of the above-mentioned aspects. In the process of document clustering, each text record is represented internally by the preprocessed words that the document contains, which are referred to as characteristics. Characteristics are the dimensions by which, in the procedures of a further analysis, documents are compared with each other according to their similarity (Liu, 2007). All documents are formally represented in the Vector Space Model, which is created through the steps described in (Cheng, Healey, McHugh & Wang, 2001):

- For each characteristic, the degree of the frequency of occurrence in the observed document is calculated in order to eliminate rarely occurring words.
- The lower threshold value of the frequency is arbitrarily set at the beginning of the clustering process, which reduces the clustering dimensionality.

- Each characteristic is mapped to the  $n$  degrees of significance, one for each of the  $n$  documents from the starting set.
- Degrees of significance are recorded in the form of the  $n \times j$  matrix, where  $j$  stands for the number of the characteristics in the input document set.

This is the so-called Vector Space Model (VSM). The degrees of significance in matrix cells are calculated as a ratio between the term frequency in a specific document and the term frequency in the other documents from the input set. This is the well-known TF-IDF measure (the term frequency-inverse document frequency).

Information retrieval techniques are used in order to find the information of interest to the user in web content mining. These techniques observe the topic/subject matter of documents when selecting those relevant to the user. The efficient filtering techniques using the topic of the documents so as to select the relevant ones are: vector-space queries, intelligent agents and information visualization (Cheng, Healey, McHugh & Wang, 2001; Kumar, Bharani & Mohamed, 2018). When querying in the vector space, documents are searched and ranked according to the (cosine) similarity with the vector presentation of the given query, which is analogous to the already described method of calculating the similarity of the document with the cluster centers.

Collaborative filtering improves information filtering techniques and the performance of information retrieval systems by concerning attributes beyond the mere analysis of the content of documents, such as the user's preferences and tastes and his/her comprehension of the quality of a product, a service or some other entity of his/her interest. J. L. Herlocker, J. A. Konstan, A. Borchers and J. Riedl (1999, 232) stated an assumption that the users who demonstrate a similar behavior share similar interests, i.e. that there is a high degree of correlation in their preferences. This assumption is taken as the foundation in collaborative filtering (Resnick & Varian, 1997, 57) and lies behind the recommender systems operation.

By definition, image mining deals with the extraction of image patterns from a large collection of images (Fayyad, Djorgovski, & Weir, 1996). Therefore, its focus is neither on understanding of and/or extracting specific features from a single image nor on the problem of retrieving relevant images. The image mining process consists of image storing, image processing (in order to improve their quality), the extraction of features (in order to generate the important features from images), image indexing and retrieval, patterns and knowledge discovery (Madhumathi & Selvadoss Thanamani, 2014, 1818). So-generated features enable mining by using data mining techniques so as to discover the significant patterns evaluated and interpreted in order to obtain the final knowledge that which can be applied to applications.

A video is an example of multimedia data as it contains several kinds of data, such as the text, the image, meta-data, visual and audio data: a video consists of a sequence of images with some temporal information; an audio consists of speech, music and various special sounds, whereas the textual information represents its linguistic form (Vijayakumar & Nedunchezian, 2012). In order to be able to analyze such heterogeneous data types, data should be transformed into structured-format features (Rui & Huang, 2000). A video data model is a representation of video data based on their characteristics and content, as well as the applications they are intended for (Kokkoras, Jiang, Vlahavas, Elmagarmid, Houstis & Aref, 2002). It is based on the idea of video segmentation or video annotation. M. Petkovic and T. D. Jonker (2001) proposed a content-based retrieval data model with four layers:

- the raw video data layer with a sequence of frames, as well as some video attributes;
- the feature layer, consisting of the domain-independent features that can be automatically extracted from raw data, characterizing colors, textures, shapes, and motion;
- the object layer, with entities characterized by a prominent spatial dimension and assigned to regions across frames;

- the event layer, with the entities that have a prominent temporal extent describing the movements and interactions of different objects in a spatial-temporal manner.

There are two main approaches to audio data mining (Leavitt, 2002), namely:

- the text-based indexing approach, which converts speech to a text and then identifies the words in a dictionary of several hundreds of thousands of entries,
- the phoneme-based indexing approach, which analyzes and identifies sounds in a piece of audio content so as to create a phonetic-based index.

A dictionary of several dozens of phonemes is used for the purpose of converting the user's search term into a correct phoneme string and the system looks for search terms in the index in order to find the most adequate one.

A video text can be obtained from three sources (Ma, Lu, Zhang & Li, 2002), namely: as a scene text (e.g. from billboards, a text on vehicles, and writings on human clothes), a superimposed text (a mechanically added text to the video frames in order to provide additional information for the purpose of a better understanding of the video), and automatic speech recognition.

For the web structure mining, the manner of the calculation of page ranks is crucial. The calculation of the ranking of a website is a difference between the number of all the inbound links and the number of all the outbound links from that page. The page that has more inbound links than is usually the case for the network being viewed is called the reference node, whereas the page with a significantly larger number of outbound links than the average is the so-called index node in the network.

The basic idea behind a slightly different approach to the calculation of a rank is that hyperlinks are the indicators of human judgment about the mutual relevance of the connected pages, and that the appearance of a link on page  $p$  to page  $q$  carries the latent information that the author who created page  $p$  and included a link to page  $q$  on it "transferred" a certain degree of importance of page  $p$  to page  $q$ . Consequently, the greater the number of inbound links from other websites, the greater the significance or authority of a page. Therefore, complex ranking approaches take into account a wider organization of the web in addition to authoritative pages with many inbound links. They also reveal pages related to many authorities, i.e. pages with many outbound links, the so-called hubs. Hubs linking authorities for a common topic allow the detection and rejection of "false" authorities, i.e. unrelated pages with a large number of input links. Any improvement of the performance of the existing methods for searching relevant websites is closely related to the issues of the efficiency of search algorithms and available data storage capacities.

Web usage mining explores data about all the activities the user carries out with respect to accessing the web that are automatically generated until the user logs out: ranging from where the visit was made, the path the visitor moved along during the search, the time spent on each page, where the user went after the visit, etc. These data are stored in log files on servers. Each mouse click after the user logs in corresponds to a single web page request, and the sequence of such clicks corresponds to the sequence of links to the pages the user has visited. In B. Liu (2007), the basic concepts of web usage mining are explained: the user's visit to a website is called a session, while the sequence of the pages viewed during a single session is called clickstream data or web clicks. The method of generating association rules from transactional data, as known as market-basket analysis, which is widely used in commercial applications, can also be used in order to analyze the web log data (Jiawei & Kamber, 2001; Li & Feng, 2010). The association rule is the rule of form  $X \Rightarrow Y$ , which should be interpreted in a sense that the purchase of the item  $X$  entails the purchase of the item  $Y$  in the

same transaction. In the web environment, the same rule indicates the relationship between the HTML pages  $X$  and  $Y$ , which frequently appear side by side in users' sessions (Markov & Larose, 2007). The association rule does not carry information about the chronology of the visited sites. The techniques for generating sequential association rules that include a temporal component are applied for these types of analyses. In sequential rules, a visit to a website listed in the antecedent of the rule was made prior to a visit to the websites listed in consequence of the rule, i.e. the sequence of clicks is analyzed in the time dimension (Markov & Larose, 2007).

The existing algorithms generate too many rules, out of which it is difficult to distinguish important ones and neglect those deprived of a potential business value. Therefore, it is necessary to determine the criteria in order to ensure the implementation of only useful association rules, whereas all the rules that cannot be sufficiently used to achieve desired business improvements should be rejected. These criteria are called interestingness measures (Tan, Kumar & Srivastava, 2004; Hilderman & Hamilton, 2013).

The question of the accuracy of the log file analysis due to web caching and the need to delegate a web usage mining task to companies specialized in data mining have resulted in a different approach to web data collection, the so-called page tagging. The method uses JavaScript embedded on a web page, so that every time a user searches the page through a web browser, or clicks on a link, he/she generates a request to an analytic server with third parties. Both web-usage data collection methods can be applied in order to report traffic on web pages.

## THE MAIN ASPECTS OF WEB DATA MINING

The incredible opportunities offered to a business by the web as a global information system could be viewed from the following three aspects: the opportunities provided by web content mining, the

business opportunities obtained by the web structure mining, and the advantages gained by insights into web usage mining. These are further described in the sequel.

## Web Content Mining

Web content mining is defined as the “research method for making repeatable and valid conclusions from information about their context” (Krippendorff, 1980, 36). The content of the web as the repository of the data made publicly available by the user carries information about the web-user’s attitudes, preferences, opinions and behavior, which can be significant in many spheres of business.

The first issue of the web as a global information system is the automated storage, access, finding, organization and presentation of data in web documents. The concept of the document was previously associated with the text files generated in the word processor, only to now be used to describe any type of the file an application can generate. A web page is also a document usually written in HTML, which can be accessed by a browser by specifying a uniform resource locator (URL). In addition to the textual content written in some of the natural languages in a free form (not following a predefined or prescribed structure or having just a partially defined one), a web page may contain images, audio, and video data and hyperlinks to other documents. Most broadly viewed, e-services, archived e-mails, and other content can also be categorized into web documents. The analysis of their content is the subject matter of the specialized approaches that go beyond the scope of this paper.

The essence of web content mining lies in the ability to find the documents that are relevant for the user. Content analysis is a widespread method for the objective and systematic quantitative testing of the delivered content and may be useful for discovering or understanding users’ preferences and behaviors in the user-generated complex social and communication trends and patterns (Kim & Kuljis, 2010, 373). Because of the semi- or unstructured document format, interactivity, decentralization, and

the hyperlink network structure, classical database management systems cannot be utilized to locate the required documents in a variety of web documents and newer approaches are necessary instead.

## Clustering

The clustering task can be described as the segmentation of a heterogeneous input set into subgroups of elements with a high degree of mutual cohesion. In the context of the web, the starting population can be made either of the documents/web pages grouped into subgroups according to the meaning of the containing terms (clustering by similarity), or web users, which are clustered based on the activities they perform when visiting the web. When web content mining is considered, documents are clustered, while web usage mining clusters website visitors based on their web usage. Although the terms web user and web visitor are often used as synonyms, yet there is a distinction between them in the context of web mining, which results from the data types automatically generated and stored on web users/visitors. The term user is more general and denotes an individual accessing the web. A unique identification code is given to each user, which distinguishes that particular user from other web users and remains unchanged even if the user switches the device or browser on a return visit to the website. The term visitor denotes an individual accessing the web from a specific device (e.g. from a laptop computer, a mobile phone, etc.) or a specific browser (Google, 2019). In this manner, one user can be represented by several visitors. It is very important for web data mining that access from another device or browser creates a new client ID as it enables data analysts to detect differences in the online behavior of the same user, e.g. in the case when such a user accesses the web from his/her own laptop computer, and in the case of access from a mobile application. Having the terminological distinction in mind, the term visitor will be used in the sequel of the paper only if we want to emphasize the fact that the specific device/browser is taken into account during web data mining. Otherwise, the term user is used.

Clustering algorithms use the VSM matrix to calculate the centers of clusters. At the next step, the distances of each document from the input set to all of the cluster centers are calculated and the results are recorded in a matrix, the so-called Document Vector Model. Based on the obtained similarities, discrete clustering is performed, i.e. each document is assigned to exactly one single partition of the starting set, namely to the one to whose center the degree of similarity of the document is the greatest. Clustering algorithms can find the documents relevant to the user very quickly and accurately, so they can be considered as an effective technology for finding information on the web (Fan, Liu, Tong, Zhao, Nie, 2016, 42).

### *Information Retrieval Systems*

It is customary for web users to demonstrate a need for specific information in the form of a user-defined query. After the user specifies his/her query, the documents relevant to a particular topic or a specific subject matter of the query are found. Information retrieval systems enable search for documents by the subject matter or the topics describing unstructured or semi-structured content, thus overcoming the deficiencies of database/data warehouse management systems. At the same time, the task of the information retrieval system is to exclude from the search results as many documents irrelevant to the user query as possible. The tools that filter the documents content compare the formal representation of the content of a web document with the formal representation of user-specified content, which is indicated through the user query, thus performing a selection of the right information for each user.

### *Collaborative Filtering*

It is common in the real world that friends give us advice on or a recommendation about the interesting products we should buy, a book worth reading, a movie we might happen to like, and so on. Formally in this scenario, they are said to be collaborating with us in the selection process. By analogy with this kind of the collaborative selection of the entities of interest, Recommender systems provide users with the pieces

of advice based on the information about the behavior and preferences of other users.

Recommender systems often encourage users to explicitly evaluate entities, or provide their own preferences, which are then stored in the system. The users of a collaborative filtering system share their own analytical judgments and rankings of entities (the evaluation of purchased products or services), so that other users can more easily decide which product to buy or which action to undertake. Based on the estimated previous experience and the prior users' satisfaction degree, a recommender system creates a personalized recommendation for the new user of the entities that he/she could find interesting. Based on user evaluations, users are classified into the categories of those with the same taste or information needs.

The performance of a recommendation system is directly proportional to the degree of user collaboration (Palau, Montaner, Lopez & de la Rosa, 2016, 145). That is why a collaborative filtering method is especially useful in a world increasingly being networked over the Internet, in which a network of documents on the web builds on the common efforts of the users themselves.

### *Non-textual Web Content Analysis*

Although the content of web documents is merely textual, documents may also contain images, video and audio data, archived mails, and other data as well. Images can be automatically classified or clustered based on the values of the basic colors (the so-called RGB components), or the texture values. Entropy is used to compare the images with some threshold constraints. Image mining is highly utilized in order to classify the medical images with the purpose of diagnosing the right disease verified earlier (Babu & Mehtre, 1995).

The objective of video data mining is not only to discover and describe interesting patterns from a huge amount of video data and automatically extract the content and structure of a video, the features of moving objects and the spatial or temporal

correlations of those features, but also to discover the patterns of the video structure, the object activities and video events out of the vast amounts of such video data with a little assumption of their content.

Audio is what plays a significant role in the detection and recognition of events in a video. Audio data mining can be used to separate different speeches, detect various audio events, analyze the spoken text, emotions, etc. The potential applications of video mining include annotation, search, traffic information mining, event detection/anomaly detection in a surveillance video, a pattern or trend analysis and detection.

Compared to the mining of the other types of data, video data mining is still in its infancy.

## Web Structure Analysis

Millions of online web users with different intentions and aims continually create the content of the web and link their documents by hyperlinks. Therefore, the structure of the web is very complex and it is impossible to plan its development or influence its evolution. Web structure mining is the process of finding information from the organizational structure of web pages, where it consists of the hyperlinks that link pages formatted in HTML together. Roughly speaking, the task is to discover those websites that are relevant to the query, whereby the quality of the search is subject to people's subjective evaluations due to the inherent personal aspect of the relevance criterion.

Web users can set up very specific queries for which there are very few documents containing the response to such a query. In such cases, it is difficult to find those documents in a plethora of web documents. This phenomenon is known as the scarcity problem. In contrast to this scenario, web users can post a query whose topic is very general or broad, so that thousands of relevant websites that contain the information requested and respond to the query can be found. This problem is known as the abundance problem. In this scenario, it is necessary to find a smaller subset of the most relevant and the most significant documents,

i.e. to filter out the most authoritative documents, the so-called authorities, from a large resulting collection. Since the most authoritative pages are not always those on which a particular term appears more often, but they can be the pages on which the term does not appear at all (e.g. as the leading car manufacturer, Honda does not make a mention of the term "car manufacturer" on its website), it is clear that the text-based approaches are not adequate for ranking pages by authority, and the approaches that rely on the hyperlinks that link websites are used instead. The results show that the text contained in the document citing another document as a reference often has a greater discriminatory and descriptive value than the text in the original document (Glover, Tsioutsoulklis, Lawrence, Pennock & Flake, 2002, 566).

## *Page Ranking by Relevance*

There are many approaches to finding relevant pages in the context of the hyperlink structure of the web. They rely on the page ranking procedure, where a rank implies an associated numerical indicator. This observation is oversimplified since the number of inbound links in popular websites (such as www.yahoo.com) is very large, so they could be considered as relevant for all queries. Although links and content are still among the most important ranking parameters for web pages, contemporary ranking systems include many more indicators, none of which gives a holistic rank, but strives to highlight the most important websites and make their content more visible. In its browser, Google uses over 200 factors for determining a page rank, but their specification falls under the business secret (Search Engine Land, 2017).

## Web Usage Mining

The data collected in log files on web servers have a certain degree of analogy with the data from the purchases transaction database. Each required web page can be considered as analogous to one item in a transaction, whereas a set of all the pages that a particular user requested during a single visit to the website can be considered as an analogue to one transaction, or a set of the items found in the

shopping cart at the time of purchase. One example of an association rule on a particular website could read as follows: "If a user has requested the websites *A*, *B* and *C*, there is an indication with a confidence level of 23% that he/she will also require pages *D* and *E*."

Web usage mining is focused on analyzing the data on the visited web pages during user sessions and allows the extraction of the knowledge of web visitors' behavior. The interesting patterns or behavioral schemes we were not aware of before bring a potential benefit to both the website owners and the visitors. The difficulty encountered by the analyses of the data collected in log files on web servers is the tendency of algorithms to generate too many association rules, among which, even by utilizing measures of interestingness, it is difficult to choose the rules providing the information useful in the given domain of application. Furthermore, both methods for collecting data - from log files or by tagging - could be used for web usage analysis. Which approach will be utilized in an enterprise depends on the cost of the analysis done in-house vs. the cost of engaging a third party.

## WEB MINING APPLICATIONS

Web content mining is widely used in social and humanity domains given the fact that all social aspects relevant to web users are embedded in the content they produced - through using symbols, transmitted messages, images included, or through the phenomenon of content linking and organizing. I. Kim and J. Kuljis (2010) described the specific use of the analysis of the content of web documents in examining a cultural impact on design and the utilization of blogs. Since users create and maintain blogs independently, the tested assumption implies that blogs reflect the system of values and the preferences of authors, which are a result of cultural heritage. The results of the survey in South Korea and the United Kingdom have denied the assumption and have shown that bloggers from the countries that are traditionally characterized by a low degree of risk and uncertainty tolerance (such as South Korea)

are less likely to reveal personal information about employment than the bloggers from the countries traditionally tolerant to risk and uncertainty (such as the United Kingdom), but also that they provide information about their age and contact link more frequently.

The structure of web links may indicate the similarity between linked web pages. Therefore, if we find the page *p* that we consider relevant for a particular topic, i.e. sufficiently authoritative for the given subject, by inspecting the links surrounding the page *p* it is possible to generate a response to the question which other topics are related to the starting topic in the opinion of the author who created the page and included the links in it. If page *p* is highly referential, there will be an enormously large number of independent opinions about the linkage of page *p* with those other pages, but if we use the notation of authorities and hubs, it is sufficient to find the nearest (local) authorities around page *p*. Local authorities are a kind of a summary of the general topics related to the page-*p* topic. Based on an insight into the hyperlink structure of the web, web pages can be categorized, or an insight can be gained into the hierarchical or network structure of the existing links on a website within a particular domain.

By analogy with the extent of authoritativeness of a website, an analysis of the web link structure can be used to measure the status, or an impact in social networking. In this sense, mechanisms for measuring the "significance" of individuals are developed through the citation of their papers, or for measuring the impact factors of the journals linked by the quoted references in an implicitly created network of scientific papers, which is used in bibliometric evaluations. The well-known measure of authority in this context is the Journal Impact Factor (Garfield, 1972), which is calculated for the year under review as the average value of the number of the citations of the scientific papers published in that particular journal in the past two years (Egghe & Rousseau, 1990). The impact factor is basically the ranking mechanism that only takes into account the input links in the network when calculating the authority.

Web usage data capture the interaction of a user with the website, based on which a user model is created as a picture of his/her behavior, interests, and personal preferences. Web usage mining has basically two applications: the analysis of traffic on web pages and application in e-commerce. Traffic analysis includes an analysis of the navigation data generated during the user session, describing the path that the user followed. Data on how many pages the user visited during the session are also recorded. Analysis usually reveals details about the visitors, such as their search style, preferences, forwarding a product/service to their friends, the number of clicks on the link and hits on a particular page, etc. Thanks to the discovery of associative rules, the visitor's behavior can be predicted by comparing website search schemas with the search schemes extracted by mining log data from other users. Based on recognized similarities and shared common interests, web content could be personalized for the user (Siddiqui & Aljahdali, 2013, 42), and recommender systems may suggest the most appropriate path for visitors to their preferred websites, or the usual route to certain e-purchases.

Large companies throughout the world have long recognized that e-commerce is not merely sales and shopping online, but also the ability to increase efficiency in a competitive market by exploiting the knowledge hidden in the large amounts of data available online. The integration of web mining techniques with e-commerce applications enables an e-store owners to improve their performance and services, and to collect information about clients and the behavior demonstrated by the customers accessing products or services online through the website. E-commerce websites generate the data that contain information on the reasons, dynamics and ways of navigating through websites, and therefore their analysis may indicate better access to preferred web content, improve the purchase process, and generate added value for consumers. In order to meet visitors' needs to the greatest possible extent, especially when consumers and loyal customers are concerned, customized web services are offered during their visit. Based on the observed similarities in the prior behavior of their visitors and the anticipated interests of the new visitor, certain websites prepare

customized product catalogs (Shukla, Silakari & Chande, 2013, 8). Many of the world's leading e-commerce companies (Yahoo!, Amazon, eBay, IBM, etc.) have customized their web presentations for personalized access and use recommender systems as a form of customer support.

Web mining is very important in e-commerce for customer relationship management (Li & Feng, 2010, 279). The emphasis is on attracting new customers, the retention of the existing ones, the cross-selling of products, and the prevention of consumer churn. Customer profiling allows organizations to predict who their potential customers or consumers of their products/services are and what kind of behavior schemes they can expect from them. Web usage mining results in an analytical insight into visitors' behavior on the company's website; by understanding which part of the population they account for (concerning their respective age, gender, location, and other characteristics); how they came to the company website; which pages were visited most frequently (which content users find the most interesting); the overall visit performance, etc. Web usage mining can be very important for marketing activities as it reveals frequent navigation routes through the company's website. Every time a visitor clicks a link, an image, or another object on a page, that piece of information is recorded and remembered. One can discover the habits of each individual, but it is more useful when one saves thousands of navigation paths and finds out users' global habits and tendencies (Jokar, Honarvar, Hamirzadeh & Esfandiari, 2016, 321). Aggregated information in a form of the overall visit statistics is very useful to decision-makers because they are a clear indicator of the frequency of visits to each page, the time spent on each page, the activity of the visitors on a particular page, the ratio between the number of the visits and the number of the conversions, the popularity of products or services, available consumer choices, etc. Information about the visited pages and their order also points to the most frequent place to leave the company's website, as well as where most products are added to the shopping cart or removed from it. The analysis of the clickstream may determine the effectiveness of the website. To do this, it is necessary to quantify the visitors' behavior during

the session, i.e. record all sales transactions during the visit. The web-usage-related association rules can be used in order to better organize the website content or give recommendations for effective cross-selling (Liu, 2007). Clickstreams may reveal the pages the majority of the visitors came from and indicate the best place for placing ads, or may show whether an online marketing campaign is successful or not (whether there is a connection with online purchases). Website navigation information may indicate an (in)adequacy of online forms or the process of the selection of an item for the virtual shopping cart, and the (in)efficiency of the payment methods.

In addition to e-commerce websites, there are the websites that are not intended for sales, but rather serve as product catalogs, while transactions are made offline. Monitoring clickstream data on these websites provides us with advanced information about demand significant for supply, the inventory planning and production (Huang & Mieghem, 2014, 334). The authors point out the fact that the businesses that use visits and clicks data may reduce the storage and ordering costs by 3-5%.

The advantages of web usage mining are also evident regarding the improvement of the performance of web servers and server applications through different cache and pre-fetching strategies in order to shorten the user query response time. Website owners can simultaneously improve the usability of web pages through a better design and implementation, e.g. in order to optimize the website for searching frequently used keywords, or to eliminate mediators through which visitors came to the website.

### Examples of the Best Practice

AMSOIL Inc., the first manufacturer of synthetic lubricant for cars and machines with a tradition of over 40 years, chose Mozenda's software solution ([www.mozenda.com](http://www.mozenda.com)) in order to search the web so as to support its business. The Mozenda Cloud-Hosted Web Harvesting Solution allows AMSOIL to extract and organize unstructured web data in order to develop and maintain the planning resources (Mozenda, 2018). The Strategic Planning Team at

AMSOIL uses the information Mozenda collects from the web for the retail distribution network planning. This primarily involves the mapping of the retail and services locations in order to identify potential locations for new retailers. Collecting and keeping track of competitors' prices is one of the most common options for every organization selling online. The Mozenda tool continuously collects publicly available information from e-commerce websites for the purpose of better understanding the market and tracking product categories and competitive prices compared to the AMSOIL prices. From e-commerce operations through retail to retail planning, quick access to unstructured web data helps AMSOIL to smoothly address a variety of strategic and tactical requirements and to successfully deal with bigger brands, such as Mobil, Pennzoil, Shell, Castrol, and Valvoline.

Tesco.com is an e-commerce subsidiary of Tesco PLC, a UK-based retailer of food and consumer goods, operating in the United Kingdom, Europe, Asia and North America. Introduced in 2000, Tesco.com has been trading with food products, consumer goods, clothing, banking and insurance services. Tesco's developers and data analysts have introduced the Splunk Enterprise Software Package in order to better understand which products and web pages users use and which web pages have resulted in the highest number of conversions. This has enabled the company to improve customer satisfaction based on new insights into online data, reduce potential revenue losses, accelerate the development cycle, and improve team collaboration. The Splunk digital intelligence solutions (Splunk, 2013) outperform classical marketing analytics and provide a complete insight into the user interaction through various digital channels, including the web, mobile communication, social media and offline interactions. The Splunk Enterprise solutions are used along with other web analytics tools in order to extract information from the historical and real-time data generated both on the client and on the server sides.

With its over-60-years-long retail experience in over 40 countries throughout the world, IKEA, a furniture and furnishing goods manufacturer, has also decided

to intelligently analyze web data in order to improve its business (Harapiak, 2013). Buyer demographic and psychographic data are primarily used to reveal their lifestyles and living habits, and consequently to improve the visual experience of a home through exhibition showrooms arranged as a real living space. Analyzing customer behavior data, IKEA has discovered a purchase pattern they named the domino effect: buying just one piece of furniture pulls out some other purchases in order to best fit it into the existing space. They have also found out that, in addition to transactions data, client demographic data are not sufficient for an analysis of consumers' habits because they do not provide information on their value system. The incorporation of psychographic data has revealed interesting behavior patterns. One of them concerns the very specific habits of the inhabitants of Pittsburgh, for which IKEA specifically created a catalog in which they primarily emphasized the price value the inhabitants in this region were particularly sensitive to, unlike other furniture characteristics prospective customers did not show sensitivity to (Dudovskiy, 2017). In IKEA, they emphasize the fact that by relying on classical analyses, this specificity would never be noticed.

AstraZeneca Co. is a multinational British-Swedish multinational biopharmaceutical company headquartered in London. AstraZeneca has seen a marked improvement in the standard of its medical research since they implemented data mining software. The Linked Life Data, a platform for gathering information from a broad range of biomedical data sources, has enabled the identification of the causal relationships hidden inside the text and making informed assertions on exactly how they are causal. This has led to the inclusion/exclusion of certain criteria for clinical studies (AstraZeneca, 2019). The Lexiquist Mine application from the SPSS software firm enables the extraction of information from the unstructured textual content of the repository that grows by thousands of documents each day (Thomas, 2002).

LIAT (Leeward Islands Air Transport) is a Caribbean airline providing interisland scheduled services operating on 15 destinations. The company has

improved its customer service by mining travelers' textual messages. Text mining and the predictive classification models built in the RapidMiner route customers' messages to relevant departments (RapidMiner, 2019a). This way, the Customer Service Department is freed from manually triaging these messages, which enabled that department to focus on responding to customer's issues and needs instead. According to LIAT, a negative social media sentiment has dropped from almost 90% to as low as 40%. This early success has opened the way for many data mining applications in other business operations.

Austria's leading mobile phone service provider, Mobilkom Austria, receives more than 800,000 emails on a monthly level. Even after spam filtering, more than 80,000 customer requests still remain. Given the fact that customers expect a timely reply, Mobilkom started automating the email classification process by analyzing the textual content of incoming emails by using the RapidMiner's Data Science Platform, by which doing email requests are automatically and quickly forwarded to the support person in charge of this topic (RapidMiner, 2019b). A competent answer is guaranteed in the shortest possible time.

PayPal is a faster and safer way to pay and be paid online, or to send and receive money around the world. With 143 million active accounts in 193 markets and 26 currencies around the world, PayPal enables global commerce, processing more than 8 million payments per day. The one never-ending task for the company is to manage customer satisfaction and reduce customer churn. The background knowledge of what makes customers satisfied and what drives the improvement of product experience is gained by applying text analytics to customers' feedback in over 60 countries worldwide. They have succeeded in identifying, classifying and counting customers as "top promoters" and "top detractors" (RapidMiner, 2019c).

Nowadays, even more software tool providers (FeaturedCustomers, 2019), nevertheless these tools are entirely dedicated to data mining or have specialized platforms or modules for intelligent data

analysis, report on their websites on their positive experiences and highly diversified applications of the best practices in web data mining.

## CONCLUSION

The incorporation of achievements in the field of artificial intelligence in all business domains is nowadays considered as one of the key strategic determinations, which requires not only a great degree of innovation, but also a transformation of business doing. Due to the complexity of new technologies and the changes they require, all those who want to remain competitive in the future must begin to shift towards new technologies and exploit their capabilities straightway. Having this in mind, the multifaceted aspects, tasks and possibilities of web data mining are presented in the paper, as their adequate application enables companies to reveal valuable information and knowledge, which would otherwise remain hidden in large data collections, and the potential benefits lost.

Taking the discovered patterns as the starting point, companies can undertake actionable steps for business leveraging. Therefore, it is important that a holistic and systematized overview of the diversified set of methods for each web data mining aspect should be provided. Different web data mining aspects are described in this paper, and they are matched with different methodological issues: web content mining is associated with the clustering techniques, information retrieval systems and collaborative filtering; web structure mining is matched with the ranking of relevant web pages in the context of the hyperlink structure; and web usage mining is associated with the extraction of the association rules.

Furthermore, an overview of the specific tasks that can be fulfilled by some web data mining approaches and the kinds of the knowledge that could be revealed are described in the paper as well. Such knowledge and information could help a company to better plan its business strategies and can enable a faster expansion. Numerous opportunities and benefits of

the utilization of web mining vs. the other analytical approaches are outlined in various business areas: a deeper insight into social processes, measuring the status or an influence (of documents, individuals, or other entities), the categorization of web pages, an insight into the hierarchical structure of web pages, web traffic analysis, revealing common navigation paths through a company's website, the assessment of a website efficiency and the improvement of its utilization, an insight into the user-website interaction and the personalization of websites/item catalogs, a recommendation for items/services, the user profiling for improved relationship management, extracting advanced information on demand valuable for demand, the inventory and production planning, the improvement of web servers' performance and applications.

The practice so far, as well as the selected examples of the best practice, have shown that every aspect of the use of intelligent techniques contributes to improved business operations, and also that the quality of the achieved results is significantly improved by a combination of several methods (Zaiane, Li & Hayward, 2004). The foregoing speaks in favor of the starting assumption that the application of web mining is extremely heterogeneous, with evident benefits in many business spheres. Many intelligent technologies, however, web mining included, are still at an early stage of adoption and broader acceptance can only be expected once more software providers include the achievements of machine learning in their solutions, or once the offer of specialized tools for this purpose is expanded. Until then, web data mining remains an advantage in market competition, so the companies already exploiting this advantage and harvesting web mining benefits are unwilling to publicly share their experiences. Therefore, there is only a small number of the best practices described in the references, amongst which e-commerce applications dominate.

In the field of artificial intelligence, various approaches to data analysis are constantly developed and the range of possible applications is being expanded. For example, Tableau and VoiceBase (Tableau-VoiceBase, 2019) have jointly developed an analysis tool allowing

conversations made through call centers to be analyzed without transcribing, visualizing voice messages and providing an insight into unstructured telephone conversations and the client base (Sevilla, 2019). In this manner, the services of marketing, sales, production, etc. can improve decision-making and taking adequate actions. Since the paper presents an overview of the current situation in the domain of web mining, such innovative approaches are not included in it. Similarly, new classes of the data generated through mobile applications, social media, sensors, and mobile devices are the segment which an ever-increasing number of organizations will rely on in their everyday operations. Understanding the utilization of these multiple channels and creating analytical data processing capabilities in order to improve online and offline business operations are the subject matter of further research.

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