

# Ekonomski horizonti



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# **Ekonomski horizonti**



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## UVODNIK

Sveska 2 Volumen 21 Godište 2019 naučnog časopisa *Ekonomski horizonti* sadrži četiri izvorna naučna i dva pregledna članka i Zahvalnicu recenzentima rukopisa, podnetih Uredništvu Časopisa za publikovanje u 2018.

Sagledavajući prednosti pograničnih i prekograničnih ekonomskih zona za podsticanje ekonomskog rasta i razvoja, koautori *Anh Thu Nguyen, Thanh Huong Vu, Thi Thanh Mai Nguyen, Thi Minh Phuong Nguyen* i *Thi Vu Ha Nguyen* istražuju potencijale pograničnih oblasti na Severu Vijetnama i njihove prednosti u pogledu uključivanja u pogranična i prekogranična tržišta, kao način da se ubrza ekonomski rast ne samo pograničnih regija, već i zemlje u celini. Istraživanjem, kojim su obuhvaćene regije Cao Bang, Lao Cai, Lang Son i Quang Ninh, konstatiše se postojanje velikih razlika u njihovoj spremnosti da se uspostavlaju prekogranične zone. U tom smislu, ukazuje se na potrebu poboljšanja povezanosti kako na nivou infrastrukturnih potencijala, tako i u pogledu usaglašavanja politika. Posebno se potenciraju prednosti od korišćenja veće povezanosti sa kineskim tržištem, što pruža višestruke pogodnosti kako za analizirane regije, tako i za zemlju u celini, zbog čega je neophodno usklađivanje zajedničkih strategija i politika kako bi se uspostavila i unapredila prekogranična saradnja.

Efekte vlasničke strukture banaka na njihovo finansijsko poslovanje, koautori *Mustafa Kevser* i *Bilge Leyli Elitaş* analiziraju na osnovu kvartalnih podataka za trinaest banaka koje se kotiraju na Istanbulskoj berzi (BIST), a koji se odnose na period 2005-2017.

Nezavisne varijable za izvođenje ove studije su porodično vlasništvo, korporativno vlasništvo, menadžersko vlasništvo, inostrano vlasništvo, vlasništvo najvećeg akcionara, vlasništvo tri najveća akcionara, i stopa slobodnog fluktuiranja, dok su koeficijent zaduženosti, ukupna aktiva, i godine poslovanja banke opredeljeni kao kontrolne varijable. Kao indikatori finansijskog poslovanja korišćeni su: prinos na ukupno angažovana sredstva, prinos na akcijski kapital, Tobinov Q-koeficijent, zarada po akciji, i koeficijent cene i čiste dobiti. Na osnovu formiranih pet modela za analizu, koautori su pokazali da vlasnička struktura utiče na finansijsko poslovanje banaka.

Mogućnosti ostvarivanja kvalitetne zdravstvene zaštite u okviru nacionalnog programa zdravstvenog osiguranja u Nigeriji, koautori *Joshua Solomon Adeyeye, Gbenga Michael Ogungbenle* i *Ogorchukwu Augustine Isimoya* istražuju na primeru Džos metropole. Međutim, uprkos činjenici da postoji organizovan program zdravstvenog osiguranja, korisnici ovih usluga nisu zadovoljni kvalitetom zdravstvene zaštite, što je rezultat moralnog hazarda, koji je prisutan kod zaposlenih u sektoru javne zdravstvene nege, kao i zbog nedostatka lekova u javnim bolnicama. Istraživanjem koje je sprovedeno u metropoli Džos, koautori nastoje da utvrde u kojoj meri nepoštovanje etičkih standarda od strane lekara i farmaceuta, i asimetrične informacije o nacionalnom programu zdravstvenog osiguranja, uzrokuju ponašanja koja su rizična po zdravlje osiguranika. Istraživanjem je potvrđena polazna pretpostavka da su ponašanja rizična po zdravlje osiguranika posledica moralog hazarda i asimetričnih informacija pružaoca usluga u okviru nacionalnog programa zdravstvenog osiguranja u Nigeriji.

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Shodno stavu da je, u savremenim uslovima poslovanja, nezamislivo kvalitetno upravljanje preduzećem bez sistema interne kontrole, *Biljana Jovković* razmatra prioritetne ciljeve interne kontrole i njeno funkcionisanje u preduzećima Šumadijskog i Raškog okruga. Istraživanje je sprovedeno u petnaest preduzeća iz Kragujevca, četrnaest iz Kraljeva i u jednom preduzeću iz Vrnjačke Banje. Rezultati istraživanja pokazuju da se u najvećem broju preduzeća prepoznaje značaj sprovođenja interne kontrole, što je za njenu efikasnost od izuzetne važnosti. Shodno tome, u većini preduzeća su ustanovljeni kontrolni postupci što, zahvaljuju preventivnom suzbijanju devijantnih pojava koje bi mogle da ugroze ostvarivanje definisanih ciljeva, omogućava izvršavanje poslovnih aktivnosti u skladu sa planom.

Dolarizacija, kao zvanična ili nezvanična upotreba strane valute u transakcijama jedne zemlje, predmet je istraživanja kojim se bavi *Vesna Martin*, prezentujući troškove i koristi njene primene. Rezultati analize pokazuju da dolarizacija, uprkos nižim troškovima transakcija u međunarodnoj trgovini, uspostavljanju makroekonomskog stablinosti, i finansijske integracije, ima za rezultat gubitak senioraže kao prihoda od štampanja novca monetarnih vlasti, ali i ograničenost primene funkcije zajmodavca. Pri tome se ukazuje da visok stepen dolarizacije utiče na smanjenje efikasnosti monetarne i fiskalne politike, a time i na ukupne efekte koje ekonomска politika ima na makroekonomsku i finansijsku stabilnost, naročito u slučaju kada je izražena volatilnost domaće valute. Zbog toga, zaključuje se da stepen dolarizacije treba da bude prilagođen svakoj zemlji ponaosob i da se primeni u skladu sa karakteristikama same ekonomije.

Shodno značaju informacija za uspešno vođenje i unapređivanje poslovanja preduzeća, koautori *Zita*

*Bošnjak, Olivera Grljević i Saša Bošnjak* razmatraju concepte, tehnike i mogućnosti primene rudarenja *web* podataka i njihove implikacije za menadžment. Budući da se na osnovu prikupljenih podataka dolazi do saznanja o indikatorima interesa, navika, preferencija i uobičajenih modaliteta ponašanja pojedinaca, menadžment ima mogućnost da donosi adekvatnije i kvalitetnije odluke, zasnovane na informacijama koje se, rudarenjem *web* podataka, transformišu u potpunije i sveobuhvatnije znanje, što je relevantno za ostvarivanje pozitivnih poslovnih rezultata. Na osnovu znanja, do kojeg se dolazi korišćenjem skrivenih i raznovrsnih podataka koji su raspoloživi *online*, menadžment je u poziciji da kreira i sprovodi poslovnu strategiju koja će rezultirati bržom ekspanzijom preduzeća, što je potvrda polazne hipoteze da rudarenje *web* podataka ima heterogenu primenu, čime se pružaju mogućnosti ostvarivanja benefita u mnogim sferama poslovanja.

U ime Uredništva Časopisa i u svoje ime, zahvaljujem se autorima priloga publikovanih u ovoj Svesci Časopisa, kao i recenzentima koji su, svojim kritičkim komentarima i sugestijama autorima, značajno doprineli unapređivanju podnetih rukopisa.

Sveska 2 Volumen 21 Godište 2019 sadrži *Zahvalnicu recenzentima* rukopisa podnetih Uredništvu Časopisa u 2018, od kojih su oni koji su pozitivno ocenjeni u dvostruko anonimnom recenzentskom postupku publikovani u Sveskama 1, 2 i 3, Volumen 20 Godište 2018.

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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

Source: Authors

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-Ha Noi-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

<sup>1</sup> 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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## **USLOVI ZA USPOSTAVLJANJE PREKOGRANIČNIH EKONOMSKIH ZONA NA SEVERU VIJETNAMA**

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Formiranje i razvoj pograničnih ekonomskih zona (GEZ) i prekograničnih ekonomskih zona (PGEZ) ne predstavlja samo priliku koja se pruža pograničnim regionima, već, takođe, predstavlja mehanizam za razvoj lanca nabavke i proizvodne mreže kao rezultat granične povezanosti. Rad se fokusira na analizu uslova za formiranje i razvoj PGEZ u pograničnim oblastima na severu Vijetnama, uključujući pokrajine Cao Bang, Lao Cai, Lang Son i Quang Ninh. Postoji velika razlika u spremnosti četiri proučavana lokaliteta za uspostavljanje PGEZ. Međutim, analizom sva četiri lokaliteta, utvrđeno je da je potrebno najviše raditi na poboljšanju povezanosti kako na nivou infrastrukturne povezanosti, tako i na nivou usaglašavanja politika.

**Ključne reči:** prekogranična ekomska zona, Severni Vijetnam, pogranična ekomska saradnja

JEL Classification: F150, F200

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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

### 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. Küçükkaplan 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. Sarrianides (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. Kabakçı (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

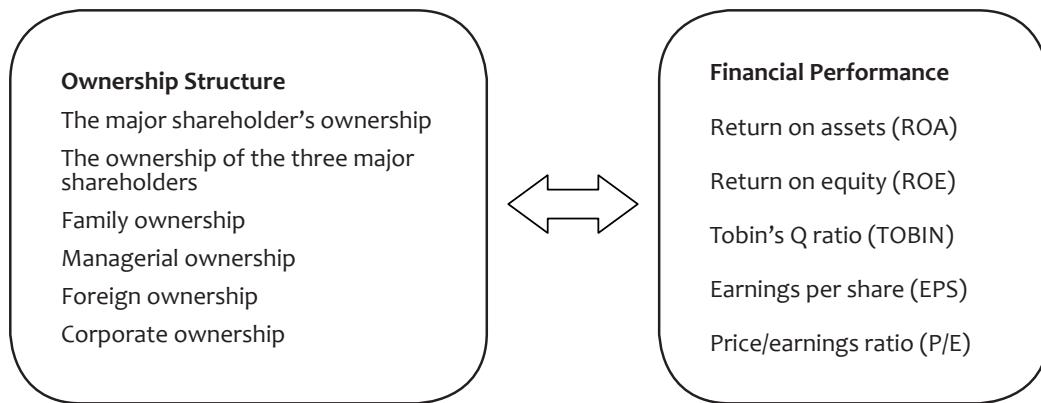
This study is aimed at analyzing the relationship between the ownership structure and the financial performance of the banks listed on the Istanbul Stock Exchange (BIST). The quarterly regular data of the 13 banks listed on BIST are applied relating to the 2005-2017 period; 52 terms were analyzed in 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

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

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

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

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

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

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.

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

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
LARGEST3	-.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

$$\text{Model 2: PROFITABILITY (ROE)}_{it} = \beta_1 (.018)LARGEST_{it} + \beta_2 (-.216)LARGEST3_{it} + \beta_3 (.274)\text{FAMILY}_{it} + \beta_4 (-.220)\text{MANAGER}_{it} + \beta_5 (0.99)\text{FOREIGN}_{it} + \beta_6 (-.058)\text{CORPORATE}_{it} + \beta_7 (-.208)\text{FFR}_{it} + \beta_8 (-.092)\text{LEVERAGE}_{it} + \beta_9 (.219)\text{ASSET}_{it} + \beta_{10} (.088)\text{AGE}_{it} + \alpha + \varepsilon_{it}$$

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

\*\*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		T	Sig.	Collinearity Statistics	
	B	Std. Dev.			B	Tolerance
CONSTANT	1.039	.385	-	.2697	.007*	-
LARGEST	.008	.002	.264	3.438	.001*	.191
LARGEST3	-.011	.005	-.250	-2.365	.018**	.101
FAMILY	.022	.002	.499	10.271	.000*	.476
MANAGER	-1.699	.247	-.313	-6.870	.000*	.540
FOREIGN	.000	.001	.021	.429	.668	.448
CORPOR.	-.001	.001	-.037	-.877	.381	.617
FFR	-.004	.004	-.092	-1.025	.306	.138
LEVERAGE	-.042	.013	-.132	-3.134	.002*	.630
ASSET	.148	.029	.229	5.048	.000*	.544
AGE	-.008	.002	-.231	-4.058	.000*	.344

\*\*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> +  $\alpha + \varepsilon_{it}$

**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
LARGEST3	-.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 (LARGEST3  $\beta = -.484$ ; 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)<sub>it</sub> =  $\beta_1 (.157)$   
 $LARGEST_{it} + \beta_2 (.140)LARGEST3_{it} + \beta_3 (-.043)FAMILY_{it}$   
 $+ \beta_4 (.013)MANAGER_{it} + \beta_5 (-.166)FOREIGN_{it} + \beta_6 (-.048)$   
 $CORPORATE_{it} + \beta_7 (.140)FFR_{it} + \beta_8 (-.221)LEVERAGE_{it}$   
 $+ \beta_9 (.117)ASSET_{it} + \beta_{10} (-.378)AGE_{it} + \alpha + \epsilon_{it}$

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

\*\*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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# ODNOS IZMEĐU VLASNIČKE STRUKTURE BANAKA I FINANSIJSKOG POSLOVANJA: EMPIRIJSKO ISTRAŽIVANJE ZA TURSKU

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Cilj ove studije je analiza efekata vlasničke strukture banaka na njihovo finansijsko poslovanje. Korišćeni su kvartalni podaci za 13 banaka koje se kotiraju na istambulskoj Berzi (BIST), a koji se odnose na period 2005-2017. Kao indikatori finansijskog poslovanja, u studiji se koriste prinos na ukupno angažovana sredstva (ROA), prinos na akcijski kapital (ROE), Tobinov Q-koeficijent (TOBIN), zarada po akciji (EPS), i koeficijent cene i čiste dobiti (P/E koeficijent). Porodično vlasništvo, korporativno vlasništvo, menadžersko vlasništvo, inostrano vlasništvo, vlasništvo najvećeg akcionara, vlasništvo tri najveća akcionara, i stopa slobodnog fluktuiranja su opredeljeni kao nezavisne varijable za izvođenje ove studije, dok su koeficijent zaduženosti, ukupna aktiva i godine poslovanja banke opredeljeni kao kontrolne varijable. Formirano je pet modela za analizu odnosa između varijabli i sprovedena je regresiona analiza. Analize su pokazale da vlasničke strukture banaka utiču na njihovo finansijsko poslovanje. Osim toga, sugeriše se da su rezultati dobijeni analizama koherentni za teoriju agencije, kao jednu od fundamentalnih teorija koje se bave ovim predmetom.

**Ključne reči:** vlasnička struktura, finansijsko poslovanje, teorija agencije, bankarstvo, korporativno upravljanje

JEL Classification: G10, G32



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# OCENA PRIORITETNIH CILJEVA I FUNKCIONISANJE INTERNE KONTROLE U PREDUZEĆIMA ŠUMADIJSKOG I RAŠKOG OKRUGA

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Bez postojanja sistema interne kontrole, u današnjim uslovima poslovanja upravljanje preduzećem bilo bi nezamislivo. Zahvaljujući kontroli, omogućeno je izvršavanje poslovnih aktivnosti u skladu sa planom, putem preventivnog suzbijanja devijantnih pojava koje bi mogle da ugroze ostvarenje definisanih ciljeva. Ukoliko sistem ne bi bio uspostavljen, preduzeće se potencijalno izlaže značajnim gubicima, čiji krajnji rezultat može biti propast i nestanak preduzeća. Cilj ovog rada je da ukaže na rangiranje i značaj pojedinih ciljeva sistema interne kontrole u praksi poslovanja preduzeća i, s tim u vezi, na potrebu uspostavljanja adekvantnih kontrolnih aktivnosti kao dodatne mere za obezbeđenje ostvarenja proklamovanih poslovnih ciljeva preduzeća. Istraživanje je pokazalo da je najbolje rangirani cilj interne kontrole unapređenje tačnosti i pouzdanosti knjigovodstvenih i operativnih podataka, što ukazuje da preduzeća eksternu odgovornost prema regulatorima vide kao prioritet u svom poslovanju. Najniže rangiran cilj ocena poslovne efikasnosti govori u prilog sekundarnog položaja potreba internog informisanja u odnosu na eksterne izveštajne zahteve. U radu je učinjen pokušaj sveobuhvatne analizire načina implementacije interne kontrole u najvažnijim funkcijama preduzeća: prodaje, nabavke, proizvodnje, kadrovske, i finansijske funkcije.

**Ključne reči:** kontrolne aktivnosti, ciljevi interne kontrole, finansijsko izveštavanje, sistem interne kontrole

**JEL Classification:** M40, M41, M42

## UVOD

Obavljanje poslovnih aktivnosti preduzeća karakteriše konstantna izloženost rizicima. Dinamičnost okruženja, zbog koga preduzeća nisu u mogućnosti

da pouzdano procenjuju ishode pojedinih aktivnosti, može da dovede u pitanje postizanje definisanih ciljeva preduzeća. U cilju smanjenja i kontrole rizika, kojima su izložena na putu ka postizanju ciljeva, preduzeća definišu sistem interne kontrole sa svrhom ograničenja rizika na prihvatljiv nivo. „Poslovno rukovodstvo je dužno da uspostavi interne kontrole koje obavljaju svi zaposleni kao sastavni deo

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njihovih redovnih radnih obaveza i da vrši nadzor nad njihovim funkcionisanjem" (Ljubisavljević, 2013, 49). Adekvatan kontrolni sistem, osim podobnog mehanizma za redukovanje rizika, istovremeno, povećava mogućnost iskorišćavanja povoljnijih eksternih šansi i prilika koje se ukažu preduzeću. Odgovornost za uspostavljanje i funkcionisanje sistema interne kontrole ima menadžment preduzeća, dok je revizor odgovoran za vrednovanje postojeće interne kontrole (Jovković, 2010, 152).

U radu se istražuje odmeravanje značaja pojedinih ciljeva sistema interne kontrole u praksi poslovanja preduzaća i ciljevi kontrolnog sistema preduzeća, koji se smatraju prioritetnijim u svom svakodnevnom poslovanju. Efekti interne kontrole su: obezbeđenje sredstava preduzeća od rasipanja, pronevera i neefikasnosti, unapređenje tačnosti i pouzdanosti knjigovodsvenih i operativnih podataka, pridržavanje poslovne politike preduzeća, i ocena poslovne efikasnosti. Kvantifikovanje značaja definisanih ciljeva kontrole važna je osnova za ispitivanje i ocenu težišta koje preduzeća stavljuju u procesu ostvarenja poslovnih ciljeva koji su opredeljeni za buduće poslovne aktivnosti. Kroz empirijsku analizu, ispitaće se postojanje pozitivnog uticaja sistema interne kontrole na uspešno ostvarenje poslovnih ciljeva preduzeća. Iskustva mnogih preduzeća u inostranstvu su pokazala da je neadekvatno sprovođenje interne kontrole dovelo do rasta troškova i pronevera. Zahvaljujući oceni uspešnosti funkcionisanja interne kontrole u preduzećima koja su predmet analize, otvara se mogućnost uočavanja eventualnih problematičnih područja koja se mogu unaprediti u procesu implementacije kontrolnih procedura.

Polazi se od osnovne hipoteze da je sistem interne kontrole uspostavljen sa ciljem pridržavanja poslovne politike i ocene poslovne efikasnosti preduzeća. Interna kontrola, kao segment nadzora, značajna je za poslovanje svakog preduzeća nezavisno od njegove veličine, delatnosti i oblika organizacije. Implementacija efikasne interne kontrole je ekonomičnije rešenje za preduzeće od sprovođenja naknadnih analiza čiji je cilj otkrivanje pronevera i grešaka.

Radi ocene uspešnosti ostvarivanja ciljeva interne kontrole u preduzećima, primenjuje se komparativna analiza dobijenih odgovora između anketiranih preduzeća. Koriste se metode dedukcije, analize, sinteze i naročito postupaka indukcije gde se polazi od osnovnih pojedinačnih pretpostavki u cilju donošenja opštih zaključaka. Rad je potkrepljen grafičkim prikazom strukture datih ocena anketiranih preduzeća i tabelarnim prikazom dobijenih rezultata istraživanja.

Najpre se u radu analizira regulativa interne kontrole i vrši pregled dosadašnjih istraživanja u relevantnoj literaturi. Nakon iznošenja ključnih regulatornih zahteva, pažnja će biti usmerena na objašnjenje primenjene metodologije istraživanja. U nastavku rada, biće izloženi rezultati do kojih se došlo u ispitivanju značaja sprovođenja osnovnih kontrolnih aktivnosti i implementacije interne kontrole po funkcijama preduzeća. Celokupna analiza biće zaokružena iznošenjem zaključaka o uočenim zakonitostima koje su posledica empirijskog istraživanja u praksi poslovanja preduzeća i mogućnostima za unapređenje sistema interne kontrole u budućnosti.

## TEORIJSKI ASPEKTI I REGULATORNI OKVIR SISTEMA INTERNE KONTROLE

Usled brojnih finansijskih prevara praćenih velikim gubicima investitora u kompanijama, u donošenju zakona i profesionalnih okvira koji se odnose na internu kontrolu prednjačile su SAD. Početkom XXI-og veka, bankrotstvo nekoliko velikih kompanija, poput Enron-a i WorldCom-a (Knapp, 2010, 46), bio je znak da treba izvršiti značajne promene u zakonskim propisima koji su se odnosili na finansijsko izveštavanje. Kao odgovor na navedene skandale usledilo je donošenje Zakona o računovodstvenoj reformi javnih kompanija i zaštiti investitora, poznatiji kao Sarbanes-Oxley zakon (SOX je usvojen 2002). Posebno je istaknut značaj sistema interne kontrole, kao sredstva za sprečavanje i otkrivanje materijalno značajnih pogrešnih iskaza u finansijskim izveštajima izazvanih prevarom. Od

menadžmenta se zahteva da implementira efektivne interne kontrole i da proveri njihovu delotvornost, u odeljku 302 SOX-a - Korporativna odgovornost za finansijske izveštaje (Public Law, 2002, 33). Odeljkom 404 SOX-a - Procena internih kontrola od strane menadžmenta, zahteva se da menadžment i eksterni revizor izveste o adekvatnosti interne kontrole. U izveštaju o internoj kontroli, koji sastavlja menadžment kompanije, potvrđuje se odgovornost menadžmenta za uspostavljanje i održavanje adekvatnog sistema interne kontrole i postupaka za finansijsko izveštavanje (Nzechukwu, 2017, 75). Kakav je sistem interne kontrole ključna je odrednica u radu eksternog revizora. U zavisnosti od njegovog kvaliteta, određuje se obim testova i postupaka suštinskog ispitivanja koji će se sprovesti u postupku prikupljanja dokaza revizora (Jovković, 2011, 94). Nacionalna komisija za krivotvoreno finansijsko izveštavanje (*Treadway Commission*), oktobra 1987, je objavila izveštaj u kome je dala preporuku „da bi sve kompanije trebalo da uspostave interne kontrole koje će obezbititi razumnoj garanciju da će obmanjivo finansijsko izveštavanje biti sprečeno ili na vreme otkriveno“ (National Commission on Fraudulent Financial Reporting, 1987, 97). Komitet sponzorskih organizacija Treadway komisije (*Committee of Sponsoring Organizations of the Treadway Commission* - COSO) je 1992 objavio izveštaj „Interni kontrola - integrirani okvir“ u kome je definisao internu kontrolu i predstavio okvir na osnovu koga kompanije mogu da je ocenjuju (The Committee of Sponsoring Organizations of the Treadway Commission, 2019). Fundamentalne komponente sistema interne kontrole, prema COSO okviru, su (Regina, Lasse & Lourdes, 2018, 4):

- kontrolno okruženje;
- upravljanje rizicima;
- kontrolne aktivnosti;
- informisanje i komuniciranje i
- aktivnosti monitoringa.

Pored ovog, najpoznatijeg i najrasprostanjenijeg modela okvira sistema interne kontrole, postoje

i sledeći modeli koji nemaju ovako dominantnu ulogu u praksi: CoCo u Kanadi, Cadbury, Rutteman, Hamleli Turnbull model (Bryan & Arnold, 2016, 178).

Pod internom kontrolom se podrazumeva skup politika i postupaka uspostavljenih od strane rukovodstva radi obezbeđenja razumnog uverenja da će specifični ciljevi preduzeća biti realizovani (Ljubisavljević i Jovković, 2016, 116). Na osnovu navedene definicije, može se uvideti da interna kontrola ima više ciljeva i da pouzdano finansijsko izveštavanje nije njen jedini cilj. Međutim, kako su brojne finansijske prevare u prošlosti bile praćene manipulacijama u finansijskim izveštajima i kako je interna kontrola predstavljana kao mehanizma koji treba da spreči takve i slične događaje, pojma interne kontrole se uglavnom vezivao za domen računovodstva. Sistem interne kontrole se sastoji od svih mera i metoda koje se primenjuju u preduzeću u cilju (Martić, 1987, 29):

- obezbeđenja njegovih sredstava od rasipanja, pronevera i neefikasnosti,
- unapređenja tačnosti i pouzdanosti knjigovodstvenih i operativnih podataka,
- pridržavanja poslovne politike preduzeća, i
- ocene poslovne efikasnosti.

Postoji više kategorija ciljeva čijem ostvarenju interna kontrola treba da doprine, koji se obično grupišu u: operativne (efektivnost i efikasnost poslovanja), informacione (pouzdanost izveštavanja), i ciljeve usaglašenosti - usaglašenost u primeni zakona i drugih propisa (Eilifsen, Messier, Glover & Prawitt, 2014, 176). Prva kategorija ciljeva odnosi se na osnovne poslovne ciljeve preduzeća, kao što su: poslovni ugled, povrat investicija, rast tržišnog udela, uvođenje novog proizvoda, i efektivno i efikasno korišćenje resursa preduzeća. Ciljevi u oblasti izveštavanja tiču se internog i eksternog finansijskog i nefinansijskog izveštavanja i uključuju pouzdanost, blagovremenost, transparentnost, i druge zahteve propisane zakonima, standardima ili internim aktima preduzeća (Porter, Simon & Hatherly, 2014, 385). Dosledna primena važećih zakona i drugih propisa koji se odnose na

određeno preduzeće, kao i pridržavanje internih politika preduzeća, čine treću kategoriju ciljeva. Profesija revizije u Republici Srbiji uređena je Zakonom o reviziji koji je usvojen 2013 (Jovkovic, 2014, 48). Profesionalnu regulativu eksternog izveštavanja preduzeća čine Međunarodni standardi finansijskog izveštavanja, koje donosi Međunarodni odbor za računovodstvene standarde IASB (Obradovic, 2018, 230). U kojoj meri su navedeni ciljevi prepoznati od strane anketiranih preduzeća kao prioritetni predmet je daljeg istraživanja u radu.

## METODOLOGIJA ISTRAŽIVANJA

Uspešnost funkcionisanja interne kontrole u praksi preduzeća, istraživana je tokom januara 2019, uzorkovanjem velikih i srednjih preduzeća iz različitih delatnosti sa teritorije Kragujevca, Kraljeva i Vrnjačke Banje. Podaci su prikupljeni korišćenjem unapred pripremljenih anketa, koje su distribuirane šefovima računovodstva u preduzećima. Upitnik je definisan tako da se ispituju percepcija i stavovi anketiranih lica u vezi sa uspešnošću ostvarivanja ciljeva interne kontrole, značajem sprovođenja ključnih kontrolnih postupaka i ispitivanje načina implementacije interne kontrole po funkcijama preduzeća. Ispitanicima je ponuđena ocena stavova upotrebom Likertove petostepene skale, koja ukazuje na stepen slaganja sa iznetim stavom. Ispitanicima su stajale na raspolaganju ocene od 1 - apsolutno se ne slažem do 5 - u potpunosti se slažem. Ključni nedostatak ankete, kao načina prikupljanja podataka u empirijskim istraživanjima, ogleda se u tome što ispitanici veoma često daju suviše optimističke odgovore o kvalitetu sprovođenja sopstvenih aktivnosti. Usled prisustva ove činjenice, neohodna je opreznost u tumačenju dobijenih rezultata. Poslato je ukupno 95 anketa na e-mail adresu velikih i srednjih preduzeća, na koju se odazvalo ukupno 30 preduzeća (stopa odgovora je 31,58%) Anketirano je 15 preduzeća iz Kragujevca, 14 preduzeća iz Kraljeva i 1 preduzeće iz Vrnjačke Banje. Od ukupnog broja anketiranih preduzeća, 21 je srednje i 9 je velikih preduzeća. Distribucija anketiranih preduzeća prema delatnosti je: 22 preduzeća se bavi proizvodnjom (14

srednjih i 8 velikih), 4 srednja preduzeća uslužnog karaktera, i 4 preduzeća su trgovinske delatnosti (3 srednja i 1 veliko). Dobijeni podaci su analizirani komparativnom metodom, izvršeno je izračunavanje pokazatelja statističke deskriptivne metode i upotrebljena je metoda histograma za prikazivanje rezultata istraživanja.

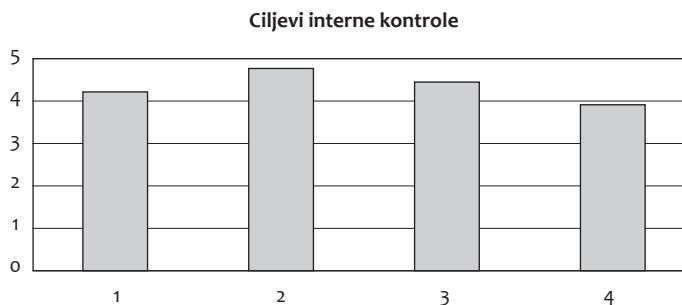
## REZULTATI I DISKUSIJA

Prvi deo anketnog upitnika odnosio se na ocenu uspešnosti ostvarivanja ciljeva interne kontrole radi uočavanja prioriteta preduzeća pri njihovoj implementaciji. Dobijeni su sledeći rezultati, prosečne ocene četiri ključna cilja interne kontrole (Slika 1):

- obezbeđenje sredstava preduzeća od rasipanja, pronevera i neefikasnosti (4,20);
- unapređenje tačnosti i pouzdanosti knjigovodstvenih i operativnih podataka (4,76);
- pridržavanje poslovne politike preduzeća (4,43); i
- ocena poslovne efikasnosti (3,90).

Standardna devijacija, kao statistička mera odstupanja datih ocena od prosečne vrednosti ocenjenog cilja interne kontrole, najviša je za prvi cilj i iznosi 0,761, dok je za drugi i treći cilj najniže vrednosti i iznosi 0,504. Standardna devijacija prosečnih ocena za sva 4 cilja interne kontrole iznosi 0,36654 i znatno je niže vrednosti u odnosu na standardnu devijaciju ciljeva ponaosob (Tabela 1).

Prosečna ocena za sva četiri cilja je 4,32. Najveće odstupanje od prosečne ocene za ciljeve interne kontrole beleži cilj dva u pozitivnom smeru (10,21%) i cilj četiri u negativnom smeru (9,82% od prosečne ocene). Najveći procenat anketiranih preduzeća, po 40% njih, je uspešnost obezbeđenja sredstava preduzeća od rasipanja, pronevera i neefikasnosti ocenilo ocenama 4 i 5, dok je ocenu 3 dalo 20% preduzeća. Preko dve trećine preduzeća koja su dala ocenu 4 i 5 su srednje veličine i u najvećem procentu to su proizvodna preduzeća. Na pitanje kojim se potvrđuje da interna kontrola doprinosi unapređenju



Slika 1 Ocena ciljeva interne kontrole

Izvor: Autor

tačnosti i pouzdanosti knjigovodstvenih i operativnih podataka 80% preduzeća je dalo ocenu 5, 16,70% - ocenu 4 i 3,33% - ocenu 3. Od preduzeća koja su dala ocenu 5, njih 77,78% su preduzeća srednje veličine, a 22,22% su velika preduzeća. Posmatrano prema delatnosti kojom se bave, 83,33% čine proizvodna preduzeća, 11,11% preduzeća koja se bave trgovinom, a 5,56% su uslužna preduzeća. Uspešnost ostvarivanja cilja pridržavanja poslovne politike preduzeća je nešto više od polovine anketiranih preduzeća ocenilo ocenom 4 (57%), a najvišu ocenu dalo je 43%. Od preduzeća koja su dala ocenu 5 njih 73,33% su srednje veličine, a 26,67% su velika preduzeća. Od toga, najveći broj njih se bavi proizvodnjom 73,33%, dok se trgovinom i uslugama bavi po 13,33% preduzeća. Najveći procenat preduzeća je ocenilo uspešnost ostvarivanja poslednjeg cilja ocenom 4 (70%), svega 10% ocenom 5 i 20% ocenom 3. Od preduzeća koja su dala ocenu 4, 72,22% su srednje veličine, a preostalih 27,78% su velika preduzeća. Od toga, najveći procenat su proizvodna preduzeća - 77,78%, dok preduzeća koja se bave trgovinom i uslugama čine po 11,11% preduzeća. Ostvarivanje prethodno navedenih ciljeva se obezbeđuje permanentnom kontrolom, u čijoj su osnovi metode upoređivanja i ispitivanja ostvarenih i planiranih zadataka, pomoću kojih se uočavaju i konstatuju određena odstupanja u procesu obavljanja definisanih poslovnih aktivnosti u preduzeću.

Rezultati, dobijeni analizom odgovora anketiranih preduzeća, ukazuju da interne kontrole u većem broju ovih preduzeća uspešno ostvaruju svoje ciljeve. Na osnovu visoke prosečne ocene za svaki cilj interne

kontrole zaključuje se da je dizajn i funkcionisanje tih kontrola zadovoljavajući. Pregled ocena ispitanika o prioritetu osnovnih ciljeva interne kontrole osporava prihvatanje osnovne hipoteze istraživanja s obzirom na to da cilj „ocena poslovne efikasnosti preduzeća“ ostvaruje najmanju prosečnu ocenu 3,90. Najveća prosečna ocena za drugi cilj interne kontrole ukazuje da su preduzeća na prvom mestu istakla ekstenu odgovornost prema regulatorima. „Računovodstvena regulativa uvek propisuje: istinito i pošteno, kao najvažnije kvalifikacije za finansijske izveštaje“ (Singh & Doliya, 2015, 64). S obzirom na to da je najmanje ocenjen četvrti cilj, implicitno se zaključuje da je interno informisanje i poslovna efikasnost u inferiornom položaju. Nameće se pitanje za neka buduća istraživanja, da li je sistem interne kontrole cilj ili sredstvo za ostvarivanje cilja? Drugačije rečeno, kako uticati na internu kontrolu, da li se poboljšanjem regulative može unaprediti sistem interne kontrole u preduzećima? „Konzistentan kvalitet revizije finansijskih izveštaja na globalnom planu, kao preduslov ujednačene primene IFRS, nemoguće je dostići bez jedinstvenih globalnih standarda revizije“ (Obradovic, 2014, 240). Menadžment se mora konstantno baviti ocenjivanjem efektivnosti internih kontrola, jer usled promene uslova poslovanja u nekom narednom periodu, sistem može postati neodgovarajući što će se svakako odraziti na stepen ostvarivanja ciljeva i kvaliteta kreiranih izveštaja. „Lažni finansijski izveštaji postoje od kada postoji finansijsko izveštavanje, jer se njima postižu određeni kratkoročni materijalni ciljevi menadžmenta ili vlasnika“ (Dimitrijevic, 2015, 139).

**Tabela 1** Prosečna ocena i standardana devijacija ocena ciljeva sistema interne kontrole

Preduzeće	Ocene cilja SIK				$(x - \bar{x})^2$			
	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
Varijansa uzorka					$S^2$ 0,57931	0,254023	0,254023	0,3
Standardna devijacija uzorka					$\sqrt{S}$ 0,761	0,504	0,504	0,547
$\bar{x}$ za $\sum 4$ cilja = 4,32					$S^2$ za $\sum 4$ cilja = 0,134352	$\sqrt{S}$ za $\sum 4$ cilja = 0,36654		

Da bi se prepoznati ciljevi implementirali, neophodno je postojanje kontrolnih aktivnosti koji to omogućavaju. Istražen je značaj sprovođenja osnovnih kontrolnih postupaka anketiranjem ispitanika kojim su ponuđene konstatacije o osnovnim kontrolnim postupcima da ih ocene na Likertovoj skali (Slika 2). Prosečne ocene dobijenih odgovora su:

- razgraničenje dužnosti je neophodna kontrolna aktivnost koja reducira rizik zavere zaposlenih, grešake ili zaobilaznje procedura (4,73);
- odobrenje transakcija obezbeđuje validnost transakcija i saglasnost sa ciljevima menadžmenta (4,17);
- adekvatna dokumentacija i evidencije obezbeđuje dokaze i trag transakcija (4,57);
- kontrole pristupa štite imovinu i evidencije preduzeća od neovlašćenog korišćenja (4,30);
- nezavisna provera je najdelotvornija kontrolna aktivnost u preduzeću (4,90); i
- Interne kontrole integrisane u informacioni sistem značajnije su od fizičkih kontrola (4,07).

Kao najbolje ocenjena kontrolna aktivnost je „nezavisna procena“ sa ocenom 4,9, dok je najslabije ocenjena „interna kontrola integrisana u informacionom sistemu“ sa ocenom 4,07. Komparacija postojećih i evidentiranih sredstava, pomoćnih

izveštaja sa kontrolnim izveštajima predstavlja koristan vid nezavisne provere i kontrole neispravnog evidentiranja. Najveći procenat ispitanika nezavisne procene vrednovao je najvišom ocenom 90% (67,11% su srednja a 32,89% su velika preduzeća) i ocenom 4 (10%), što govori o dominaciji tradicionalnog shvatanja interne kontrole u praksi preduzeća i potrebe provere nekog trećeg lica, kao najskupljeg oblika kontrole. Slaba ocena internih kontrola u informacionom sistemu ostavlja prostor za razvoj internih kontrola zasnovanih na IT mogućnostima (Hall, 2011, 68). Drugocenjena kontrolna aktivnost je „razgraničenje dužnosti“ koja, zajedno sa trećeocenjenom kontrolnom aktivnošću „dokumentacija i evidencije“, je u skladu sa prethodno dobijenih rezultatima istraživanja u pogledu najbolje rangiranih ciljeva interne kontrole (eksterna izveštajna obaveza preduzeća). Interne kontrole, najpre, treba da služe internim potrebama preduzećima pa tek onda regulatorima. Razgraničenjem dužnosti se smanjuje mogućnost za pojavu grešaka, kršenje procedura i tajne sporazume zaposlenih. Pitanje razgraničenja dužnosti zahteva postojanje odgovarajućih organizacionih rešenja kojima se neće dozvoliti da jedan zaposleni obavlja poslovnu operaciju od početka do kraja i tako bude u poziciji da učini i prikrije napravilnost. Na pitanje kojim se potvrđuje da je pravilno razgraničenje dužnosti važan koncept kontrole, najveći procenat preduzeća je dao ocenu 5 (86,67%), dok je ocenu 3 dalo 13,33% preduzeća. Od preduzeća koja su dala ocenu 5, njih 81,25% su srednja preduzeća, a



Slika 2 Ocena važnosti pojedinih kontrolnih aktivnosti u sistemu interne kontrole

18,75% su velika preduzeća, najveći broj njih se bavi proizvodnjom (93,75%), dok se trgovinom bavi svega 6,25% anketiranih preduzeća. Prosečna ocena za sve kontrolne aktivnosti je 4,45. Najveće odstupanje od prosečne vrednosti beleži se kod kontrolne aktivnosti nezavisne provere, 10,15% od proseka, i kod interne kontrole integrisane u informacioni sistem 8,54%. Iz navedenog proizilazi da većina anketiranih prepoznaće značaj sprovođenja osnovnih kontrolnih aktivnosti jer su navedene stavove ocenjivali ocenama 4 ili 5.

Prethodni kontrolni postupci dekomponovani su po pojedinim poslovnim funkcijama u preduzeću. Sagledaće se način na koji su preduzeća koja su obuhvaćena istraživanjem implementirala internu kontrolu u okviru osnovnih funkcija: prodaje, nabavke, proizvodnje, kadrovske i finansijske funkcije. Kontrolni postupci koji su ponuđeni ispitanicima na izjašњavanje samo su neki od potencijalnih postupaka koji se mogu primeniti u pojedinim funkcijama preduzeća. U ispitivanju interne kontrole, koja se sprovodi u okviru prodajne funkcije, dobijeni su sledeći odgovori:

- razgraničene su funkcije otpreme proizvoda, evidentiranja porudžbina kupaca i fakturisanja (u 26/30 preduzeća, 86,67%);
- evidencija o prodatim proizvodima zasnovana je na adekvatnoj dokumentaciji (u 30/30 preduzeća, 100%);
- dokumenta u vezi sa prodajom proizvoda su prethodno numerisana u većini anketiranih preduzeća (u 30/30, 100%);
- periodično se sa kupcima usaglašavaju podaci o prodatim proizvodima (u 28/30 preduzeća, 93,33%); i
- ispituje se kredibilitet potencijalnih kupaca pre uspostavljanja saradnje (u 27/30 preduzeća, 90%).

Veliki broj preduzeća prepoznaće značaj sprovođenja nevedenih kontrolnih procedura u okviru prodajne funkcije. Ispitanici su, dominantno, potvrdili (86,67%) da su dužnosti koje se tiču otpreme proizvoda, evidentiranja porudžbina kupaca i fakturisanja razgraničene, čime se onemogućava isporuka

proizvoda bez zaduženja kupaca i odobravanje popusta neusklađenih sa važećim cenovnikom. Uz razgraničenje dužnosti navedenih funkcija, da bi se izbeglo potcenjivanje potraživanja od kupaca i precenjivanje zaliha, prodaja treba biti potkrepljena adekvatnom dokumentacijom, što su potvrdila sva preduzeća. Oba kontrolna postupka, usaglašavanje podataka sa kupcima, i provera kredibiliteta potencijalnih kupaca, sprovode se u većini preduzeća. Usaglašavanje podataka sa kupcima je značajan vid kontrole, jer omogućava utvrđivanje razlika koje treba da budu predmet dalje analize kako bi se otkrili uzroci njihovog nastanka, dok se proverom potencijalnih kupaca pre uspostavljanja saradnje mogu izbeći eventualni problemi oko naplate potraživanja.

Na pitanja koja se odnose na implementaciju interne kontrole u okviru nabavne funkcije, ispitanici su odgovorili:

- mogućnost poručivanja ograničena je samo na ovlašćena lica (28/30 preduzeća, odnosno 93,33%);
- ovlašćenim osobama limitiran je iznos porudžbine, iznad tog iznosa potrebno je dodatno odobrenje (u 23/30, 76,67%);
- postoji razgraničenje između funkcija iniciranja nabavke i funkcije evidentiranja i isplate obaveza prema dobavljačima u skoro svim preduzećima (29/30, 96,67%);
- vrši se kvalitativni i kvantitativni pregled naručene robe i sastavlja se zapisnik o prijemu naručene robe (u 25/30, 83,33%); i
- vrši se upoređivanje porudžbenica sa otpremnicama i fakturama (u 29/30, 96,67%).

Na osnovu odgovora ispitanika, može se zaključiti da su kontrolni postupci u okviru nabavne funkcije u većini preduzeća implementirani na adekvatan način, dok su u manjem broju preduzeća uočeni određeni propusti. Uočeno je da u određenim preduzećima mogućnost naručivanja je delegirana ovlašćenim osobama, s tim da iznos porudžbine nije limitiran niti uslovjen dodatnim odobrenjem. Takva preduzeća su se zaštitila od dupliranja porudžbina, ali ne i od porudžbina u većim iznosima koje ovlašćenim licima u dogовору sa dobavljačima mogu doneti određenu

proviziju. Važnost poslednja dva navedena kontrolna postupka ogleda se u otkrivanju odstupanja i odgovornosti koja mogu negativno uticati i izazvati prekid kontinuiteta u obavljanju poslovnih aktivnosti preduzeća. Preduzeća u kojima se ti kontrolni postupci ne primenjuju mogu se suočiti sa problemom neodgovarajućeg kvaliteta naručene robe, pa čak i nemogućnošću utvrđivanja „glavnog krivca“ ukoliko ne postoje zapisnici koji će obezbediti podatke o tome da li je roba u takvom stanju primljena, ili je do oštećenja i gubitaka došlo kasnije.

Kontrolne aktivnosti u proizvodnoj funkciji ocenjene su samo u proizvodnim preduzećima (22 proizvodna preduzeća iz uzorka) na sledeći način:

- plan proizvodnje se zasniva na planu prodaje (21/22 preduzeća 95,45%);
- proizvodne operacije se odvijaju na način propisan internim aktima preduzeća (u 21/22 preduzeća, 95,45%);
- radne naloge kreiraju isključivo ovlašćena lica u svim anketiranim preduzećima;
- proizvodi su zaštićeni od slučajnog/namernog oštećenja ili krađe (u 19/22 preduzeća, 86,36%); i
- periodično se proverava podudarnost stvarnog i knjigovodstvenog stanja zaliha gotovih proizvoda u skoro svim preduzećima (21/22 tj. 95,45%).

Planovi i interni akti predstavljaju značajne instrumente kontrole, jer omogućavaju dobijanje blagovremenog signala o odstupanjima koja se mogu javiti pri izvršavanju proizvodnih operacija. U 95,45% posmatranih preduzeća, proizvodne operacije se odvijaju na način propisan internim aktima (uputstvima, naredbama i sl.), a u isto toliko preduzeća se plan proizvodnje zasniva na planu prodaje, čime se sprečava proizvodnja proizvoda koji po obimu ili vrsti odstupaju od proizvoda čija je realizacija predviđena. Za razliku od prethodnih oblika kontrole, ispostavljanje radnih naloga isključivo od strane ovlašćenog lica se vrši u svim anketiranim preduzećima tako da ne postoji mogućnost njihovog dupliranja. Rezultati istraživanja ukazuju na to da veliki broj anketiranih preduzeća vodi računa o bezbednosti proizvoda (u 86,36% preduzeća proizvodi

su zaštićeni od slučajnog ili namernog oštećenja ili krađe, dok se u 95,45% preduzeća vrši poređenje stvarnog sa knjigovodstvenim stanjem zaliha sa ciljem otkrivanja razlika i utvrđivanja njihovog uzroka).

Odgovori na pitanja o kadrovskim poslovima ukazuju na implementaciju interne kontrole na sledeći način:

- postoji razgraničenje između funkcija obračuna i isplate zarada u 21/30 ispitanih preduzeća (70%);
- zaposleni su u obavezi da iskoriste godišnji odmor u 25 anketiranih preduzeća (83,33%);
- rotaciju zaposlenih na osjetljivim radnim mestima vrši se u 18 preduzeća (60%);
- neutralizacija nezamenljivosti radnika u 19/30 preduzeća (63,33%); i
- pokreću se disciplinski postupci ili sudske sporove u slučaju povrede radnih obaveza, zakonskih propisa ili opštih akata u većini preduzeća (28/30 tj. 93,33%).

U sled mogućnosti lažiranja platnih spiskova i sličnih prevara lica zaduženih za obračun i isplatu zarada, potrebno je implementirati navedene kontrolne postupake. Prethodni rezultati pokazuju da u skoro 3/4 anketiranih preduzeća nije izvršeno razgraničenje dužnosti između funkcija obračuna i isplate zarada. Lice koje je istovremeno zaduženo za obračun i isplatu zarada može da navede veće iznose zarada nekolicini zaposlenih, pravdajući ih prekovremenim radom koji nije ostvaren, a da taj iznos potom podeli sa tim zaposlenima, ili da lažira platni spisak tako što će dodati nepostojeće radnike i fiktivnu zadaru zadržavati za sebe. Kada je reč o zaštiti preduzeća od prevara zaposlenih, istraživanje je pokazalo da mnoga anketirana preduzeća nisu implementirala neke od značajnih mera zaštite. Tako, u 16,67% preduzeća zaposleni nisu u obavezi da iskoriste godišnji odmor, u 40% njih se ne vrši rotacija zaposlenih na osjetljivim radnim mestima, dok 36,67% preduzeća uopšte ne teži izbegavanju situacija u kojima pojedine radnike niko nije u stanju da zameni. Rizik od prevelikog uticaja radnika može se ograničiti zahtevom da zaposleni svake godine koriste odmor. Rotacija zaposlenih je značajna zbog mogućnosti otkrivanja grešaka koje su

počinili prethodni zaposleni na datom radnom mestu. Na pitanje o postojanju opštih akata i pokretanje disciplinskih ili sudskeh sporova, preduzeća su u velikom procentu pozitivno odgovorila (u 93,33% preduzeća postoje opšti akti kojima se reguliše pokretanje odgovornosti).

Analiziranjem prikupljenih odgovora, koji se tiču interne kontrole u finansijskoj funkciji, dobijeni su sledeći rezultati:

- kreira se finansijski plan/plan novčanih tokova u 25 anketiranih preduzeća (83,33%);
- plaćanje se inicira samo od strane ovlašćenog lica u svih 30 preduzeća;
- periodično se vrši usaglašavanje stanja na računu sa bankom u svih 30 ispitanih preduzeća;
- svakodnevno se kontroliše saldo gotovine u blagajni u većini preduzeća (28/30, 93,33%); i
- pristup gotovini omogućen je samo ovlašćenom licu u svih 30 preduzeća.

S obzirom na ulogu i značaj finansijske funkcije u ukupnim poslovnim aktivnostima preduzeća i na podložnost aktivnosti unutar ove funkcije prevarama, razumljiva je posvećenost preduzeća u sprečavanju prevara i sličnih događaja definisanjem preventivnih kontrola. Upravo iz razloga što je sprovedeno istraživanje pokazalo da su u pojedinim preduzećima sprovedeni svi ostali kontrolni postupci, ali da nije sačinjen plan novčanih tokova, bitno je ukazati na važnost njegovog definisanja. Finansijskim planom se vrši predviđanje priliva i odliva gotovine, tako da prisustvo plana obeshrabruje potencijalne prnevere naplate potraživanja, duple isplate ili falsifikovanje knjiženja novčanih izdataka.

Upoređivanjem odgovora velikih i srednjih preduzeća na pitanja u vezi sa implementacijom kontrolnih postupaka u okviru funkcija, tačnije, posmatranjem strukture svih negativnih odgovora, uočava se da su srednja preduzeća, u poređenju sa velikim, na postavljena pitanja zaokružila znatno više negativnih odgovora. Dakle, veličina preduzeća može predstavljati jedan od faktora koji utiču na mogućnost

i način implementacije pojedinih kontrolnih postupaka, a samim tim i na kvalitet interne kontrole. Kao najčešći razlozi zbog kojih srednja preduzeća nisu u mogućnosti da implementiraju određene kontrolne postupke, navode se manji broj zaposlenih i teže finansiranje troškova koje ti kontrolni postupci izazivaju.

## ZAKLJUČAK

Politike i postupci interne kontrole, uspostavljeni sa ciljem obezbeđenja sigurnosti realizacije definisanih ciljeva, snažan su instrument u rukama menadžmenta. Ono što internu kontrolu čini nezamenljivim vidom nadzora je omogućavanje svakodnevnog praćenja svih aktivnosti u preduzeću, pružajući na taj način mogućnost da se sve uočene nepravilnosti brzo otklone i izbegnu štetne posledice.

Adekvatno dizajnirana i implementirana interna kontrola doprinosi efikasnom obavljanju poslova, zaštiti sredstava preduzeća od neovlašćene ili neadekvatne upotrebe, usklađenost poslovanja sa važećom zakonskom regulativom i doslednoj primeni politika preduzeća. Interna kontrola ima značajnu ulogu u obezbeđivanju pouzdane računovodstvene evidencije i pripremi verodostojnih računovodstvenih informacija za interne i eksterne korisnike. U radu je izvršeno ispitivanje stavova anketiranjem 30 velikih i srednjih preduzeća o prioritetnosti ciljeva interne kontrole, značajem sprovođenja ključnih kontrolnih postupaka i ispitivanje načina implementacije interne kontrole po funkcijama preduzeća. Ispitanici su, prema prioritetu, na prvom mestu rangirali cilj unapređenje tačnosti i pouzdanosti knjigovodstvenih i operativnih podataka (4,76), a na poslednjem ocenu poslovne efikasnosti (3,90). Rezultati istraživanja ukazali su da je drugi po prioritetu cilj pridržavanje poslovne politike preduzeća (4,43) i na trećem obezbeđenje sredstava preduzeća od rasipanja, prnevera i neefikasnosti (4,20). Prosečna ocena za sva 4 cilja je 4,32. Ključna hipoteza od koje se u radu pošlo nije potvrđena analizom ocena ispitanika o prioritetu osnovnih ciljeva interne kontrole, s obzirom na to da

cilj ocena poslovne efikasnosti preduzeća ostvaruje najmanju prosečnu ocenu 3,90. Dobijena najveća prosečna ocena za drugi cilj interne kontrole ukazuje da su preduzeća na prvom mestu istakla eksternu odgovornost prema regulatorima. Takođe, najmanja ocena za četvrti cilj implicitno je potvrdila zaključak da interno informisanje i poslovna efikasnost je sekundarnog karaktera u odnosu na zahteve zakonodavstva.

Imajući u vidu da definisanje interne kontrole nije garancija njenog uspešnog funkcionisanja izrazito je bitno da zaposleni u preduzeću razumeju važnost njene implementacije. Ispitujući stavove preduzeća o osnovnim kontrolnim aktivnostima i njihovom analizom, došlo se do rezultata koji ukazuju na to da se u najvećem broju preduzeća prepoznaže značaj sprovođenja kontrola, što je za efektivnost interne kontrole izuzetno važno. Najbolja ocena kontrolne aktivnosti - nezavisna provera od strane trećeg lica (4,9) i razgraničenje dužnosti između zaposlenih (4,73), potvrđuju rezultate dobijene ispitivanjem prioritetnosti ciljeva interne kontrole i fokusiranosti preduzeća na zadovoljenje eksterne izveštajne obaveze.

Analiza odgovora o implementaciji kontrolnih postupaka u okviru pojedinih poslovnih funkcija, ukazuje na to da su kontrolni postupci ustanovljeni u većini preduzeća na zadovoljavajućem nivou, stim da su uočeni propusti u nekim preduzećima. Propusti koji su identifikovani, uglavnom u srednjim preduzećima, odnose se na nepostojanje ograničenja ili nepravilno delegiranje ovlašćenja, neadekvatno razgraničenje dužnosti, lošu zaštitu sredstava i evidencija preduzeća, nepostojanje ili nepridržavanje definisanih politika, planova, akata, nesprovođenje mera kojim se sprečavaju prevare od strane zaposlenih. Uočeni propusti uglavnom su pravdani manjom broju zaposlenih.

Osnovni doprinos ovog rada ogleda se u sveobuhvatnoj analizi stavova preduzeća i formulisanju zaključaka koji od ključnih ciljeva interne kontrole, koji su prepoznati u revizorskoj teoriji, preduzeća akcentuju u svakodnevnom poslovanju. Ova analiza omogućava

definisanje kontrolnih aktivnosti koje vode ostvarenju prioritetnih ciljeva i neutralisanje uočenih gepova i nedostataka u funkcionisanju interne kontrole u praksi.

Osnovno ograničenje u radu odnosi se na analizu malog broja preduzeća iz samo dva okruga i slabu stopu odziva, od svega 31,58% od 95 poslatih upitnika. Rešenje uočenog problema nekooperativnosti preduzeća u naučnim istraživanjima mogao bi ići u pravcu davanja poreskih olakšica preduzećima koja se odazovu, čime bi veći broj njih bio spreman da izdvoji vreme i odgovori na pitanja iz upitnika. S obzirom na to da su ispitivana samo preduzeća proizvodnog, trgovinskog i uslužnog karaktera, buduća istraživanja treba usmeriti na ispitivanje ostvarivanja ciljeva interne kontrole u preduzećima koja pripadaju privatnom sektoru i javnom sektoru kao dva stratuma i izvođenje zaključaka kompracijom rezultata dobijenim u oba stratuma. Takođe, na osnovu najlošije ocene za interne kontrole integrisane u informacioni sistem, predmet istraživanja u budućnosti mogao bi ići u pravcu ispitivanja postojanja korelacije između starosne strukture ispitanika u preduzećima i postojanja internih kontrola u IT okruženju, s obzirom na rigidnost starijih radnika za usvanjanje novih tehnoloških rešenja.

S obzirom na to da priroda i okolnosti svakog pojedinačnog preduzeća uslovjavaju konkretni sistem interne kontrole, svako preduzeće treba da implementira one kontrole koje su u skladu sa njegovim potrebama. Da bi interna kontrola bila delotvorna, neophodno je da zaposleni na svim nivoima u preduzeću razumeju važnost njene primene, i da postoji eksterna podrška u vidu regulative i profesionalnih organizacija koji podstiču njenje dalje unapređenje i razvoj.

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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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## 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 recompensed 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 queueing system in the health sector indicate a strong relationship between patients' satisfaction and their satisfaction with respect to the drug services (Ndukwu, 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. Adeyeye

(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:

$$HRBehv = \gamma_0 + \gamma_1 MORHAZ + \gamma_2 INFAS + \epsilon \quad (1)$$

where:

*HRBehv* - Health risk behaviour,

*MORHAZ* - Moral hazard,

*INFAS* - 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				Durbin-Watson
						F Change	df1	df2	Sig. F Change	
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 Beta	t	Sig.
	B	Std. Error			
1	(Constant)	1.094	.216	5.061	.000
	MORHAZ	.557	.051	10.898	.000
2	(Constant)	.588	.289	2.038	.042
	MORHAZ	.511	.054	9.531	.000
	INFAS	.170	.065	.131	.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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# ASIMETRIČNE INFORMACIJE I PONAŠANJE RIZIČNO PO ZDRAVLJE U NACIONALNOM PROGRAMU ZDRAVSTVENOG OSIGURANJA U METROPOLI DŽOS, NIGERIJA

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Omogućavanje pristupa kvalitetnoj zdravstvenoj nezi predstavlja primarnu svrhu u koju je i bio uveden nacionalni program zdravstvenog osiguranja (NPZO) u Nigeriji. Veruje se da će uvođenje NPZO za radnike njihovu smanjiti sklonost ka modalitetima ponašanja rizičnim po zdravlje. Uprkos činjenici da NPZO postoji, osiguranici (osigurani radnici) se još uvek žale na lošu uslugu zdravstvene nege, koju dobijaju od pružalaca te usluge. Kao rezultat toga, neki još uvek pokazuju sklonost ka škodljivom ponašanju rizičnom po zdravlje, zbog moralnog hazarda prisutnog kod radnika u sektoru javne zdravstvene nege, kao i zbog nedostatka lekova u javnim bolnicama. Ova studija je sprovedena u metropoli Džos, kako bismo utvrdili u kojoj meri moralni hazard i asimetrične informacije o NPZO vode ka ponašanju rizičnom po zdravlje među državnim službenicima. Sprovedeno istraživanje je pokazalo da postoji umereni nivo moralnog hazarda na strani pružalaca usluga u okviru NPZO, pošto na mernoj skali od 1 do 7 sveukupni prosek značajno ima vrednost 4 od maksimalno 7. Suprotno umerenom nivou moralnog hazarda prisutnog na strani pružalaca usluga NPZO, došlo se do saznanja da najveći broj osiguranika NPZO u proseku ispoljava sklonost ka ponašanju sa niskim rizikom po zdravlje.

**Ključne reči:** pružaoci usluga NPZO, moralni hazard, asimetrične informacije, ponašanje rizično po zdravlje

JEL Classification: D82, I11, I13



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## **IMPLIKACIJE PRIMENE DOLARIZACIJE ZA MAKROEKONOMSKU STABILNOST**

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Cilj ovog rada je prezentovanje troškova i koristi primene dolarizacije. Najčešći razlozi prihvatanja, u potpunosti ili delimično, strane valute su prisustvo visoke i volatilne stope inflacije, zatim, značajna volatilnost deviznog kursa, kao i narušeno poverenje u sopstvenu valutu. Isto tako, visoko dolarizovane zemlje najčešće imaju niži stepen razvoja finansijskog tržišta. Dolarizacija doprinosi sniženju troškova transakcija u međunarodnoj trgovini i postizanju cenovne i finansijske stabilnosti, jer je uvozna inflacija niža od domaće. S druge strane, prisustvo pune dolarizacije označava gubitak senioraže kao prihoda od štampanja novca monetarnih vlasti, ali i ograničenost primene funkcije zajmodavca u poslednjoj instanci. Rezultati analize ukazuju da je kod dolarizovanih zemalja došlo do sniženja stope inflacije i do uspostavljanja makroekonomskog stabilnosti, kao i do prisustva finansijske integracije. Analiza je, takođe, pokazala da gubitak prihoda od senioraže, mereno kao učešće u bruto domaćem proizvodu, nije zanemarljivo, dok se funkcija zajmodavca u poslednjoj instanci može nadoknaditi kroz formiranje stabilizacionih fondova i sklapanje ugovora sa finansijskim institucijama.

**Ključne reči:** dolarizacija, uloga zajmodavca u poslednjoj instanci, senioraža, integracija finansijskih tržišta

JEL Classification: E42, E44, E58

### **UVOD**

Dolarizacija se može definisati kao zvanična ili nezvanična upotreba strane valute u transakcijama jedne zemlje. Najčešće se kao razlog primene dolarizacije navodi veće poverenje u stranu valutu u poređenju sa domaćom. Time se direktno utiče na ograničeno dejstvo monetarne politike kroz veći

uticaj transmisije kanala deviznog kursa u poređenju sa kanalom kamatnih stopa, koji bi trebalo da ima dominatan uticaj u režimu ciljanja inflacije kod onih centralnih banaka koje su se opredelile da targetiraju inflaciju kao monetarnu strategiju. Istovremeno inostrane kamatne stope, poput Euribor-a i Libor-a, imaju veći uticaj na cenu troškova zaduživanja u poređenju sa kamatnim stopama koje se odnose na trošak zaduživanja u domaćoj valuti.

Cilj rada je da predstavi troškove i koristi primene dolarizacije. Prednosti primene dolarizacije jesu

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smanjenje transakcionih troškova u trgovinskoj razmeni, prisustvo uvozne inflacije koja je najčešće niža od domaće inflacije, ali i odsustvo volatilnosti deviznog kursa usled prihvatanja strane valute kao sopstvene. S druge strane, treba ukazati na nedostatke primene dolarizacije poput senioraže, koja u osnovi predstavlja prihod centralne banke od štampanja novca, ali i nemogućnost primene funkcije zajmodavca u poslednjoj instanci.

Predmet istraživanja u ovom radu su dolarizovane zemlje i implikacije koje dolarizacija, puna ili delimična, ima za funkcionisanje ekonomija tih zemalja. Najčešći razlozi za primenu dolarizacije jesu prisustvo dugoročne nestabilnosti na makroekonomskom nivou, koja se reflektuje kroz visoku i nestabilnu stopu inflacije, značajnu volatilnost deviznog kursa, ali i odsustvo poverenja u domaću valutu. U takvim okolnostima, strana valuta preuzima primat i koristi se kao sredstvo plaćanja, jedinica mera, ali je prisutna i veća štednja u stranoj valuti u poređenju sa domaćom.

U ovom istraživanju biće korišćene induktivna i deduktivna metoda, metoda analize i sinteze, metoda klasifikacije i metoda komparacije. Navedene metode biće korišćene kako bi se napravila komparacija zemalja koje primenjuju dolarizaciju, uvideli razlozi za primenu strane valute kao domaće, i stekao uvid u efekte prihvatanja strane valute (niža inflacija, odsustvo volatilnosti deviznog kursa usled primene pune dolarizacije). Ovakav pristup analize je osnova da se sagledaju zemlje različitog nivoa ekonomske i finansijske razvijenosti, čime se postiže mogućnost davanja preporuka domaćim monetarnim vlastima o primeni mera kako bi se u Republici Srbiji (RS) povećao stepen dinarizacije.

Hipoteza od koje se polazi u analizi jeste:

H: Postoji visoka međuzavisnost kretanja stepena dolarizacije (u slučaju Republike Srbije, evroizacije) i stope inflacije, kao indeksa potrošačkih cena na međugodišnjoj osnovi.

Ove varijable su izabrane jer visok stepen dolarizacije treba da bude povezan sa sniženjem stope inflacije, zbog prisustva uvozne inflacije koja je najčešće niža u

poređenju sa domaćom stopom inflacije. Za testiranje ove hipoteze, korišćen je koeficijent korelacije i obračun baziran na podacima za RS.

Monetarne vlasti trebaju da budu svesne da je proces vraćanja poverenja u domaću valutu dug, imajući u vidu da su korenji dolarizacije duboki. Svako nastojanje da se snizi stepen dolarizacije treba da bude praćeno održavanjem finansijske i cenovne stabilnosti, a da primenjene mere dedolarizacije budu dugoročno održive i prilagođene karakteristikama domaće ekonomije (faza ekonomskog i finansijskog razvoja, stepen razvijenosti finansijskog tržišta, režim deviznog kursa i slično). Rešavanje problema dolarizacije treba da bude održivo, zbog čega u njegovo rešavanje treba da budu uključeni nosioci monetarne i fiskalne politike, ali i predstavnici nefinansijskog sektora. Time bi se dobila sveobuhvatna strategija, bazirana na mikro i makroprudencijalnim merama.

Rad je strukturiran na sledeći način. U prvom delu, prezentirani su pojam i vrste dolarizacije, a potom načini merenja dolarizacije, njene prednosti i nedostaci, gde je fokus analize na prikazu uloge zajmodavca u poslednjoj instanci, senioraži i stabilnosti i integraciji finansijskog tržišta. Takođe, u ovom radu razmatraju se evroizacija u RS i strategija dinarizacije koja je doneta kako bi se promovisala veća upotreba dinara u ekonomiji. U Zaključku su sumirani glavni rezultati analize, ukazano je na ključne doprinose rada i date preporuke za dalja istraživanja ove aktuelne teme. Isto tako, izložene su preporuke monetarnim vlastima u RS, kako bi se povećao stepen dinarizacije.

## POJAM I VRSTE DOLARIZACIJE

Dolarizacija (*dollarisation*) predstavlja uvođenje u domaću ekonomiju dolara ili neke druge strane valute, koja fukcioniše paralelno sa domaćom valutom, ili umesto nje. U Tabeli 1, prikazan je istorijski razvoj primene dolarizacije.

Literatura nudi mogućnost sagledavanja većeg broja definicija pojma dolarizacije, što ukazuje da je

**Tabela 1** Istorijski pregled primene dolarizacije

Zemlja	Period primene dolarizacije	Zemlja	Period primene dolarizacije
Američka Samoa	?-trenutno	Dominikana	1938-1951
Albanija*	1912-1925	Dominikanska Republika*	1899-1947
Andora*	?-trenutno	Ekvador*	2000-trenutno
Angola	1938-1951	Egipat*	1856-1898
Bahrein	1920-1965	El Salvador	2001-trenutno
Butan*	1968-1974	Gambija	1800-1969
Bocvana*	1950-1976	Gana	1902-1913
Brunei*	1945-1951	Gibraltar	1896-1913
Kameron	1910-1916	Grenada	1888-1927
Kajmanska ostrva	?-1972	Honduras*	1838-1951
Kuba*	1902-1934	Indonezija	1912-1950
Kipar	1880-1914	Irak	1974-1807
Kuvajt	1942-1961	Izrael	1917-1932
Lihtenštajn*	?-trenutno	Jordan	1917-1927
Libija	1912-1943	Kenija	1917-1927
Malta	1903-1939	Nigerija	1896-1898
Monako*	1865-trenutno	Peru	1891-1913
Crna Gora	1999-trenutno	Katar	1887-1914
Maroko	1897-1907	Tunis*	1949-1966
San Marino*	1800-1969	Uganda	1873-1904
Saudijska Arabija*	1897-trenutno	Ujedinjeni Arapski Emirati*	1906-1920
Singapur	1918-1952	Vatikan*	1946-1973
Švajcarska	1840-1849	Vijetnam	1929-trenutno
	1921-1974		1862-1876

Napomena: Znak (\*) označava zemlje koje su bile nezavisne u nekim ili u svim epizodama dolarizacije i znak (?) označava da autor u navedenom radu nije naveo početak primene dolarizacije u navedenim zemljama

Izvor: Schuler, 2005, 121-123

istraživački potencijal ove materije značajan. Veći broj definicija dolarizacije ukazuju na postojanje različitih pojavnih oblika ove strategije u različitim zemljama.

Dolarizacija, prema S. Heysen-u (2005), može da se posmatra kao puna ili zvanična i kao parcijalna dolarizacija. Puna ili zvanična dolarizacija (*full or official dollarization*), predstavlja situaciju kada je stranu valutu, najčešće dolar, zemlja prihvatile kao glavno sredstvo plaćanja (*legal tender*). Delimična ili *de facto* dolarizacija se dešava u zemlji koja zadržava svoju lokalnu valutu u opticaju, ali, istovremeno, daje mogućnost da se plaćanja i transakcije obavljaju slobodno u dolarima.

A. Ize i A. A. Powell (2004), u svojoj analizi su napravili razliku između četiri vrste dolarizacije. Prva vrsta je tzv. dolarizacija makroekonomskog hedžinga (*macroeconomic hedging dollarization*), koja predstavlja

sposobnost investitora da ograniči izloženost svog portfolija prema volatilnosti inflacije i deviznog kursa, pri čemu je taj portfolio, istovremeno, uložen u stranu i domaću valutu. Druga vrsta je dolarizacija tržišne nesavršenosti (*market imperfections dollarization*) i ova vrsta dolarizacije se javlja kada je manje efikasna regulacija domaćeg deviznog tržišta, usled čega je posedovanje domaće valute skuplje nego strane. Treća vrsta je *default* dolarizacija, koja se dešava u situaciji kada postoji velika verovatnoća da imalac prihoda (poput zarade) neće obezbediti plaćanje svojih obaveza i ova vrsta dolarizacije je zastupljena kada je veća dominacija posedovanja strane u odnosu na domaću valutu. Četvrta vrsta je dolarizacija moralnog hazarda (*moral hazard dollarization*), koja je prisutna u situaciji kada postoji mogućnost da zajmoprimac ne izvrši plaćanje svojih obaveza, što, posledično, može dovesti do toga da se isti obrazac ponašanja prenese

na banku. Ukoliko su deponenti zaštićeni primenom šeme osiguranja depozita, sklapanje ugovora u dolarima daje mogućnost bankama i njihovim zajmoprincima da zabeleže niže stope pri zaduženju ukoliko ne dođe do devalvacije domaće valute.

Prema L. I. Jácome-u i A. Lönnberg-u (2010), postoje nekoliko preduslova, koje je potrebno ispuniti, kako bi došlo do primene pune ili zvanične dolarizacije. U pitanju su sledeći preduslov:

- prudentan finansijski sistem i jaka finansijska supervizija, kako bi se smanjila verovatnoća bankarske krize u slučaju kada ne postoji, ili je smanjeno dejstvo funkcije zajmodavca u poslednjoj instanci;
- uređene javne finansije, koje pružaju dovoljno poverenja tržišnim učesnicima da će se primeniti mere fisklane politike; i
- uređeno tržište rada, koje će biti apsorber eksternih šokova i ostvariti makroekonomsku prilagođenost.

Potrebno je napraviti razliku između tri vrste dolarizacije:

- dolarizacija plaćanja (*payments dollarization*), koja se dešava u slučaju kada se dolar ili neka druga strana valuta pretežno upotrebljavaju kao sredstvo plaćanja;
- finansijska dolarizacija (*financial dollarization*) se javlja u situaciji kada rezidenti svoju finansijsku aktivu drže u dolarima ili u nekoj drugoj stranoj valuti; i
- realna dolarizacija (*real dollarization*), koja je prisutna kada su domaće cene i/ili zarade denominovane u dolarima ili nekoj drugoj stranoj valuti.

Koncept dolarizacije po G. Ortiz-u (1983) se povezuje sa pojmom valutne supstitucije (*currency substitution*). U tom smislu, monetarna politika biće neefikasná u onoj zemlji gde je strana valuta dobra zamena za domaću valutu. Važna posledica ovog stava je da će zamenljivost između domaće i strane valute

da se poveća u periodu kada dođe do porasta fluktuacije deviznog kursa i, na bazi toga, da se desi porast valutnog rizika. Prema K. Forbes-u, V. Sebastian-u, C. Mapingure-u, M. Charity-u, M. Kumbirai-u, C. Felistus-u i M. Rumbidzai-u (2013), pored valutne supstitucije, pojam dolarizacije se vezuje i za supstituciju aktive (*assert substitution*). Ž. Bogetić (2000) skreće pažnju da je neophodno napraviti distinkciju između valutne supstitucije, koja predstavlja primarnu upotrebu strane valute i deviznih depozita kao sredstva plaćanja, i supstitucije aktive koja podrazumeva primarno korišćenje strane valute u funkciji očuvanja vrednosti (*store of value*). S druge strane, K. Schuler (2005) smatra da je dolarizacija još jedan oblik fiksнog deviznog kursa (*fixed exchange rate*). Dolarizacija se koristi kako bi označila široku upotrebu strane valute kao sredstva plaćanja ili jedinicu mere.

Treba napraviti razliku između tri oblika dolarizacije, koje, obuhvataju nezvaničnu, poluzvaničnu, i zvaničnu dolarizaciju (Makochekanwa, 2010). Puna ili zvanična dolarizacija se javlja u situaciji kada konkretna zemlja počne da koristi stranu valutu kao sredstvo plaćanja i da posledično smanjuje korišćenje domaće valute. U takvom valutnom sistemu, prema Ž. Bogetiću (2000), ne postoji valutni rizik i nema rizika od valutne krize. Postoje varijacije u primeni pune ili zvanične dolarizacije, koje se nazivaju poluzvanična dolarizacija (*semi-official dollarization*), ili bimonetarni sistem (*bimetary system*). Bimonetarni sistem se dešava u situaciji kada se strana valuta (ili strane valute) upotrebljava kao sredstvo plaćanja i ima dominantnu ulogu u valutnoj strukturi bankarskih depozita, ali ima sekundarnu ulogu prema domaćoj valuti, koja se primarno koristi za transakcije kao što su isplate zarada, poreza i svakodnevnih transakcija, poput transportnih usluga i slično. Zemlje koje koriste poluzvaničnu dolarizaciju imaju svoju centralnu banku ili monetarne vlasti koje će sprovoditi sopstvenu monetarnu politiku. Nezvanična dolarizacija se dešava u slučaju kada rezidenti date zemlje drže veliki deo svoje aktive u stranoj valuti, iako strana valuta nije zvanično sredstvo plaćanja prema monetarnoj ili finansijskoj regulativi te zemlje. Upotreba dolara (ili druge strane valute), u ovom slučaju, primenjivaće se, u velikoj meri u privatnim

transakcijama kao jedinica mere, sredstvo razmene i mera vrednosti. Ž. Bogetic (2000) ističe da koncept nezvanične dolarizacije može da ima nekoliko oblika:

- posedovanje deviznih depozita u domaćim bankama;
- posedovanje deviznih depozita u stranim bankama;
- držanje obveznica denominiranih u stranoj valuti ili druge nenovčane aktive, i
- držanje deviza, bez obzira da li se poseduju na legalan ili nelegalan način.

Shodno definisanim različitim pojavnim oblicima dolarizacije, biće prikazani načini merenja stepena dolarizacije. Dok se dolarizacija, najjednostavnije, može definisati kao veća zastupljenost strane valute u odnosu na domaću, stvarni nivo dolarizacije nije moguće egzaktно identifikovati. Način merenja zavisi od raspoloživih podataka, ali i pojavnog oblika dolarizacije u konkretnoj zemlji.

## NAČINI MERENJA STEPENA DOLARIZACIJE

Kako postoji veliki broj definicija dolarizacije, tako i veliki broj studija na različiti način meri stepen dolarizacije. Najčešće se stepen dolarizacije meri kroz dolarizaciju depozita (*deposit dollarization*), koja se računa kada se u odnos stavi iznos deviznih depozita prema novčanoj masi ili prema ukupnom nivou depozita. Centralna banka, najčešće, objavljuje i poseduje podatke o deviznim depozitima, kao i monetarnim agregatima. Za razliku od monetarnih agregata, koji se publikuju u domaćoj valuti, devizni depoziti su iskazani u različitim stranim valutima i upotrebom odgovarajućih međuvalutnih odnosa mogu se preračunati u domaću valutu. Ovaj preračun deviznih depozita iz originalne strane valute u domaću valutu može da dovede do velike oscilacije vrednosti koeficijenta dolarizacije depozita, naročito ukoliko dođe do značajne depresijacije domaće valute. N. Mwase i F. Kumah (2015), iz tog razloga predlažu

da se stepen dolarizacije meri u realnom izrazu, time što će se koristiti tzv. prilagođeni devizni depozit, koji se upotrebom odgovarajućih međuvalutnih odnosa preračunava u depozit u domaćoj valuti.

A. Ize i E. L. Yeyati (2003), s druge strane, drugačije definišu indikator realne dolarizacije, koji predstavlja nivo u kojem su cene i zarade iskazane u stranoj valuti i ovaj indikator iskazuje u kojoj meri efekat koeficijenta prenosa deviznog kursa (*pass-through coefficient of exchange rate*) ima na kretanje cena. M. Garcia-Escribano i S. Sosa (2011), kod određivanja depozitne (kreditne) dolarizacije, koriste racio između deviznih depozita (kredita) prema ukupnim depozitima (kreditima) po tekućem deviznom kursu, umesto da ove varijable iskazuju po konstantnom deviznom kursu.

Nakon definisane dolarizacije depozita, neophodno je objasniti pokazatelj dolarizacije kredita (*loan dollarization*). L. Cattao i M. Terrones (2000) ukazuju da je nephodno, istovremeno, posmatrati i dolarizaciju depozita i kredita, kako bi se sagledala valutna i ročna usklađenost pozicija bilansa banke, ali i drugih privrednih subjekata kod kojih je zastupljena valutna i ročna neusklađenost generisanja prihoda i plaćanja rashoda. Naglašava se da stepen dolarizacije depozita i kredita zavisi od međusobne veze bankarskih troškova, strukture tržišta kredita i makroekonomskih šokova.

C. Reinhart, K. Rogoff i M. Savastano (2003) su razvili sledeće pokazatelje dolarizacije:

- Kompozitni indeks dolarizacije za svaku zemљu u uzorku. Uzorak koji su analizirali je podeljen na kraću i dužu seriju podataka. Kraća serija obuhvata 90 zemalja sa godišnjim opservacijama u kreiranju kompozitnog dolarskog indeksa u periodu 1996-2001. Duža serija podataka se bazira na analizi 48 zemalja sa godišnjim opservacijama u kreiranju kompozitnog dolarskog indeksa, u periodu 1980-2011.
- Svaka analizirana zemlja je grupisana u neku od četiri kategorije, u zavisnosti od tipa dolarizacije kojoj pripada. Navedeni autori su kompozitni indeks dolarizacije definisali kao učešće javnog

duga u bruto domaćem proizvodu, zatim kao učešće ukupnih bankarskih deviznih depozita u nekom od monetarnih agregata, i kao učešće vladinog duga koji je denominiran u stranoj valuti u ukupnom dugu vlade. Sve tri navedene komponente sačinjavaju kompozitni indeks koji uzima vrednost od 0 do 10. Ovako izračunat kompozitni indeks daje mogućnost merenja stepena dolarizacije za svaku analiziranu zemlju iz uzorka i ima vrednost od 0 do 30.

Na bazi sledeća dva kriterijuma, definisan je tip dolarizacije:

- stepen domaće dolarizacije, i
- nivo deviznog zaduženja od strane privatnog sektora.

Domaća dolarizacija je u ovoj analizi definisana kao učešće deviznog duga vlade u ukupnom javnom dugu. Na bazi ovog učešća, analizirane zemlje su podeljene na dve grupe: zemlje sa učešćem ispod 10% i zemlje čije je učešće preko 10%. Kod pokazatelja deviznog zaduženja privatnog sektora, analizirane zemlje su podeljene na dve grupe: zemlje kojima je devizni dug privatnog sektora najmanje 10%, od ukupnog javnog duga, i zemlje kojima je to učešće ispod 10%. Ova dva kriterijuma omogućavaju da se dolarizovane zemlje podele u četiri kategorije ili četiri tipa dolarizacije, kao što je prikazano u Tabeli 2. Zemlje u kojima je sličan nivo dolarizacije iz domaćih i inostranih izvora (iznad 10%), klasifikovane su kao Tip 1; zemlje u kojima je dolarizacije pretežno inostranog izvora su klasifikovane kao Tip 2; zemlje u kojima je izvor dolarizacije pretežno domaćeg izvora su klasifikovane

kao Tip 3; i zemlje u kojima je dolarizacija na niskom nivou (tj. ispod 10%) i po osnovu domaće i inostrane dolarizacije su klasifikovane u Tip 4.

Prednost ovog pristupa u merenju stepena dolarizacije, jeste mogućnost da se za svaku analiziranu zemlju izmeri nivo domaće i inostrane dolarizacije. Takođe, prednosti ovog proračuna su jednostavnost izračunavanja kvantitativnih pokazatelja i lakoća njihovog razumevanja.

## KORISTI I TROŠKOVI PRIMENE DOLARIZACIJE

### Uloga zajmodavca u poslednjoj instanci

Ukoliko se zemlja odrekne upotrebe nacionalne valute, istovremeno se gubi i mogućnost vođenja samostalne monetarne politike, tj. u tom slučaju javlja se rizik da zajednička monetarna politika (u slučaju monetarne unije), ili strana monetarna politika (u slučaju dolarizacije), neće odgovarati interesima posmatrane zemlje u datom trenutku (Stanisic, 2012). Primenom koncepta pune dolarizacije, eliminise se rizik od volatilnosti deviznog kursa i naglih devalvacija i apresijacija domaće valute u odnosu na stranu valutu. Koncept pune dolarizacije označava eliminaciju funkcije zajmodavca u poslednjoj instanci (*lender-of-last-resort*), čime centralna banka gubi mogućnost reagovanja na poremećaje u domaćem i međunarodnom finansijskom sistemu, kroz pružanje kratkoročne likvidnosti finansijskom sistemu.

**Tabela 2** Tipovi dolarizacije

	Učešće deviznog duga privatnog sektora u ukupnom javnom dugu je 10% ili više	Učešće deviznog duga privatnog sektora u ukupnom javnom dugu je manje od 10%
Učešće deviznog duga vlade u javnom dugu je 10% ili više	Tip 1	Tip 2
Učešće deviznog duga vlade u javnom dugu je ispod 10%	Tip 3	Tip 4

G. Calvo (2002) ističe da je greška povezati funkciju zajmodavca u poslednjoj instanci sa sposobnošću centralne banke da emitiše novac. Naglašava se da postoje alternativni načini preko kojih centralna banka može da obezbedi likvidnost. Tu se, pre svega, misli da, na primer, centralna banka i ministarstvo finansija mogu da: stvore stabilizacioni fond (*stabilization fund*), ili da ugovore kreditne linije sa privatnim bankama.

A. Berg i E. Borensztein (2000) ističu potrebu da se napravi distinkcija između uloge centralne banke da poslovnim bankama obezbedi kratkoročnu likvidnost od njene uloge da bude krajnji garant stabilnosti finansijskog i platnog prometa u slučaju bankarske krize. Dolarizacija ne bi trebalo da, u velikoj meri, onemogući sposobnost monetarnih vlasti da obezbede kratkoročnu likvidnost celokupnom bankarskom sistemu, ili pojedinim bankama koje imaju probleme u poslovanju. Ove odluke su na raspolaganju ako centralna banka unapred obezbedi potrebna sredstva pomoći, ili sa međunarodnim finansijskim organizacijama zaključi kreditne linije. Zemlja koja primenje punu dolarizaciju može da ima problem sa naglim povlačenjem depozita, kao i sposobnost da garantuje potpunu operativnost platnog sistema. Odgovarajuća reakcija centralne banke na povlačenje bankarskih depozita u dolarizovanoj ekonomiji zavisi od uzroka tog povlačenja. Ukoliko povlačenje podrazumeva da se depoziti prebacuju iz jedne banke u drugu, odgovarajuća akcija monetarnih vlasti bi mogla da bude povlačenje likvidnosti od jačih banaka i obezbeđivanje likvidnosti slabijim institucijama. Međutim, ukoliko do povlačenja depozita dođe na nivou celog bankarskog sistema, monetarne vlasti bi trebalo da imaju priličan iznos likvidnih sredstava. U tom slučaju, neophodno je da postoji šema osiguranja depozita, koja bi značila određeni stepen sigurnosti za deponente. U dolarizovanoj ekonomiji manje je verovatno da do povlačenja depozita dođe, jer je celokupna bankarska aktiva denominirana u dolarima (ili izražena u nekoj drugoj valuti osim dolara) i da je time postignuta valutna usklađenost pozicija bilansa banaka. Posledično, time se umanjuje opasnost od oslabljene uloge zajmodavca u poslednjoj instanci (Berg & Borensztein, 2000).

U situaciji kada se smanji poverenje u bankarski i sveukupni finansijski sistem, povlačenje depozita može da bude značajno po iznosima povučenih sredstava i time se direktno ugrožava likvidnost celokupnog sistema. U slučaju da centralna banka ima mogućnost da primeni funkciju zajmodavca u poslednjoj instanci ova kriza likvidnosti se može izbeći. Prema S. Broda-u i E. L. Yeyati-u (2002), samo postojanje funkcije zajmodavca u poslednjoj instanci pruža mogućnost da se obezbedi elastična ponuda rezervi koje mogu preventivno delovati u sprečavanju krize likvidnosti. Istiće se značaj preventivne uloge postojanja šeme osiguranja depozita. U analizi funkcije zajmodavca, u poslednjoj instanci, treba uzeti i nivo stresa, odnosno, nestabilnosti u bankarskom sistemu. Prema C. Garcia-de-Andoain, F. Heider, M. Hoerova i S. Manganelli (2016), stepen stabilnosti bankarskog sistema direktno utiče na nivo sredstava koje su banke spremne da pozajme na međubankarskom tržištu, kao i nivo tražnje za sredstvima centralne banke. Potencijalni zajmodavci, u slučaju nestabilnosti, mogu da budu manje voljni da pruže likvidnost ili zbog rizika ugovorne strane (*counterparty risk*), ili zbog toga što žele da likvidnost zadrže za sebe iz razloga predostrožnosti.

O. Jeanne i C. Wyplosz (2001) ulogu zajmodavca u poslednjoj instanci posmatraju na dva načina: kao mogućnost sprečavanja bankarske krize, u slučaju značajnog odliva depozita, i kao način sprečavanja valutne krize. Ponudili su dva aranžmana kako bi se sprečio nastanak krize likvidnosti: prvi, da centralna banka primenom funkcije zajmodavca u poslednjoj instanci na međunarodnom nivou obezbedi likvidnost na međunarodnom finansijskom tržištu, i drugi, da se putem primene funkcije zajmodavca u poslednjoj instanci povrati sigurnost i poverenje u domaći finansijski sistem. Oba predložena aranžmana podrazumevaju promenu finansijske arhitekture na globalnom nivou: prvi aranžman preporučuje osnivanje globalne centralne banke, koja će emitovati međunarodnu valutu, dok bi drugi aranžman mogao da funkcioniše kao međunarodni bankarski fond koji bi vršio nadzor i superviziju domaćeg bankarskog sistema.

Naravno, treba ukazati i na druge mere koje su na raspolažanju centralnoj banci kako bi se izborila sa povlačenjem depozita, poput višeg nivoa obavezne rezerve, poboljšanja sistema nadzora i kontrole poslovanja banaka i spremnim setom mera za očuvanje i poboljšanje finansijske stabilnosti. Naravno, pobrojane mere ne treba izolovano da se primenjuju na punu dolarizovanu ekonomiju, već i one koje imaju manji stepen dolarizacije.

## Senioraža

Senioraža (*seniorage*), u osnovi, predstavlja prihod centralne banke na bazi štampanja novca. Prema M. J. M. Neumann-u (1992), postoje tri koncepta senioraže:

- oportunitetni trošak senioraže (*opportunity cost of seniorage*),
- monetarna senioraža (*monetary seigniorage*), i
- produžena monetarna senioraža (*extended monetary seigniorage*).

Oportunitetni trošak senioraže posmatra senioražu kao ukupan oportunitetni trošak imaoča novca. Ovaj pristup polazi od pitanja koji bi dodatni realni dohodak pojedinci zarađili ukoliko bi posedovali aktivan na bazi kojeg bi ostvarili kamatu umesto posedovanja novca koji ne generiše kamatu. Realni oportunitetni trošak senioraže se izračunava na bazi sledećeg proračuna:

$$s_o = rB/P$$

gde je:

*r* - nominalna stopa prinosa na drugu aktivan osim novca,

*B* - ukupan iznos novca koji pojedinac poseduje, i

*P* - nivo potrošačkih cena, meren indeksom potrošačkih cena.

Prikazani koncept definisanja senioraže je adekvatan sa aspekta teorijske analize. Analitička prednost ovog pristupa je ta što vrednost senioraže računa na bazi vrednosti koje funkcije novca imaju za pojedince koji taj novac poseduju. Istovremeno, ovaj koncept ne identificuje senioražu sa kamatnim prihodom

koji bi pojedinici mogli da ostvare ukoliko bi umesto posedovanja novca imali neku drugu aktivan koja bi generisala neki oblik prihoda. Kako bi ovaj koncept bio prilagođen za empirijske analize, N. J. Neumann (1992) ukazuje na mogućnost da se umesto korišćenja nominalne stope prinosa na drugu aktivan osim novca koristi stopa prinosa, pri čemu predlaže da to može biti prosečan prinos na vladine obveznice ili stopa prinosa akcija. U zavisnosti od izabrane stope prinosa, razlikovaće se nivo senioraže. Treba ukazati i na to da ovaj koncept merenja senioraže u sebi sadrži konceptualni problem. Oportunitetni trošak senioraže nije jednak stvarnom prihodu monetarnih vlasti od štampanja novca, budući da struktura portfolija koju poseduju monetarne vlasti, u značajnoj meri, se razlikuje od strukture aktive koju poseduju pojedinci. Posledično, oportunitetni trošak senioraže ne obezbeđuje meru prihoda za monetarne vlasti na bazi kreiranja novca.

Koncept monetarne senioraže se definiše kao odnos neto promene novčane mase i nivoa potrošačkih cena:

$$sM^* = AB/P$$

gde je:

*AB* - neto promena novčane mase, i

*P* - nivo potrošačkih cena, meren indeksom potrošačkih cena.

Monetarna senioraža polazi od merenja vrednosti transakcija nemonetarne aktive koju imaoci novca koriste za trgovinu kako bi došli do željenog porasta nivoa novčane mase (*AB*). Ovaj pristup u merenju senioraže je jasan model sa aspekta teorijske analize i do neophodnih podataka za njegov obračun je jednostavno doći. Međutim, sam koncept monetarne senioraže ne obezbeđuje potpuni obračun vrednosti prihoda koji monetarne vlasti ostvaruju od štampanja novca. Dve komponentne čine ukupan prihod od senioraže. Prva komponenta predstavlja realnu vrednost nemonetarne aktive, koju centralna banka generiše u zamenu za porast novčane mase. Ova komponenta se meri tradicionalnim konceptom monetarne senioraže. Druga komponenta prihoda od senioraže je zarada od kamate koju centralna banka

ostvaruje na bazi posedovanja nevladinog duga (*nongovernment debt*), tj. duga koji se odnosi na domaće i strane dužnike. Centralna banka povremeno može da realizuje kapitalne dobitke (gubitke) prodajom aktive na tržištu po višoj (nižoj) ceni od cene koju je platila za datu aktivu.

Proširena monetarna senioraža se računa na sledeći način:

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

gde je:

$sM^*$  - monetarna senioraža,

$dD$  - kamata na dug koji drže domaći dužnici,

$fF$  - kamata na dug koji drže strani dužnici,

$GR$  - kapitalni dobitak (gubitak), i

$P$  - nivo potrošačkih cena, meren indeksom  
potrošačkih cena.

S. Fischer (1982) pravi razliku između aktivne i pasivne senioraže. Aktivna senioraža se odnosi na zemlje koje imaju visoku stopu inflacije, dok je pasivna senioraža zastupljena u brzo rastućim zemljama. U slučaju pasivne senioraže ovaj prihod se realizuje time što je emitovanje novca povezano sa visokim nivoom privrednog rasta, ukoliko u isto vreme inflacija nije visoka.

Realan prihod od senioraže može se izračunati na sledeći način (Mankiw, 1987):

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

gde je:

$\pi = \dot{P}/P$  - stopa inflacije,

$g = \dot{Y}/Y$  - stopa rasta autputa (autor ne precizira koji output je u pitanju), i

$k$  - konstanta.

G. N. Mankiw (1987) objašnjava teoriju optimalne senioraže (*theory of optimal seigniorage*), time što su stopa porasta novčane mase, inflacije i nominalne

kamatne stope određene na bazi potrebnih prihoda koje vlada jedne zemlje treba da realizuje. Teoriju optimalne senioraže testira shodno tome da li je tokom vremena viša poreska stopa povezana sa višom stopom inflacije i višom nominalnom kamatnom stopom. Navedeno testiranje sprovedeno je na osnovu podataka za SAD, za period 1951-1985, gde je za aproksimaciju nominalne kamatne stope uzeta tromesečna stopa prinosa na zapise trezora (*three-month Treasury bill rate*), dok su za prosečnu poresku stopu korišćeni prihodi vlade, kao procenat bruto nacionalnog proizvoda (*Gross national product - GNP*). Bruto nacionalni proizvod se u SAD koristio za određivanje ukupne ekonomske aktivnosti do 1991, od kada je u upotrebi termin bruto domaći proizvod. Sprovedena analiza je pokazala da je u navedenom periodu porast federalnih poreskih prihoda od 1% prouzrokovao porast nominalne kamatne stope od 1,43%. Pokazano je da je uticaj rasta federalnih prihoda, a time i poreskih stopa, na nominalnu kamatnu stopu pozitivan i značajan. J. H. Haslag (1998) je, koristeći podatke u periodu 1965-1994, izračunao da su prihodi od senioraže, mereni kao odnos prihoda od senioraže i bruto nacionalnog proizvoda, za privredu SAD-a, u proseku iznosili oko 2%, dok je učešće prihoda od poreza u bruto nacionalnom proizvodu 22%. Time je pokazano da za privredu SAD učešće prihoda od senioraže u bruto nacionalnom proizvodu nije zanemarljivo.

## STABILNOST I INTEGRACIJA FINANSIJSKIH TRŽIŠTA

Kada se govori o dolarizaciji, fokus analize treba usmeriti i ka stabilnosti i integraciji finansijskih tržišta. R. Rennhack i M. Nozaki (2006), kao i I. Asel (2010), pokazali su da su, početkom 2000-tih, ekonomije u tranziciji, usled opšte makroekonomске nestabilnosti, započele u većoj meri da umesto domaće koriste stranu valutu. Analizom finansijske dolarizacije ukazano je da je u zemljama koje su prihvatile stranu valutu došlo do značajnog smanjenja stope inflacije. U analiziranim zemljama Afrike (Angola, Gana, Nigerija, Južna Afrika i Zambija), prosečna stopa inflacije u periodu 1995-1999, je

smanjena sa 127% na 37,6%, u periodu 2000-2003. U azijskim zemljama (Indonezija, Laos, Koreja, Filipini, Tajland i Vjetnam) inflacija je smanjena sa 11,2% na 4,4%, respektivno, a u zemljama Latinske Amerike (Argentina, Bolivija, Brazil, Čile, Kolumbija, Kostarika, Dominikanska Republika, Ekvador, El Salvador, Gvatemala, Honduras, Meksiko, Nikaragva, Paragvaj, Peru, Ugurvaj i Venecuela) sa 14,8% na 9,3%, respektivno, i u zemljama u tranziciji sa 44,1% na 10,4%, respektivno. Nivo finansijske dolarizacije od 2001. je smanjen u nekim zemljama Latinske Amerike. Argentina je, na primer, uticala da njeni rezidenti svoje devizne depozite konvertuju u pezos, čime je u značajnom meri snizila stepen dolarizacije. Bolivija, Peru i Urugvaj su iskusili skromno smanjenje učešća deviznih depozita u ukupnom depozitima, dok je u Paragvaju prilično smanjen stepen finansijske dolarizacije.

Kada je reč o smanjenju inflacije usled rasta finansijske dolarizacije, racionalna je odluka rezidenata da svoje depozite konvertuju iz nacionalne valute u stranu kako bi se zaštitili od rizika mogućeg daljeg porasta inflacije i gubitka vrednosti tih depozita. A. Ize i E. Yeyati (2003), ukazali su na značaj relativne volatilnosti inflacije u određivanju stepena finansijske dolarizacije. Naime, rezidenti više preferiraju da drže devizne depozite, naročito ako postoji veliki rizik od razvoja visoke stope inflacije. Ukoliko su stopa inflacije i devizni kurs volatilniji, rezidenti drže veći deo svog portfolija u stranoj valuti i sagledavaju volatilnost inflacije u kontekstu promene realnog deviznog kursa. U ovoj situaciji, realna vrednost imovine koja je izražena u stranoj valuti, a merena je putem domaće kupovne moći (*domestic purchasing power*), pokazuje veći nivo stabilnosti u odnosu na situaciju da je imovina izražena u domaćoj valuti. Ukoliko je, s druge strane, prisutna stabilnost domaće stope inflacije i realnog deviznog kursa, to će uticati da rezidenti smatraju aktivan u domaćoj valuti kao bolji čuvar vrednosti. A. Ize i E. Parrado (2002) ukazuju da realna i finansijska dolarizacija imaju tendenciju porasta usled rasta volatilnosti domaće inflacije (što dalje utiče na volatilnost zarada i stope prinosa na investicije u domaćoj valuti), ali i da beleže pad usled rasta volatilnosti deviznog kursa (što povećava volatilnost indeksiranih zarada u dolaru ili stope prinosa).

Kada je reč o nivou dolarizacije, potrebno je ukazati i na kredibilitet monetarne politike i jačinu rada institucija (Jakšić, 2013; Jakšić & Jakšić, 2013). Institucije koje su slabe mogu da ugroze kredibilitet rada monetarnih vlasti, jer rezidenti u toj situaciji imaju strah da će vlada, svojim odlukama, da ugrozi vrednost njihove finansijske aktive time što će u zemlji doći do visoke inflacije. A. De la Torre i S. Schmukler (2004) ističu da slabe institucije mogu da povećaju neizvesnost oko doslednosti primene ugovora i da time daju podstrek rezidentima da prevremeno razoroče svoje depozite ili da takve transakcije izvrše u zemljama koje imaju sigurniji pravni sistem. Za analizu uspeha rada institucija, može da posluži studija Svetske banke za 215 zemalja u okviru projekta globalni indikatori upravljanja (*The Worldwide Governance Indicators - WGI project*), za period 1996-2014. Predmet analize su šest dimenzija koje mere nivo globalnog indikatora upravljanja za svaku zemlju i to: odgovornost; politička stabilnost i odsustvo nasilja; efikasnost vlade; kvalitet regulatornih tela; vladavina zakona; i kontrola korupcije.

Prethodno navedene studije ukazuju da je finansijska dolarizacija racionalan odgovor na neizvesnost oko nivoa stope inflacije. Finansijska dolarizacija će biti na visokom nivou u zemljama koje imaju nestabilnu i visoku domaću inflaciju i u kojima institucije mogu da ugroze poverenje vezano za buduće kretanje stope inflacije. L. Chițu (2012) se bavi analizom uticaja nezvanične dolarizacije na veliku svetsku finansijsku krizu u periodu 2007-2009, na primeru zemalja u razvoju. Ova studija je pokazala da je dolarizacija kredita bila dobar pokazatelj koji je mogao da predviđi sniženje realne stope bruto domaćeg proizvoda između 2007. i 2009, na uzorku od oko 60 zemalja u razvoju. U proseku, procenjuje se da je pad realnog bruto domaćeg proizvoda iznosio oko 0,84% u onim ekonomijama kod kojih je nivo kreditne dolarizacije bio viši od 10%.

Kada je reč o integraciji finansijskih tržišta, M. Brown, R. De Haas i V. Sokolov (2013), na primeru Ruske Federacije, nivo integracije i stabilnosti finansijskih tržišta, u okviru postojanja finansijske dolarizacije, mere kroz tri indikatora: učešće domaćih banaka u ukupnom broju banaka u zemlji; učešće filijala

domaćih banaka u ukupnom broju filijala celokupnog bankarskog sektora; i učešće strane pasive domaćih banaka u ukupnoj pasivi bankarskog sektora. Na ovaj način, utvrđuje se u kojoj meri je domaći bankarski sektor integriran sa ostatkom finansijskog sektora. Daljom analizom, ova studija nastoji da otkrije da li uticaj domaće inflacije na finansijsku dolarizaciju zavisi od toga da li je bankarski sektor integriran u ukupan finansijski sektor ili ne, kao i u kojoj meri ta integracija postoji. Ukoliko je bankarski sektor manje integriran u ukupan finansijski sektor, banke ne mogu da alociraju svoja devizna sredstva na eksterna tržišta ili na međunarodna tržišta kapitala. Ovo znači da ukoliko banka želi da neutrališe valutnu neusklađenost pozicija svog bilansa stanja da je potrebno da depozite u domaćoj valuti iskoristi za plasmane u domaćoj valuti. Dodatna prednost finansijske integracije, kada je reč o punoj dolarizaciji, jeste sniženje troškova zaduženja. Upotreba američkog dolara eliminiše rizik od devalvacije u zoni domaće valute i trebalo bi da snizi nivo kamatnih stopa pri zaduženju.

Druge studije, međutim, ukazuju da bi integracija finansijskih tržišta trebalo da se desi pre dolarizacije. Tako, na primer, V. Bencivenga, E. Huybens i B. D. Smith (2001) su pokazali da dolarizacija ima različit uticaj, što zavisi od stepena integracije finansijskih tržišta dve ekonomije. Pokazano je da dolarizacija ima svoje benefite kada su tržišta dobro integrisana, a ta korisnost zavisi od stepena dolarizacije. U suprotnom, dolarizacija može biti izvor nestabilnosti u ekonomiji.

## EVROIZACIJA U REPUBLICI SRBIJI

U literaturi, dolarizacija je termin koji se koristi češće od termina evroizacija, jer je izraženje vezivanje za dolar nego za evro. Zbog toga smo u prethodnim delovima rada koristili termin dolarizacija, dok ćemo u slučaju RS koristiti termin evroizacija. Samo kroz veću zastupljenost dinara i bolju valutnu i ročnu usklađenost izvora i plasmana bankarskog i nebankarskog sektora, snizio bi se nivo valutnog rizika, što bi vodilo unapređenju finansijske stabilnosti i porastu efikasnosti monetarne politike.

Finansijski sektor u RS je visoko evroizovan kako na strani depozita, tako i na strani kredita. Prema podacima Izveštaja o dinarizaciji finansijskog sistema Srbija iz decembra 2018, na kraju četvrtog kvartala 2018. učešće ukupnih plasmana sektora privrede i stanovništva u ukupnim plasmanima u dinarima iznosi 33% i ovaj pokazatelj je povećan za 0,2% u odnosu na prethodni kvartal (National bank of Serbia, 2018a). Učešće dinarskih depozita u ukupnim depozitim sektora privrede i stanovništva na kraju četvrtog kvartala 2018, iznosi 32,2% i beleži porast od 1,2% u odnosu na kraj prethodnog kvartala. Dinarska štednja stanovništva (rezidenata i nerezidenata) položena kod banaka u Republici Srbiji na kraju decembra 2018. iznosi 61,1 mlrd dinara i zabeležila je porast za 4,6 mlrd dinara u odnosu na kraj septembra. Učešće dinarske štednje u ukupnoj štednji na kraju 2018, iznosi 4,9% (na kraju septembra 4,7%) i predstavlja najviši nivo dosadašnjeg učešća.

Za testiranje početne hipotezu, korišćena je koreaciona analiza, na osnovu podataka za period 2011-2018, za koji se raspolaze podacima o kretanju stepena evroizacije. Korišćeni podaci za analizu su stopa inflacije u RS, merena kao indeks potrošačkih cena, i međugodišnja stopa inflacija u decembru svake od posmatranih godina. Za merenje stepena evroizacije u RS korišćena su dva pokazatelja: učešće deviznih plasmana u ukupnim plasmanima privredi i stanovništву, i učešće deviznih depozita u ukupnim depozitim privredi i stanovništву. Za oba pokazatelia stepena evroizacije korišćena je njihova vrednost u decembru svake analizirane godine.

Primenom koreacione analize, sa ciljem utvrđivanja postojanja kvantitativnog slaganje između prethodno navedenih pokazatelia, konstatovan je stepen slaganja. U slučaju da se posmatraju dve varijable reč je o prostoj korelaciji, a ako je reč o više varijabli onda o višestrukoj korelaciji. Zadatak proste linearne korelacije jeste da pokaže da između varijacija dve pojave postoji prosta pravolinjinska veza. Koeficijent korelacije predstavlja pokazatelj stepena kvantitativnog slaganja između promenljivih. Koeficijent proste linearne korelacije se u osnovnom skupu označava sa  $\rho$ , a u uzorku sa  $r$  i može uzeti vrednosti samo u intervalu od -1 do 1, tj.  $-1 \leq \rho \leq 1$  i  $-1 \leq r \leq 1$ .

Na bazi podataka iz Tabele 3, možemo da zaključimo da postoji niska korelacija između kretanja stope inflacije i učešća deviznih plasmana u ukupnim plasmanima privredi i stanovništву i iznosi 0,38. S druge strane, stepen korelacije između stope inflacije i učešća deviznih depozita privrede i stanovništva u ukupnim depozitima je visok i iznosi 0,72. Ovaj rezultat se može objasniti činjenicom da je veća zastupljenost deviznih depozita u poređenju sa deviznim plasmanima u ukupnim depozitima/plasmanima privrede i stanovništva. Na bazi prikazanih rezultata analize, postavljena hipoteza je delimično potvrđena i zaključuje se da postoji visoka međuzavisnost između stope inflacije i evroizracije, merena kao učešće deviznih depozita u ukupnim depozitima privrede i stanovništva, dok je ta međuzavisnost niska ukoliko se za evroizraciju koristi pokazatelj učešće deviznih plasmana u ukupnim plasmanima privrede i stanovništva.

U okruženju koje karakteriše visoka evroizracija, Narodna banka Srbije sprečava preteranu kratkoročnu volatilnost deviznog kursa time što interveniše na deviznom tržištu, imajući u vidu da fluktuacija deviznog kursa dinara utiče na sposobnost dužnika da otplaćuje devizne obaveze. U isto vreme, inflacija je u okviru targeta, finansijski sistem u celini je stabilan kao i devizni kurs, dok je referentna kamatna stopa na najnižem nivou od kada je započela primena

strategije targetiranja inflacije (trenutno na nivou od 3%), što je dovelo do značajnog pada stope na dinarske kredite i porast tražnje za dinarskim kreditima.

Imajući u vidu da je od uvođenja strategije dinarizacije, u 2012, održana makroekonomska stabilnost i ojačana finansijska stabilnost, u decembru 2018, između Vlade Republike Srbije i Narodne banke Srbije potpisana je novi Memorandum o strategiji dinarizacije (National bank of Serbia, 2018b). Novim Memorandumom, sagledani su dosadašnji rezultati primene strategije dinarizacije i predložene su nove mere kako bi se povećala upotreba dinara u finansijskom sistemu RS, koje se odnose na podsticanje banaka da više koriste izvore sredstava u domaćoj valuti kako bi se povećala kreditna aktivnost u dinarima, potom rad na daljem razvoju tržišta dinarskih hartija od vrednosti, kao i dalja promocija instrumenata zaštite od deviznog rizika (instrumenti hedžinga poput forvarda, opcija, svopova).

## ZAKLJUČAK

Dolarizacija se najčešće dešava u zemljama koje su u dužem periodu izložene visokoj stopi inflacije, volatilnom deviznom kursu, kao i smanjenom poverenju u domaću valutu. U takvim okolnostima, dolazi do prihvatanja strane valute, u potpunosti

**Tabela 3** Korelacija stope inflacije i evroizracije u Republici Srbiji

Godina	Indeks potrošačkih cena u decembru posmatrane godine (u %)	Učešće deviznih plasmana u ukupnim plasmanima privredi i stanovništvu (u %)	Učešće deviznih depozita u ukupnim depozitima privredi i stanovništvu (u %)
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 korelaciјe		0,38	0,72

ili delimično, koja se koristi kao sredstvo plaćanja, jedinica mere i štednje. Pored toga, zastupljeno je iskazivanje plata i cena u stranoj valuti, ali i aktive veće vrednosti poput stanova, kuća i automobila.

Ključni doprinos ovog rada je prikaz glavnih troškova i koristi primene dolarizacije. To se ogleda kroz sniženje stope inflacije, jer je prisutna uvozna inflacija koja je niža u poređenju sa stopom u domaćim okvirima. Sniženjem stope inflacije postiže se cenovna i finansijska stabilnost, što je važan preduslov za rast i razvoj jedne ekonomije. Pored toga, dolarizacija doprinosi integraciji finansijskih tržišta i sniženju troškova transakcija u trgovinskoj razmeni. S druge strane, treba ukazati da u slučaju pune dolarizacije dolazi do gubitka senioraže, koja se u opštem slučaju može definisati kao prihod monetarnih vlasti koji se stiče štampanjem novca. Isto tako, postoji mogućnost gubitka primene funkcije zajmodavca u poslednjoj instanci, čime se ograničava mogućnost centralne banke da obezbedi likvidnost u kratkom roku. Međutim, treba ukazati na druge načine obezbeđivanja likvidnosti bankarskom i celom finansijskom sektoru kroz stvaranje stabilizacionih fondova, ali i zaključenje kreditnih linija sa međunarodnim finansijskim organizacijama.

Korišćenjem koeficijenta korelacije između međugodišnje stope inflacije, merene kao indeks potrošačkih cena, i pokazatelja evroizracije u RS, pokazano je postojanje visoke korelacije između stope inflacije i evroizracije, merene kao učešće deviznih depozita u ukupnim depozitima privrede i stanovništva (0,72), dok je ta međuzavisnost niska ukoliko se za evroizraciju koristi pokazatelj učešće deviznih plasmana u ukupnim plasmanima privrede i stanovništva (0,38). Time je, delimično, potvrđena početna hipoteza, što se može objasniti da je u RS veći stepen evroizracije na strani depozita nego na strani plasmana.

Rad sadrži i kratak osvrt na trenutno stanje primene strategije dinarizacije u RS, čiji je cilj veća upotreba dinara u njenom finansijskom sistemu. Kroz veću zastupljenost dinarskih izvora i plasmana snizio bi se devizni rizik, koji se često materijalizuje kroz visok stepen problematičnih kredita na bazi prelivanja

deviznog rizika u kreditni rizik. Kako bi se to sprečilo, potrebno je da monetarne vlasti, zajedno sa predstvincima fiskalne politike, nastave da rade na sniženju stepena evroizracije u RS i da aktivno promovišu dinarsku štednju, dinarske kredite i ulaganje u dinarske hartije od vrednosti. Da bi se vratilo poverenje u nacionalnu valutu, potrebno je da se održi postignuta makroekonomski stabilnost merena kroz nisku, stabilnu i predvidivu inflaciju, da se zadrži relativna stabilnost deviznog kursa dinara u odnosu na evro i da se promoviše dinarska štednja koja ima povoljniji poreski tretman u odnosu na deviznu. Proces vraćanja poverenja u domaću valutu nije lak niti kratkog roka jer su uzoci prisustva evroizracije u RS duboko ukorenjeni.

Kako je tema dolarizacije, odnosno evroizracije, aktuelna i prisutna u većem broju zemalja, ne samo u našem okruženju, nego i na globalnom nivou, time se otvara mogućnost dalje analize ove problematike. Analiza može biti usmerena ka prikazu uzroka dolarizacije i razloga zbog kojih su visoko dolarizovane zemlje prihvatile stranu valutu kao sopstvenu, potom ka prikazu mera u borbi ka sniženju stepena dolarizacije (tržišne, regulatorne), ali i održivosti rezultata tih mera u srednjem i dugom roku. Kada je reč o domaćim okvirima, nastavak istraživanja može biti usmeren ka predstavljanju efikasnosti dosadašnjih mera od strane Narodne banke Srbije i Vlade Republike Srbije, prikazu trenutnog stanja stepena dinarizacije po različitim pokazateljima (dinarizacija depozita, dinarizacija kredita, dinarska štednje) i predstavljanju budućih mera.

Visok stepen dolarizacije utiče na smanjenje efikasnosti monetarne i fiskalne politike, a time i na ukupne efekte koje ekonomska politika ima na makroekonomsku i finansijsku stabilnost, naročito u slučaju kada je izražena volatilnost domaće valute. Zemlje koje imaju visok nivo dolarizacije imaju i visok prenosni efekat deviznog kursa na inflaciju, odnosno, dolazi da se depresijacija domaće valute brže prelije na kretanje stope inflacije. U takvim okolnostima, otežana je uloga monetarnih vlasti da postignu i očuvaju cenovnu i finansijsku stabilnost. Iz tog razloga, predstavnici monetarnih vlasti su svesni

da zajedničkim naporom sa predstavnicima fiskalne politike i nefinansijskim sektorom treba da reše visok nivo dolarizacije, a da predloženo rešenje bude dugoročno održivo i efikasno. To rešenje treba da bude prilagođeno svakoj zemlji ponaosob i da bude u skladu sa karakteristikama same ekonomije.

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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

**Pregledni članak**

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## **TRANSFORMACIJA WEB PODATAKA U ZNANJE - IMPLIKACIJE ZA MENADŽMENT**

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Preduzeća svakodnevno prikupljaju različite podatke o *online* ponašanju pojedinaca na svojim računarima, koje uključuje njihovo pretraživanje sajtova, *online* kupovine, postavljanje komentara i sl. Ove podatke jednim imenom nazivamo *web* podacima. U njima se kriju indikatori interesa, navika, preferencija ili uobičajenih modaliteta ponašanja pojedinaca, tzv. paterni. Međutim, mnogo je korisnije kada preduzeće prikuplja podatke o svim svojim korisnicima, te analizom ovih podataka stekne uvid u njihove navike i tendencije. Uočavanjem i interpretiranjem ovih paterna, menadžment može donositi odluke koje su adekvatnije, budući da su zasnovane na informacijama i saznanjima deriviranim iz podataka, te bolje zadovoljavaju potrebe komitenata. Postupak otkrivanja paterna, tzv. rudarenje *web* podataka, transformiše iste u znanje. U radu je istraženo na koji način metode i tehnike rudarenja podataka mogu da se primene na *web*-bazirane forme podataka i na koji način otkrivanje paterna u *web* sadržajima, strukturi i načinu upotrebe *web-a* utiče na menadžment.

**Ključne reči:** nestrukturirani podaci, rudarenje *web-a*, segmentacija komitenata, modelovanje *online* pristupa, kolaborativno filtriranje

**JEL Classification:** O33, L190, D85, Z13

### **UVOD**

*World Wide Web (web)* je nastao i doživeo ekspanziju devedesetih godina prošlog veka, zahvaljujući širokoj upotrebi mikrokompjutera, razvoju *hardware-a* (pre svega, mikroprocesora, memorijskih elemenata, i tehnologija za skladištenje podataka), razvoju korisnički orientisanih i jednostavnih za upotrebu *software-skih* alata i neverovatnim mogućnostima

koje je *web* kao globalni informacioni sistem stvorio u domenu poslovanja. Tehnologija druge generacije *web-a* je omogućila da korisnici sami kreiraju sadržaj na *web-u*, te se *web* kakav danas poznajemo sastoji od *web* stranica, slika, video i drugih *online* materijala kojima se može pristupiti putem čitača *web-a*, ali i interaktivnih medija (društveni mediji) i korisnički generisanih sadržaja. U želji da saznaju informacije o svojim komitentima, preduzeća više nisu prinuđena da informacije prikupljaju kroz intervjuje, upitnike ili kroz drugačiji vid interakcije sa korisnicima, jer su one dobровoljno već postavljene na *webu*. Međutim,

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neprekidni porast obima generisanih podataka i diversifikovanje njihovih izvora su značajno usložnili postupke za izbor adekvatnih metrika i sticanje uvida u podatke na osnovu kojih preduzeće može preduzimati određene korake ka poboljšanju poslovanja. Ogromne količine podataka i informacija su otežale pretraživanje i nalaženje određene, specifične informacije, te je sve više vremena potrebno za kolekciju i transformaciju podataka, a sve manje vremena ostaje za strategijsko planiranje (Markov & Larose, 2007, 4). Ovo je dovelo do nastanka i razvoja inteligentnih tehnika i alata koji pružaju podršku u obavljanju sve kompleksnijeg zadatka analize *web* podataka i ekstrakcije informacija i znanja iz njih.

Otkrivanje znanja sadržanog u podacima (*Knowledge Discovery in Data*), je oblast koja se oslanja na dostignuća mašinskog učenja kao dela veštačke inteligencije, sa ciljem ekstrakcije potencijalno korisnih i interesantnih saznanja iz podataka velikog obima. Tradicionalno, tehnike rudarenja podataka (*Data Mining*), bile su primenjene na podatke koji su se kroz vreme prikupljali u relacionim ili transakcionim bazama ili skladištima podataka preduzeća, ali se one, u principu, mogu primeniti na bilo koju vrstu repozitorijuma podataka, pa i na *web* podatke.

U radu su razmatrani koncepti, tehnike i mogućnosti primene rudarenja *web-a*, discipline koja se rapidno razvija zahvaljujući velikim potencijalima za unapređenje poslovanja, naročito e-biznisa. Kako rudarenje *web-a* može da se sproveđe kroz različite pristupe i primenom različitih tehnologija, njegova implementacija nije uniformna i jasno određena već varira u zavisnosti od zadatka, domena primene i cilja analize.

Shodno tome, predmet istraživanja su ključni aspekti o kojima je potrebno voditi računa prilikom opredeljivanja za primenu novih tehnologija i tokom sprovodenja analiza nad *web* podacima. Istraživanje se bavi najčešćim vrstama zadataka na koje se ova relativno nova disciplina može uspešno primeniti, te opisuje specifičnosti različitih pristupa u njihovom rešavanju.

U radu smo pošli od hipoteze da rudarenje *web* podataka ima veoma heterogenu primenu koja donosi

benefite u mnogim sferama poslovanja, zahvaljujući otkrivenim (sa)znanjima koja bi inače ostala skrivena u mnoštvu *web* podataka.

Da bismo testirali polaznu hipotezu, istražili smo relevantnu literaturu i sagledali o kojim sve primenama i kakvim rezultatima rudarenja *web-a* je izveštavano i u kojim zadacima, koje su prednosti koje rudarenje *web-a* pruža u različitim sferama poslovanja u odnosu na druge analitičke pristupe i koje sve mogućnosti inkorporiranja nove tehnologije u poslovanje stoje menadžmentu na raspaganju. Shodno tome, najpre je dat pregled različitih načina rudarenja *web* podataka, u zavisnosti od izvora raspoloživih podataka (podaci o posetama *web* stranama, podaci o međupovezanosti *web* strana, podaci o ključnim temama relevantnim za dokumente na *webu* i sl.) i vrste saznanja koja se žele derivirati (da li se želi saznati profil posetilaca *web* stranice koji su tokom posete izvršili *online* kupovinu proizvoda, ili derivirati model za automatizovanu klasifikaciju velikih količina dokumenata u zadate kategorije, ili pak informacije o tome koje proizvode preporučiti posetiocu sajta, kako bi se maksimizirala šansa za potencijalnom *online* kupovinom). Nadalje, ukazano je na empirijski potvrđena iskustva u rudarenju podataka, saopštена u relevantnim izvorima. Fokus rada je na primenljivosti i koristima rudarenja sadržaja, strukture i načina upotrebe *web-a* u poslovnom okruženju, a ne na samim tehnologijama pretraživanja informacija i njihovom efikasnošću.

Struktura rada je sledeća: u drugom delu je dat pregled literature o teorijsko-metodološkim aspektima transformacije *web* podataka u znanje. U trećem delu rada, opisana su tri ključna aspekta rudarenja *web* podataka, i to:

- postupci rudarenja sadržaja *web-a*: algoritam klasterovanja, sistemi za pronalaženje informacija, pristup kolaborativnog filtriranja, i specifični pristup analizi netekstualnih sadržaja;
- rudarenje strukture *web-a* i mogućnosti analize strukture rangiranjem relevantnih stranica; i
- rudarenje upotrebe *web-a*.

Mogućnosti primene pristupa opisanih u prethodnim delovima rada, u različitim sferama poslovanja su opisane u četvrtom delu, uz nekoliko primera dobre prakse. Zaključna razmatranja i budući pravci istraživanja rudarenja web-a dati su u petom odeljku.

## PREGLED LITERATURE O TEORIJSKO-METODOLOŠKIM ASPEKTIMA TRANSFORMACIJE WEB PODATAKA U ZNANJE

Otkrivanje znanja sadržanog u podacima (KDD) je proces kojim se ekstrahuju značajne informacije i (sa) znanja skrivena u mnoštvu podataka i dokumenata. Generička metodologija, koja se najčešće koristi u upravljanju procesom otkrivanja znanja, te poprima obeležja standarda, je CRISP-DM metodologija (*Cross Industry Standard Process for Data Mining*), (Shearer, 2000; Jiawei & Kamber, 2001; Guandong, Yanchun & Lin, 2011). Ona opisuje kontinualan, iterativni proces koji se sastoji iz niza koraka koji su domen-nezavisni, odnosno, primenljivi u svim industrijama i oblastima poslovanja. Prema CRISP-DM metodologiji, neophodno je, najpre, poznavati oblast poslovanja da bi poslovna pitanja mogla da se prevedu u ciljeve rudarenja podataka. U narednom koraku, potrebno je prikupiti i razumeti relevantne podatke, te ih pripremiti za dalju obradu. Postupci pripreme podataka, tzv. preprocessiranje, umnogome zavise od njihove izvorne forme i cilja analize, a sastoje se od integracije, pročišćavanja, filtriranja i transformacije podataka u adekvatnu formu. Pripremu podataka u CRISP-DM metodologiji prati modelovanje, tj. ekstrahovanje skrivenih relacija, zakonomernosti ili shema ponašanja, a primenjuju se naučne metode i tehnike rudarenja podataka. Evaluacija i provera izgrađenog modela treba da pokažu da li on ispunjava poslovne ciljeve. U slučaju pozitivnog ishoda, potrebno je interpretirati uočene paterne ponašanja i razviti plan akcije za dalju implementaciju otkrivenih znanja. Sekvenca navedenih koraka nije striktna, već je uobičajeno vraćanje sa narednih na prethodne korake radi dobijanja boljih međurezultata. Otkrivena saznanja se koriste za definisanje još užih poslovnih

zadataka na koje se, kontinualnim rudarenjem podataka, uz stečena iskustva kroz prethodne iteracije, traže odgovori.

IBM korporacija je 2015. osmisnila novu metodologiju, poznatu kao ASUM-DM (*Analytics Solutions Unified Method for Data Mining/Predictive Analytics*). Ova metodologija je ekstenzija i poboljšanje postojeće CRISP-DM metodologije (IBM Analytics, 2016), budući da se u većoj meri bavi infrastrukturnim i operativnim aspektima rudarenja podataka i prediktivne analitike, kao i menadžerskim aktivnostima u fazi implementacije.

E. Yoneki, J. M. Tirado, Q. Guo i O. Serban (2016), opisali su ekspert-centričnu metodologiju za ekstrakciju znanja iz web podataka. Prema njihovoj zamisli, celokupan zadatak otkrivanja znanja se vezuje za eksperta i njegovu ekspertizu. Naime, od samog početka procesa, odnosno, od koraka prikupljanja podataka, pa sve do ekstrahovanja paterna i implementacije otkrivenih saznanja u poslovanju, ekspertu stoji na raspolaganju skup software-skih alata koji mu pomažu da samostalno, uz minimalne intervencije razvojnog tima, sproveđe ceo iterativni proces.

Kada rudarenje podataka koristimo za klasterovanje, klasifikaciju, predikciju ili regresiju velikih količina web podataka u namjeri da izvučemo korist za poslovanje, govorimo o disciplini rudarenja web-a (Markov & Larose, 2007; Liu, 2007; Palau, Montaner, Lopez & de la Rosa, 2016). Ona ima tri različita aspekta:

- Rudarenje sadržaja web-a (*Web Content Mining*) - zadatak se sastoji od pronalaženja sadrzine web stranica i rezultata web pretrage. Svaka web stranica je osmišljena sa namjerom da posluži posjetiocima sajta, te sadrži relevantne podatke. Međutim, oni nisu ograničeni na tekstualnu formu, već mogu biti u formi slike, grafičkih elemenata ili tabela, što značajno usložnjava analizu sadržaja.
- Rudarenje strukture web-a (*Web Structure Mining*) - zadatak je da se analizira hiperlink struktura, odnosno, podaci o načinu na koji su povezane i organizovane web stranice. Informacije o strukturi

unutar stranice objašnjavaju kako su uređeni različiti HTML (*Hypertext Markup Language*) ili XML (*Extensible Markup Language*) tagovi unutar posmatrane strane. Informacije o spoljašnjoj povezanosti stанице са другим *web* stranama су date у форми мреже *hyperlink*-ова који повезују међусобно више страница.

- Rudarenje upotrebe *web*-a (*Web Usage Mining*)
  - задатак је да се анализира навигациони пут посетилача *web*-а. Подаци који дaju информације о шеми приступа *web* страницама се најчешће чувају у проширеном *log* формату (*Extended Common Log Format*) у *log* датотекама на серверима, и садрže информације као што су: IP (Internet Protokol) адреса, referencia посечене странице, време и место приступа.

Postupci припреме и моделовања *web* података су специфични за сваки од наведених аспеката. Заrudarenje садржине *web*-а карактеристично је представљање докумената помоћу пре процесираних речи које документ садржи, а које се називају карактеристикама. Карактеристике су димензије по којима се у даљим поступцима анализе документи међусобно упоређују по сличности (Liu, 2007). Сви документи се формално представљају у векторском моделу простора (*Vector Space Model*). То је матрична презентација свих докумената полезног скupa, која се креира у поступку описаном у (Cheng, Healey, McHugh & Wang, 2001):

- За сваку карактеристику се израчунају степен учесталости појављивања или фреквентност у посматраном улазном скупу докумената (*Degree of Frequency*);
- Речи које се ретко појављују се укинују из даље анализе. Вредност доњег прага фреквентности се произвљају на почетку процесаrudarenja података, чиме се reduкује димензионалност анализе;
- Свакој од преосталих карактеристика се придржује  $n$  степени значајности, по један за сваки од  $n$  докумената из полезног скупа докумената;
- Степени значајности се записују у форми матрице  $n \times j$ , где  $j$  означава број карактеристика улазног скупа докумената. Ова матрица се назива векторски модел простора (*Vector Space Model*),

а вредности у целијама матрице се израчунају као TF-IDF (*Term Frequency-Inverse Document Frequency*) мера, односно, однос фреквентности термина у посматраном документу према броју појављивања истог термина у свим документима улазног скупа.

Za pronalaženje informacija od interesa za korisnika, u postupku rudarenja sadržine *web*-a se koriste tehnike filtriranja informacija. Ove tehnike posmatraju тему/ предмет докумената при селектовању оних који су relevantni за корисника. Najčešće коришћене методеfiltriranja су upiti u vektorsком простору (*Vector-Space Queries*), интелигентни агенти (*Intelligent Agents*) и визуелизација информација (*Information Visualization*) (Cheng, Healey, McHugh & Wang, 2001; Kumar & Mohamed, 2018) Kod upita u vektorsком простору се претражују и rangiraju документи по (косинусној) сличности са векторском презентацијом задатог упита, што је analogno ranije описаном поступку израчунавања сличности документа са центрима klastera.

Performanse система за pronalaženje информација се могу unaprediti приступом колаборативногfiltriranja (*Collaborative Filtering*), који својим квалитетом надилази пукуну анализу садрžине докумената, а тије се атрибута као што су preferencije и укус корисника и njihovo поimanje kvaliteta proizvoda, usluga или drugih entiteta od интереса. J. L. Herlocker, J. A. Konstan, A. Borchers i J. Riedl (1999, 232), izneli су prepostavku да корисници *web*-а који искazuju слично понашање имају сличне интересе, tj. да постоји висок степен корелације у njihovim preferencijama. Uzimajući ovu prepostavku за polaziште, развијен је поступак колаборативногfiltriranja (Resnick & Varian, 1997, 57), који је основа система за давање препорука (*Recommender Systems*).

Po definiciji,rudarenje слика (*Image Mining*) се бави екстракцијом сликовних патерна из великих колекција слика (Fayyad, Djorgovski, & Weir, 1996), а не разумевањем и/или екстракцијом специфичних карактеристика једне слике, нити налаžeњем relevantnih слика. Postupakrudarenja слика се састоји од складиштења и процесуирања, како би се побољшао квалитет слике, генерирања bitnih карактеристика на основу слике, indeksiranja и pronalaženja слика и откривања патерна и знanja (Madhumathi & Selvadoss Thanamani, 2014, 1818). Tehnikerudarenja података

se primenjuju na generisane karakteristike i otkrivaju se značajni paterni, od kojih se, nakon evaluacije i interpretacije, dobija finalno znanje, koje se primenjuje u aplikacijama.

Video je primer multimedijalnih podataka, jer sadrži tekst, sliku, meta-podatke, visuelni i audio zapis: video zapis sadrži sekvencu slika sa temporalnim informacijama, dok se audio zapis sastoji od govora, muzike i specijalnih zvukova, dok je tekstualni zapis lingvistička forma unutar videa (Vijayakumar & Nedunchezhian, 2012). Kako bi se video podaci mogli analizirati, moraju se prevesti u strukturiranu formu (Rui & Huang, 2000). Model video podataka je reprezentacija videa koja se bazira na njegovim karakteristikama, sadržini i nameni analize (Kokkoras, Jiang, Vlahavas, Elmagarmid, Houstis & Aref, 2002). Model se pravi segmentacijom ili anotacijom videa. M. Petkovic i T. D. Jonker (2001), predložili su model sa četri nivoa podataka:

- nivo sirovih podataka, sa sekvencom "uramljenih slika" (*Frames*) i video atributima,
- nivo karakteristika, koji sadrži domen-nezavisne karakteristike koje se mogu automatizovano generisati iz sirovih podataka, opisujući boje, teksture, oblike i pokrete,
- nivo objekata, koji sadrži entitete sa istaknutim prostornim dimenzijama, pridružene "uramljenim slikama", i
- nivo događaja, sa entitetima koji imaju istaknute vremenske dodatke koji opisuju kretanje i međusobnu interakciju objekata u prostoru i vremenu.

Postoje dve vrste rudarenja audio podataka (*Audio Data Mining*) (Leavitt, 2002):

- indeksiranje, bazirano na tekstu, koje prevodi izgovoreni tekst u tekstualni zapis te uz pomoć posebnih rečnika identificuje šta je izgovoren,
- fonemski-bazirano indeksiranje, koje analizira i identificuje zvuke u delu audio zapisa kako bi se kreirao indeks.

Rečnik fonema se koristi za prevođenje upita u odgovarajući fonetski niz, a sistem pretražuje indekse kako bi našao onaj koji najviše odgovara zadatom upitu.

Tekst unutar videa se može izdvojiti na više načina (Ma, Lu, Zhang & Li, 2002): iz scene (natpsi na bilbordima, ciradi kamiona ili na majicama), iz mehanički pridruženog tekstualnog sadržaja (dopunske informacije za bolje razumevanje pojedinih sekvenci), ili automatskim prepoznavanjem izgovorenog teksta.

Za rudarenje strukture *web-a* je presudno na koji način će se izračunavati značaj, odnosno, rang *web* strana. Izračunavanje ranga *web* stranice vrši se na osnovu razlike sume svih ulaznih i sume svih izlaznih *link-ova* sa te stranice. Osnovu nešto drugačijeg pristupa izračunavanju ranga, čini ideja da su *hyperlink-ovi* indikatori ljudskog prosuđivanja o međusobnoj relevantnosti, te da pojava *link-a* na stranici *p* ka stranici *q* nosi latentnu informaciju o tome da je autor koji je kreirao stranicu *p*, i u nju uključio *link* na stranicu *q*, „preneo“ određeni stepen značaja stranice *p* na stranicu *q*. Posledično, što veći broj linkova sa drugih *web* stranica vodi ka nekoj stranici (ulazni *link-ovi*), to je veći njen značaj, odnosno, autoritet. Kompleksniji pristup rangiranju uzimaju u obzir širu organizaciju *web-a*, u kojoj, pored autoritativnih stranica sa mnogo ulaznih *link-ova*, otkrivaju i stranice koje su povezane sa mnogim autoritetima, odnosno imaju mnogo izlaznih *link-ova*, te predstavljaju centar razgranavanja ili vrstu „jezgra“, tzv. habovi (*Hub Pages*). *Hub-ovi* koji povezuju autoritete za zajedničku temu omogućavaju da se uoče i odbace „lažni“ autoriteti, tj. nepovezane stranice sa velikim brojem ulaznih *link-ova*. Svako poboljšanje performansi postojećih metoda pretrage je usko povezano sa pitanjima efikasnosti algoritama pretraživanja i raspoloživim kapacitetima za skladištenje podataka.

Osnovni koncepti rudarenja upotrebe *web-a* objasnio je B. Liu (2007). Rudarenje upotrebe *web-a* koristi podatke o svim aktivnostima posetilaca *web-a*, koji se automatski generišu od momenta prijave na *web*, do momenta odjave: odakle je poseta izvršena, kojom putanjom se posetilac kretao tokom pretraživanja sajta, vreme provedeno na svakoj stranici, kuda je nakon posete stranici korisnik otišao, itd. Ovi podaci se čuvaju u *log* datotekama na serverima. Svaki klik mišem nakon što se korisnik ulogovao odgovara jednom zahtevu za *web* stranicom, a sekvenca klikova odgovara sekvenci linkova na stranice koje je

korisnik posetio. Korisnička poseta *web*-u se naziva sesijom, a podaci o sekvencama stranica posećenih tokom jedne sesije se nazivaju *clickstream* podacima ili *web* klikovima (*Web clicks*). Metoda generisanja asocijativnih pravila iz transakcionih podataka, poznata kao analiza potrošačke korpe (*Market-Basket Analysis*) se može iskoristiti i za analizu *web log* podataka (Jiawei & Kamber, 2001; Li & Feng, 2010). Asocijativno pravilo je pravilo oblika  $X \Rightarrow Y$ , koje tumačimo tako da kupovina artikla  $X$  povlači sa sobom kupovinu artikla  $Y$  u istoj transakciji. U *web* okruženju, isto pravilo ukazuje na relaciju između HTML stranica  $X$  i  $Y$ , koje se učestalo pojavljuju jedna pored druge u korisničkim sesijama (Markov & Larose, 2007). Asocijativno pravilo ne nosi informaciju o hronologiji obavljenih poseta sajtu. Za ovakve vrste analiza se koriste tehnike za generisanje sekvenčnih asocijativnih pravila, koje uključuju i temporalnu komponentu. U sekvenčnim pravilima, poseta *web* sajtu navedenom u antecedensu pravila usledila je pre posete *web* sajtovima navedenim u konsekvensu pravila, odnosno, analizira se sekvenca klikova u vremenu (Markov & Larose, 2007). Postojeći algoritmi za rudarenje upotrebe *web*-a generišu preveliki broj pravila, u kojima je teško razlučiti koja pravila su bitna, a koja nemaju potencijalnu vrednost za korisnika (Cheng, Healey, McHugh & Wang, 2001). Stoga je potrebno odrediti kriterijume kojima će se osigurati implementacija samo korisnih asocijativnih pravila, dok će se odbaciti sva pravila koja se u nedovoljnoj meri mogu iskoristiti za postizanje željenih efekata analize. Ove kriterijume nazivamo merama interesantnosti pravila (Tan, Kumar & Srivastava, 2004; Hilderman & Hamilton, 2013).

Pitanje tačnosti analize *log* datoteka, usled keširanja *web* stranica i potreba da se zadatak delegira preduzećima specijalizovanim za *web* analitiku dovelo je do nastanka drugačijeg pristupa prikupljanju podataka za analizu upotrebe *web*-a, tzv. tagovanja stranica (*Page Tagging*). Metod koristi *JavaScript* ugnezđen na *web* stranici, kako bi svaki put kada korisnik putem čitača *web*-a zatraži stranicu, ili klikne mišem na link, generisao zahtev analitičkom serveru kod trećih lica. Oba metoda prikupljanja podataka o upotrebi *web*-a se mogu koristiti za izveštavanje o saobraćaju na *web* stranicama.

## ASPEKTI RUDARENJA WEB PODATAKA

Neverovatne mogućnosti *web*-a kao globalnog informacionog sistema u domenu poslovanja možemo posmatrati sa tri aspekta: mogućnosti koje pruža analiza sadržaja *web*-a, koje proizilaze iz analize njegove strukture i koje stvaraju (sa)znanja o njegovoj upotrebi.

### Rudarenje sadržaja *web*-a

Rudarenje sadržaja *web*-a se definiše kao „istraživački metod za izradu ponovljivih i validnih zaključaka iz podataka o njihovom kontekstu“ (Krippendorff, 1980, 36). Sadržaj *web*-a, kao rezervorijum podataka koji su korisnici postavili na uvid javnosti, nosi informacije o stavovima, preferencijama, mišljenjima i ponašanju korisnika *web*-a, što može biti veoma značajno u mnogim sferama poslovanja.

Prvi aspekt *web*-a, kao globalnog informacionog sistema, je automatizovano pohranjivanje, pristupanje, pronalaženje, organizovanje i predstavljanje podataka u *web* dokumentima. Pojam dokumenta je ranije bio vezan za tekstualne datoteke generisane u nekom programu za obradu teksta, ali se danas koristi za opisivanje bilo kojeg tipa datoteke koja se nekom aplikacijom može generisati. *Web* stranica je, takođe, dokument, koji je obično pisan u HTML jeziku i kojem se može pristupiti putem čitača *web*-a, navodenjem URL adrese. Osim tekstualne sadržine, pisane nekim od prirodnih jezika u slobodnoj formi (bez unapred određene ili propisane strukture, ili je ona samo delimično uređena), *web* stranica može da sadrži slike, audio i video zapise i *hyperlink*-ove na druge dokumente. Najšire posmatrano, e-servisi, arhivirani mejlovi, i drugi sadržaji se, takođe, mogu podvesti pod *web* dokumente.

Suština rudarenja sadržaja *web*-a jeste u sposobnosti pronalaženja dokumenata relevantnih za korisnika. Analiza sadržaja je široko rasprostranjen metod za objektivno i sistematično kvantitativno ispitivanje sadržaja koji se prenosi, a može biti koristan za otkrivanje ili uvid u preferencije i ponašanje korisnika, u kompleksne društvene i komunikacione trendove i paterne koje korisnici generišu (Kim &

Kuljis, 2010, 373). Zbog polu- ili nestruktuirane forme dokumenata, interaktivnosti, decentralizovanosti i mrežne strukture hiperlinkova, klasični sistemi za upravljanje bazama podataka ne mogu poslužiti za pronađenje potrebnih dokumenata u mnoštvu *web* dokumenata, već se koriste noviji pristupi.

### *Klasterovanje*

Zadatak klasterovanja može se opisati kao segmentacija heterogenog polaznog skupa u podskupove elemenata sa visokim stepenom međusobne kohezije. U kontekstu rudarenja *web-a*, polaznu populaciju mogu činiti kako dokumenti, tako i *web* stranice, koje grupišemo u podgrupe prema njihovom značenju i smislu termina navedenim u njima (klasterovanje po sličnosti), bilo korisnici *web-a*, na osnovu aktivnosti koje obavljaju kada dođu na *web*. Kada je u pitanju rudarenje sadržaja *web-a*, klasteruju se dokumenti, dok se prilikom rudarenja upotrebe *web-a* klasteruju *web* posetioci na osnovu načina korišćenja *web-a*. Iako se termini korisnik i posetilac *web-a* često koriste kao sinonimi, u kontekstu rudarenja *web-a* se oni razlikuju. Razlika proizilazi iz vrste podataka koje se automatizovano generišu i pamte o korisnicima/posetiocima *web-a*. Termin korisnik je opštiji i označava pojedinca koji pristupa *webu*. Korisniku se pridružuje jedinstveni identifikacioni kod, koji ga razlikuje od drugih korisnika *web-a*, a ostaje nepromenjen čak i ako korisnik pristupa *webu* sa različitim uređajem ili promeni svoj *web* pretraživač. Pojam posetioc označava pojedinca koji pristupa *webu* sa određenog uređaja (laptop, mobilni telefon, i dr.), koristeći određeni pretraživač (Google, 2019). Na taj način se za jednog korisnika vezuje više posetilaca *web-u*. Za potrebe analize *web* podataka je značajno da pristup korisnika sa drugog uređaja ili iz drugog pretraživača generiše drugi identifikacioni kod posetioca, jer se na taj način mogu uočiti razlike u *online* ponašanju istog korisnika, npr. drugačije se ponaša u slučaju kada pristupa *web-u* sa laptop računara nego ako mu pristupa iz aplikacije na mobilnom telefonu. Shodno rečenom, u nastavku će se termin posetioc *web-a* koristiti jedino kada je bitno naglasiti da se prilikom rudarenja podataka uzima u obzir uređaj/pretraživač

kojim se korisnik služi. U suprotnom će se koristiti termin korisnik.

Algoritmi klasterovanja koriste matricu vektorskog prostora za izračunavanje optimalnog broja klastera i njihovih centara. Udaljenosti svakog dokumenta ulaznog skupa do izračunatih centara klastera se zapisuju u vektorski model dokumenta. Na osnovu nje, vrši se diskretno klasterovanje dokumenata u onu particiju polaznog skupa do čijeg centra je stepen sličnosti dokumenta najveći. Algoritmi klasterovanja mogu pronaći dokumente koji su relevantni za korisnika veoma brzo i tačno, pa se mogu smatrati efikasnom tehnologijom za pronađenje informacija na *web-u* (Fan, Liu, Tong, Zhao, Nie, 2016, 42).

### *Sistemi za pronađenje informacija*

Uobičajeno je da korisnici *web-a* iskazuju potrebu za određenom informacijom u formi korisnički definisanog upita. Nakon što korisnik specificira svoj upit, pronalaze se relevantni dokumenti, u skladu sa potrebama korisnika. Sistemi za pronađenje informacija (*Information Retrieval Systems*) koriste tehnike filtriranja i pretražuju dokumente po predmetu ili temama za koji se vezuje sadržaj, te na taj način prevazilaze nedostatke sistema za upravljanje strukturiranim repozitorijumima podataka. Istovremeno, zadatok sistema za pronađenje informacija je da isključi rezultata pretrage što više dokumenata irelevantnih za korisnički upit. Alati koji filtriraju sadržaj dokumenata upoređuju formalnu reprezentaciju sadržine koja se nalazi u *web* dokumentima sa formalnom reprezentacijom sadržine koja interesuje korisnika, a koja je navedena kroz korisnički upit, te na taj način selektuju pravu informaciju za svakog korisnika.

### *Kolaborativno filtriranje*

U realnom svetu se često dešava da nam prijatelji daju savet, ili preporuku, o interesantnim proizvodima koje bismo trebali kupiti, knjizi koju vredi pročitati, filmu koji bi nam se mogao dopasti i sl. Preporučeni entiteti mogu biti i *online* resursi (*web* stranice) ili *online* aktivnosti (registracija na forum ili grupu,

*online* kupovina i dr.). Formalno, za ovakav scenario kažemo da oni sarađuju - vrše kolaboraciju sa nama u procesu selekcije. Koristeći postupak kolaborativnog filtriranja, sistemi za davanje preporuka savetuju korisnike na osnovu informacija o ponašanjima i preferencijama drugih korisnika.

Ovi sistemi neretko podstiču korisnike da eksplicitno ocene entitet, ili iznesu svoje lične preferencije, koje se memorišu u sistemu. Korisnici sistema za kolaborativno filtriranje dele svoje analitičko prosuđivanje i rangiranje entiteta (ocenjivanje kupljenih proizvoda ili usluga), tako da drugi korisnici mogu lakše odlučivati koje proizvode da kupe ili koju drugu akciju da preduzmu. Na osnovu ocenjenog prethodnog iskustva i stepena zadovoljstva ranijih korisnika, sistem za preporučivanje kreira personalizovanu preporuku entiteta koji bi mogli biti interesantni novom korisniku. Na osnovu ocena korisnika, moguće je vršiti njihovo klasterovanje u segmente onih koji imaju isti ukus ili informacione potrebe.

Performanse sistema za davanje preporuka su upravo proporcionalne stepenu kolaboracije korisnika (Palau, Montaner, Lopez & de la Rosa, 2016, 145). Zato je metoda kolaborativnog filtriranja naročito korisna u svetu koji je sve više umrežen putem interneta i u kojem se mreža dokumenata na *web*-u gradi zajedničkim naporima samih korisnika.

### *Analiza netekstualnog sadržaja web dokumenata*

Iako sadržaj *web* dokumenata, najvećim delom, čine tekstualni podaci, u dokumentima se mogu naći slike, video i audio zapis, arhivirani mejlovi i drugi sadržaji. Slike se mogu automatizovano klasifikovati ili klasterovati po vrednostima bazičnih boja (RGB komponenta), ili vrednostima teksture. Kao mera sličnosti slike sa zadatim graničnim uslovima se koristi entropija. Rudarenje slika je veliku primenu našlo u medicini, gde se medicinske slike klasifikuju radi potvrđivanja postavljenih dijagnoza (Babu & Mehtre, 1995).

Cilj rudarenja video podataka (*Video Data Mining*) je ne samo da se automatizovano otkrije sadržina i

struktura videa, karakteristike pokretnih objekata i njihova prostorna i vremenska korelacija, već se otkrivaju paterni u aktivnostima objekata i snimljeni događaji, uz veoma malo znanja o samoj sadržini videa. Audio zapis igra značajnu ulogu u detekciji i prepoznavanju događaja u videu. Rudarenje audio podataka se može koristiti za automatizovano razlikovanje više govornika, analizu izgovorenog teksta, detekciju emocija, i sl. Potencijalne aplikacije rudarenja videa uključuju anotaciju, pretraživanje, rudarenje saobraćajnih informacija, detekciju događaja ili anomalija iz videa snimljenih nadzornim kamerama, analizu i uočavanje paterna i trendova. U poređenju sa rudarenjem drugih tipova podataka, rudarenje video podataka je tek u povoju.

### *Analiza strukture web-a*

Milioni *online* korisnika *web*-a, sa različitim namerama i pobudama, kontinualno kreiraju hiperlinkovima povezanu sadržinu *web*-a. Zbog toga je struktura *web*-a kompleksna i nemoguće ju je planirati ili uticati na njenu evoluciju. Rudarenje strukture *web*-a je proces saznavanja informacija iz organizacione strukture *web* stranica, koja se sastoji od *hyperlink*ova koji povezuju određene stranice formatirane u HTML jeziku. Grubo posmatrano, zadatak je otkriti one stranice koje su relevantne za postavljeni upit, pri čemu je ocena kvaliteta pretrage predmet subjektivnog rasuđivanja ljudi, usled inherentnog ličnosnog aspekta kriterijuma relevantnosti.

Korisnici *web*-a mogu postaviti specifične upite, za koje postoji mali broj dokumenata koji sadrže odgovor na navedeni upit. U ovakvim slučajevima, teško je identifikovati malobrojne relevantne dokumente koji sadrže zahtevanu informaciju u mnoštvu *web* dokumenata. Ovaj fenomen je poznat kao problem retkog pojavljivanja (*Scarcity Problem*). Nasuprot ovog scenarija, korisnici *web*-a mogu postaviti upit čija tema je opšta ili široka, te se može naći na hiljade relevantnih *web* stranica koje sadrže traženu informaciju i odgovaraju na zadati upit. Ovaj problem je poznat kao problem preobimnosti (*Abundance Problem*). U ovom scenaruju je potrebno pronaći manji podskup najznačajnijih, najvažnijih dokumenata, odnosno, filtrirati iz velike rezultujuće kolekcije

tzv. autoritativne dokumente. Budući da nisu uvek najautoritativnije stranice na kojima se neki pojam učestalo pojavljuje, već to mogu biti stranice na kojima se pojam ne mora ni pojaviti (Honda, kao vodeći proizvođač automobila na svom sajtu ne pominje termin „proizvođač automobila“), jasno je da tekst-bazirani pristupi nisu adekvatni za rangiranje stranica po autoritetu, već se koriste pristupi koji se oslanjaju na hiperlinkove koji povezuju web stranice. Rezultati pokazuju da tekst, sadržan u dokumentu koji navodi neki drugi dokument kao referencu, često ima veću diskriminativnu i deskriptivnu vrednost nego tekst u originalnom dokumentu (Glover, Tsoutsouliklis, Lawrence, Pennock & Flake, 2002, 566).

### Rangiranje relevantnih stranica

Postoji više pristupa pronađenju relevantnih stranica u kontekstu *hyperlink*-ovske strukture web-a. Oni se oslanjaju na postupak rangiranja stranica, pri čemu se pod rangom podrazumeva pridružen numerički pokazatelj. Ovakvo posmatranje je previše pojednostavljeno, s obzirom na to da je broj ulaznih link-ova veliki kod popularnih stranica ([www.yahoo.com](http://www.yahoo.com)), pa bi se oni mogli smatrati relevantnim za sve upite.

Iako su link-ovi i sadržina i dalje među najznačajnijim parametrima za rangiranje web stranica, savremeni sistemi za rangiranje uključuju mnogo više pokazatelja, od kojih nijedan zasebno ne daje pravu sliku ranga, ali nastoji da najznačajnije stranice istakne i njihov sadržaj učini vidljivijim. Google u svom pretraživaču koristi preko 200 faktora za određivanje ranga stranice, ali njihova specifikacija potпадa pod poslovnu tajnu (Search Engine Land, 2017).

### Rudarenje upotrebe web-a

Podaci koji su prikupljeni u log datotekama na web serverima imaju određeni stepen analogije sa podacima iz transakcionih baza podataka o kupovinama. Svaka zahtevana web stranica može se smatrati analognom jednom artiklu u transakciji, dok se skup svih stranica koje je određeni korisnik tražio tokom jedne posete web sajtu može smatrati analognim

jednoj transakciji, odnosno, skupu artikala koji su se našli u potrošačkoj korpi prilikom kupovine. Primer asocijativnog pravila o određenom web sajtu mogao bi da glasi: „Ako je korisnik zahtevaо web stranice A, B i C, postoji indikacija sa merom sigurnosti od 23% da će takođe zahtevati stranice D i E.“

Rudarenje (načina) upotrebe web-a je fokusirano na analizu podataka o posećenim web stranicama tokom korisničkih sesija i omogućava ekstrahovanje saznanja o ponašanju posetilaca web-a. Interesantne zakonomernosti, ili sheme ponašanja, kojih ranije nismo bili svesni, donose potencijalnu korist kako vlasnicima sajta, tako i posetiocima. Poteškoća sa kojom se susreću analitičari podataka prikupljenih u log datotekama na web serverima, je tendencija generisanja prevelikog broja rezultujućih pravila, među kojima je, čak i upotrebo mera interesantnosti, teško odabratи ona pravila koja daju informacije korisne u datom domenu primene. Nadalje, obe metode prikupljanja podataka o upotrebi web-a (iz log fajlova i tagovanjem), mogu se koristiti za izveštavanje o saobraćaju na web stranicama. Za koji pristup će se preduzeće opredeliti, zavisi i od razlike u ceni analize ako se ona obavlja „u kući“ ili angažovanjem spoljnjih saradnika.

## MOGUĆNOSTI PRIMENE RUDARENJA WEB-A

Najširu primenu analize sadržaja web-a nalazimo u društvenim i humanističkim domenima, jer su u sadržaju utkani svi socijalni procesi značajni za korisnike web-a - kroz upotrebu simbola, preko poruka koje se prenose, kroz uključene slike ili fenomen organizovanja. I. Kim i J. Kuljis (2010), opisali su specifičnu upotrebu analize sadržaja web dokumenata u ispitivanju kulturološkog uticaja na dizajn i upotrebu blog-ova. S obzirom na to da korisnici samostalno kreiraju i održavaju blog-ove, pretpostavka koja je ispitana je da blogovi oslikavaju sistem vrednosti i preferencije autora, koji su rezultat kulturološkog nasleđa. Rezultati istraživanja u Južnoj Koreji i Velikoj Britaniji su opovrgli pretpostavku i pokazali da blog-eri iz zemalja koje tradicionalno

imaju nizak stepen tolerantnosti na rizik i nesigurnost (kao što je Južna Koreja), manje verovatno otkrivaju personalne informacije o zaposlenju, nego *blog*-eri iz zemalja koje su tradicionalno tolerantne na rizik i neizvesnost (kao što je Velika Britanija), ali da zato čeće daju informacije o godinama i *link* za kontakte.

Struktura *web link*-ova može ukazivati na sličnost među povezanim *web* stranicama. Stoga, ukoliko smo pronašli stranicu *p*, koju smatramo relevantnom za neku određenu temu, odnosno, dovoljno autoritativnom za datu temu, uvidom u *link*-ove koji okružuju stranicu *p* možemo dobiti odgovor na pitanje koje druge teme su po mišljenju korisnika koji su kreirali stranice i *link*-ove na *webu*, povezane sa polaznom temom. Ako je stranica *p* visoko referentna, postojaće enormno velik broj nezavisnih mišljenja o povezanosti stranice *p* sa drugim stranicama, ali ako iskoristimo notacije autoriteta i *hub*-ova, dovoljno je da pronađemo najbliže (lokalne) autoritete oko *p*. Lokalni autoriteti su neka vrsta sažetka opštih tema koje su u vezi sa temom stranice *p*. Na osnovu uvida u *hyperlink* strukturu *web-a*, možemo kategorisati *web* stranice ili steći uvid u hijerarhijsku ili mrežnu strukturu postojećih veza na *web* sajtu, u okviru određenog domena.

Po analogiji sa merom autoritativnosti *web* stranica, analiza strukture *web linkova* se može iskoristiti za merenje statusa, uticaja (*impact-a*) na društvenim mrežama. U tom smislu su razvijeni mehanizmi za merenje „značaja“ pojedinaca kroz citiranost njihovih radova, ili pak za merenje *impact* faktora časopisa u implicitno kreiranoj mreži naučnih radova koji su povezani citiranim referencama, a koje se koristi u bibliometrijskim evaluacijama. Najpoznatija mera autoritativnosti u ovom kontekstu je *impact* faktor časopisa (Garfield, 1972), koji se za posmatranu godinu izračunava kao prosečna vrednost broja citata naučnih radova objavljenih u tom časopisu u prethodne dve godine (Egghe & Rousseau, 1990). *Impact* faktor je, u osnovi, mehanizam rangiranja koji prilikom izračunavanja autoriteta uzima u obzir samo ulazne *link*-ove u mreži.

Podaci o upotrebi *web-a* ukazuju na interakciju korisnika i sajta, na osnovu koje se kreira korisnikov

model kao slika njegovog ponašanja, interesovanja i ličnih preferencija. Rudarenje upotrebe *web-a*, u osnovi, ima dve primene: analizu saobraćaja na *web* stranicama, i primenu u e-komercu. Analiza saobraćaja uključuje analizu podataka o navigacionoj putanji korisnika koju je sledio tokom svoje sesije. Beleži se i podaci o tome koliko puta je tokom pretraživanja učitao određene stranice. Analiza obično otkriva detalje o posetiocima, kao što je stil pretraživanja, preferencije, prosleđivanje proizvoda/usluga prijateljima, broj klikova na *link* i pogodaka na određenu stranicu, itd. Zahvaljujući otkrivanju asocijativnih pravila, ponašanje posetilaca se može predvideti upoređujući sheme pretraživanja sajta sa shemama pretrage koje su ekstrahovane rudarenjem *log* podataka drugih korisnika. Na osnovu prepoznatih sličnosti i uočenih zajedničkih interesovanja, sistemi za preporučivanje mogu sugerisati posetiocima najadekvatniju putanju do preferiranih sajtova, ili pak uobičajenu putanju do određene elektronske kupovine i personalizovati *web* sadržaj (Siddiqui & Aljahdali, 2013, 42).

Velike kompanije širom sveta su odavno shvatile da e-komerč nije puka prodaja i kupovina putem interneta, već mogućnost povećanja efikasnosti u konkurenčkoj borbi na tržištu, iskorištavanjem znanja skrivenih u velikim količinama podataka raspoloživih *online*. Integracija tehnika rudarenja *web-a* sa e-komerč aplikacijama omogućava vlasnicima e-prodavnica da poboljšaju svoje performanse i usluge, te prikupe informacije o korisnicima i ponašanju korisnika koji pristupaju proizvodima ili uslugama putem *web* sajta. E-komerč sajтовi generišu podatke koji nose informaciju o razlozima, dinamici i načinima navigacije kroz *web* sajtove, te njihova analiza može ukazati na bolji pristup željenim *web* sadržajima, poboljšati tok kupoprodajnih procesa i generisati novu vrednost za konzumente. U nameri da se udovolji potrebama posetilaca u što većoj meri, pogotovo komitentima i lojalnim konzumentima, tokom njihove posete se na *web-u* nude kustomizovane usluge. Pojedini sajтовi, na osnovu uočenih sličnosti u ponašanju posetilaca i predviđenih interesa posmatranog posetioca, pripremaju kustomizovane kataloge proizvoda (Shukla, Silakari & Chande, 2013, 8). Većina vodećih e-komerč preduzeća u svetu

(Yahoo!, Amazon, eBay, IBM, itd.), prilagodila je svoje *web* prezentacije i sisteme za preporučivanje za personalizovani pristup.

Rudarenje *web* podataka je značajno u e-komercu, za upravljanje odnosima sa komitentima (Li & Feng, 2010, 279). Naglasak je na privlačenju novih komitenata, zadržavanju postojećih, unakrsnoj prodaji proizvoda i odlivu potrošača. Profilisanje posetilaca omogućava preduzećima da predvide ko su njihovi potencijalni komitenti ili konzumenti proizvoda/usluga, i kakve sheme ponašanja mogu očekivati od njih. Rudarenje upotrebe *web-a* rezultuje analitičkim pregledom ponašanja posetilaca kada posete *web* stranicu preduzeća; uvidom u to koji deo populacije oni čine (u odnosu na njihove godine, pol, lokaciju, i druge karakteristike); kako su dospeli na *web* stranicu preduzeća; šta su najčešće posećivali (koji sadržaj je najinteresantniji za njih); ukupan učinak poseta; i dr. Rudarenje upotrebe *web-a* može biti bitno za marketinške aktivnosti, jer otkriva učestale navigacione puteve kroz *web* sajt preduzeća. „Svaki put kada posetilac sajta klikne na link, sliku, ili neki drugi objekat na stranici, ta infomacija biva zabeležena i zapamćena. Možete otkriti navike svakog pojedinca, ali je korisnije kada memorise na hiljade navigacionih putanja i saznate globalne navike i tendencije vaših korisnika“ (Jokar, Honarvar, Hamirzadeh & Esfandiari, 2016, 321). Agregirane informacije u formi sveukupne statistike poseta su korisne donosiocima odluka, jer su jasan indikator učestalosti posećivanja svake stranice, vremena provedenog na svakoj stranici, aktivnosti posetilaca na određenoj stranici, broja poseta spram broja komercijalnih aktivnosti naručivanja ili kupovine, popularnosti svih proizvoda ili usluga, raspoloživih izbora za konzumenta, itd. Informacija o posećenim stranicama i njihovom redosledu, takođe, govori i o najčešćem mestu napuštanja *web* sajta preduzeća, kao i o tome gde je najviše proizvoda dodato u potrošačku korpu ili uklonjeno iz nje. Analizom sekvence klikova se može utvrditi efikasnost sajta. Za to je potrebno kvantifikovati ponašanje posetilaca tokom sesije, odnosno evidentirati sve prodajne transakcije tokom posete. Asocijativna pravila o upotrebi *web-a* mogu potpomoći bolju organizaciju sadržine, ili dati preporuke za efektivnu unakrsnu prodaju (Liu, 2007).

Sekvenca klikova može ukazati na najbolje mesto za postavljanje oglasa, ukoliko znamo sa kojih stranica su posetioci došli na posmatrani sajt, a može pokazati da li je *online* marketinška kampanja uspešna ili ne (postoji li veza sa kupovinama preko *web-a*). Podaci o navigaciji kroz *web* stranice mogu ukazati na (ne) adekvatnost *online* obrazaca, načina selekcije robe za virtuelnu korpu i načina plaćanja.

Osim e-komerčnih sajtova, postoje i sajtovi koji nisu namenjeni prodaji, već služe kao katalozi proizvoda, dok se transakcije obavljaju *offline*. Praćenje *clickstream* podataka na ovim sajtovima pruža napredne informacije o potražnji, značajne za snabdevanje, planiranje zaliha i proizvodnju (Huang & Mieghem, 2014, 334). Autori ističu da preduzeća koja koriste podatke o posetama i klikovima mogu smanjiti troškove skladištenja i naručivanja za 3-5%.

Prednosti rudarenja upotrebe *web-a* se koriste i za poboljšanje performansi *web* servera i njihovih aplikacija, kroz različite strategije keširanja sadržaja i pred-pristupa (*Pre-Fetching*), kako bi se skratilo vreme odziva na postavljeni upit korisnika. Istovremeno vlasnici *web* stranica mogu poboljšati upotrebljivost *web* strana kroz bolji dizajn i implementaciju, npr. optimizovati sajt za pretragu po često korištenim ključnim rečima ili eliminisati posrednike preko kojih su posetioci došli na sajt.

## Primeri dobre prakse

AMSOIL Inc, prvi proizvođač sintetičkog maziva za vozila i mašine, sa preko četrdeset godina tradicije, opredelio se za *software-sko* rešenje Mozenda, za pretraživanje *web-a* kao podršku svom poslovanju. Mozenda Cloud-Hosted Web Harvesting Solution omogućava AMSOIL-u da ekstrahuje i organizuje nestrukturirane *web* podatke kako bi razvio i održavao resurse za planiranje (Mozenda, 2018). Tim za strateško planiranje u AMSOIL-u koristi podatke koje Mozenda prikuplja sa *web-a* za planiranje distributivne mreže u maloprodaji. Ovo, pre svega, podrazumeva mapiranje maloprodaja i servisnih lokacija, na kojima se obavlja zamena ulja za vozila i mehanizaciju, kako bi se identifikovale potencijalne lokacije za nove maloprodaje. Istraživanje konkurenčkih cena

je jedna od najčešćih primena opcije prikupljanja *web* podataka za svako preduzeće koje se bavi *online* prodajom. Alat Mozenda neprekidno prikuplja javno dostupne informacije sa e-komerc sajtova, kako bi se bolje razumelo tržište i pratile kategorije proizvoda i konkurentske cene naspram cena AMSOIL-a. Od e-komerc operacija, preko maloprodaje, do planiranja maloprodajne mreže, brzi pristup nestrukturiranim *web* podacima pomaže AMSOIL-u da neometano rešava različite strateške i taktičke zahteve i da se uspešno nosi sa većim brendovima, kao što su: Mobil, Pennzoil, Shell, Castrol i Valvoline.

Tesco.com je e-komerc ogrank Tesco PLC-a, britanskog trgovca prehrabnim proizvodima i robom široke potrošnje, koji posluje u Velikoj Britaniji, Evropi, Aziji i Severnoj Americi. Predstavljen 2000, Tesco.com trguje prehrabnim proizvodima, robom široke potrošnje, odećom, bankarskim i osiguravajućim uslugama. Tesco programeri i analitičari podataka, radi boljeg razumevanja koje proizvode i koje *web* stranice korisnici koriste i koji su navigacioni putevi rezultovali najvećim brojem konverzija, uveli su *software*-ski paket Splunk Enterprise, koji je preduzeću omogućio da na osnovu novih uvida u *online* podatke poboljša zadovoljstvo komitenata; smanji potencijalne gubitke prihoda; ubrza razvojni ciklus i poboljša saradnju među timovima. Splunk digital intelligence solutions (Splunk, 2013), prevazilazi klasičnu marketing analitiku i pruža celokupan uvid u korisnikovu interakciju kroz različite digitalne kanale, uključujući *web*, mobilnu komunikaciju, društvene medije i *offline* interakciju. Splunk Enterprise rešenja se koriste zajedno sa drugim alatima za *web* analitiku, da bi se ekstrahovale informacije iz istorijskih i podataka u realnom vremenu, generisanih kako na klijentskoj, tako i serverskoj strani aplikacije.

Proizvođač nameštaja i artikala za opremanje enterijera, IKEA, sa preko 60 godina iskustva u maloprodajama, u preko 40 zemalja sveta, se, takođe, opredelila za inteligentnu analizu *web* podataka kako bi unapredila svoje poslovanje (Harapiak, 2013). Prevashodno, demografski i psihografski podaci o kupcima iskorišteni su za otkrivanje njihovih navika življenja i, konsekventno, za unapređenje

vizuelnog doživljaja doma kroz izložbene salone uređene kao realni životni prostor. Analizirajući podatke o ponašanju potrošača, IKEA je otkrila šablon kupovine koji su nazvali domino efektom: kupovina samo jednog komada nameštaja povlači za sobom određene druge kupovine, kako bi se on što bolje uklopio u postojeći prostor. Takođe, otkrili su da demografski podaci komitenata, pored podataka o izvršenim transakcijama, nisu dovoljni za analizu njihovih potrošačkih navika, jer ne nose informaciju o njihovom sistemu vrednosti. Uključivanjem psihografskih podataka, otkrili su zanimljive šablone ponašanja. Jedan od njih se ticao usko specifičnih navika stanovnika Pittsburgha, za koje su posebno kreirali katalog u kojem su prevashodno isticali cenovnu prednost na koju su u ovoj regiji stanovnici bili posebno osetljivi, za razliku od drugih karakteristika nameštaja za koji nisu iskazivali senzibilitet (Dudovskiy, 2017). U IKEA-i ističu da oslanjanjem na klasične analize ovakvu specifičnost nikada ne bi uočili.

AstraZeneca Co. je britansko-švedsko multinacionalno farmaceutsko i biotehnološko preduzeće, sa sedištem u Londonu. Nakon implementacije *software*-a za rudarenje podataka, AstraZeneca je ostvarila značajno poboljšanje standarda za svoja medicinska istraživanja. Platforma za prikupljanje podataka iz najrazličitijih biomedicinskih izvora, Linked Life Data, je omogućila interaktivno otkrivanje uzročno-posledičnih veza biomedicinskih entiteta i objašnjenje uočenih kauzaliteta, što je doprinelo da se uključe/isključe određeni kriterijumi iz kliničkih ispitivanja (AstraZeneca, 2019). Alat Lexiquest Mine application, čiji vendor je SPSS, je potrebne informacije ekstrahovao iz nestrukturiranog tekstualnog sadržaja iz repozitorijuma koji svakodnevno primi na hiljade novih tekstualnih dokumenata (Thomas, 2002).

LIAT (*Leeward Islands Air Transport*) je avionska kompanija sa Kariba, koja opslužuje međuostrvski saobraćaj na 15 destinacija. Preduzeće je rudarenjem tekstualnih poruka putnika unapredilo korisnički servis. Izgrađeni su prediktivni klasifikacioni modeli u alatu RapidMiner, koji su preusmeravali poruke korisnika relevantnim odeljenjima (RapidMiner, 2019a). Na taj način je Odeljenje za odnose sa

korisnicima oslobođeno manuelnog prosleđivanja poruka, te su se mogli fokusirati na davanje kvalitetnih odgovora. LIAT tvrdi da je negativni sentiment korisnika na društvenim mrežama opao sa 90% na 40%. Ovaj rani uspeh je otvorio put primeni rudarenja podataka u drugim poslovnim operacijama.

Vodeći provajder mobilne telefonije u Austriji, Mobilkom Austria, prima više od 800.000 e-mail poruka svakog meseca, od kojih čak i nakon filtriranja *spam-a* (neželjena pošta) ostaje oko 80.000 korisničkih zahteva. Budući da u komunikaciji sa preduzećem korisnici očekuju brz odgovor, Mobilkom je započeo rudarenje sadržine ovih *e-mail-ova* u alatu RapidMiner - Data Science Platform. *E-mail-ovi* su automatizovano klasifikovani po temama i prosleđeni osoblju za podršku, koje je bilo kompetentno za datu temu (RapidMiner, 2019b). Na ovaj način je zagarantovan kvalitetan odgovor u najkraćem mogućem roku.

PayPal je najbrži i najbezbedniji *online* način plaćanja i primanja novca iz celog sveta. Sa 143 miliona aktivnih računa na 193 tržišta i 26 valuta, PayPal omogućava globalnu trgovinu, u kojoj dnevno obradi preko 8 miliona transakcija. Jedan od neprekidnih zadataka kompanije je upravljanje zadovoljstvom korisnika i smanjivanje njihovog odliva. U pozadini je saznanje o tome šta korisnike čini zadovoljnima i na koji način se njihov doživljaj proizvoda može poboljšati. Primenjujući analizu tekstualnih povratnih informacija od korisnika iz 60 zemalja sveta, uspeli su da identifikuju „top promotere“ i „top ogovarače“ preduzeća (RapidMiner, 2019c).

Sve više provajdera *software-skih* alata (Featured Customers, 2019), bilo da su ti alati u celosti posvećeni rudarenju podataka ili pak imaju zasebne platforme ili module za inteligentne analize, izveštavaju na svojim *web* stranicama o pozitivnim iskustvima i najrazličitijim primerima dobre prakse u rudarenju *web-a*.

## ZAKLJUČAK

Inkorporacija dostignuća veštačke inteligencije u svim domenima poslovanja, smatra se danas jednim

od ključnih strateških opredeljenja, koje zahteva ne samo veliki stepen inovativnosti, već i transformaciju poslovanja. Zbog kompleksnosti novih tehnologija i promena koje one zahtevaju, svi koji žele ostati konkurentni u budućnosti, moraju započeti sa zaokretom ka novim tehnologijama i eksploracijom njihovih mogućnosti već sada. Imajući ovo na umu, u radu su prikazani mnogostruki aspekti, zadaci i mogućnosti rudarenja *web* podataka, jer njihova adekvatna primena omogućava preduzećima ekstrakciju vrednih informacija i znanja, koji inače ostaju skriveni u velikim kolekcijama podataka na *webu*, a njihovi potencijali neiskorišćeni. Na osnovu izrudarenih paterna, preduzeća mogu preduzimati određene korake ka unapređenju poslovanja, te je značajno da postoji celovit i sistematičan prikaz široke palete diversifikovanih metoda koji se u pojedinim pristupima rudarenju *web* podataka koriste. U radu su prikazani različiti aspekti rudarenja *web-a* i mapirani uz različite metodološke pristupe: uz rudarenje sadržaja *web-a* se vezuju metode klasterovanja, sistemi za pronalaženje informacija i kolaborativno filtriranje; rudarenje strukture *web-a* je povezano sa metodom rangiranja relevantnih stranica u kontekstu hiperlinkovske strukture *web-a*; uz rudarenje upotrebe *web-a* je vezan metod otkrivanja asocijativnih pravila.

Nadalje, dat je pregled specifičnih zadataka koje pojedini aspekti rudarenja *web-a* rešavaju i opisani su tipovi (saznanja koji se mogu derivirati). Na osnovu ovakvih informacija i saznanja, preduzeće može bolje planirati poslovne strategije i ostvariti bržu ekspanziju. Istaknute su mnogobrojne mogućnosti i prednosti koje rudarenje *web* podataka pruža u različitim sferama poslovanja u odnosu na druge analitičke pristupe: dublja analiza socijalnih i društvenih procesa, merenje statusa ili uticaja (dokumenata, pojedinaca i dr. entiteta), kategorisanje *web* stranica, uvid u hijerarhiju *web* strana, analiza *web* saobraćaja, otkrivanje učestalih navigacionih puteva kroz *web* sajt preduzeća, procena efikasnosti sajta i poboljšanje upotrebljivosti *web* strana, uvid u interakciju korisnika i sajta radi personalizacije *web* sajtova/kataloga proizvoda, preporučivanje proizvoda/usluga, profilisanje korisnika za bolje upravljanje odnosima sa komitetima, otkrivanje naprednih informacija o potražnji, značajnih za

snabdevanje, planiranje zaliha i proizvodnju, poboljšanje performansi *web* servera i njihovih aplikacija. Dosadašnja praksa je pokazala, a o tome svedoče i odabrani primeri dobre prakse navedeni u radu, da svaki aspekt upotrebe inteligentnih tehnika doprinosi poboljšanom poslovanju, a da se kvalitet postignutih rezultata značajno poboljšava kombinacijom više metoda (Zaiane, Li & Hayward, 2004). Sve ovo govori u prilog polaznoj pretpostavci da rudarenje podataka ima heterogenu primenu, koja donosi benefite u mnogim sferama poslovanja. Pa ipak, pojedine inteligentne tehnologije, uključujući i rudarenje *web-a*, još uvek su u ranoj fazi prihvatanja, čiju širu zastupljenost možemo očekivati tek kada više *software-skih* provajdera bude uključilo dostignuća mašinskog učenja u svoja rešenja, odnosno, kada se proširi ponuda specijalizovanih alata za ovu namenu. Do tada, rudarenje *web* podataka će predstavljati konkurenčku prednost i preduzeća koja su preduzelu aktivnosti oko njegove primene, ili već postižu određene rezultate, nerado dele svoja iskustva sa širim javnošću. Zbog toga se u referentnim izvorima može naći samo manji broj primera dobre prakse, i to pretežno iz domena e-komerca.

U oblasti veštacke inteligencije se neprekidno razvijaju različiti pristupi analizi podataka i proširuje paleta mogućih aplikacija. Na primer, Tableau i VoiceBase (Tableau-VoiceBase, 2019), su zajednički razvili alat za analizu izgovorenog teksta, koji omogućava da se zvučni zapisi kontakt centara zapisuju bez transkribovanja, vizualizuju i pruže uvid u nestrukturirane telefonske razgovore i bazu korsnika (Sevilla, 2019). Na ovaj način će službe marketinga, prodaje, proizvodnje i dr. moći poboljšati odlučivanje i preduzeti adekvatne akcije. Obzirom da rad daje presek trenutnog stanja u oblasti rudarenja *web* podataka, ovakve i slične inovativne aplikacije nisu njime obuhvaćene. Isto tako, nove klase podataka, generisane kroz mobilne aplikacije, društvene medije, senzore, mobilne uređaje, su segment na koji će se preduzeća sve više oslanjati u operativnom radu. Razumevanje upotrebe ovih mnogostrukih kanala i kreiranje analitičkih mogućnosti njihove obrade u cilju boljeg *online* i *offline* poslovanja su predmet budućih istraživanja.

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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

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