

Ekonomski horizonti



Ekonomski fakultet Univerziteta u Kragujevcu
ISSN 1450-863X

2018 20 (3)

Osemene, O. F. *Kumaza, A.*
Obradović, V. *Adeyele, J. S.* *Adinnu, P.*
Sakarya, Ş. *Zeren, F.* *Nikolić, J.*
Peko, M. *Komatina, N.* *Akkuş, H. T.*
Crnjac, M. *Banduka, N.*

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Časopis se referiše u bazama:

**EconLit, Cabell's Directories, EBSCO, DOAJ,
ProQuest - ABI/INFORM, Index Copernicus,
Ulrich's Web**

.....

Izdavanje Časopisa finansijski je podržalo **Ministarstvo prosvete, nauke i tehnološkog razvoja Republike Srbije**,
Rešenje broj: 451-03-237/2018-14/2.

ČASOPIS IZLAZI TRI PUTA GODIŠNJE - u aprilu, avgustu i decembru

ISSN 1450-863X

eISSN 2217-9232

UDC 33

COBISS.SR-ID 158022663

Ekonomski horizonti



Ekonomski fakultet
Univerziteta u Kragujevcu

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Septembar - Decembar 2018.

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UVODNIK

Sveska 3 Volumen 20 Godište 2018 sadrži četiri izvorna naučna i jedan pregledni članak, prikaz međunarodne naučne konferencije, Predmetni indeks članaka i Pregled autora i naslova svih priloga publikovanih u *Ekonomskim horizontima*, u 2018. Istovremeno, ukazujemo na to da je, u Sveskama 1, 2 i 3 Volumen 20 Godište 2018, publikovano šest naučnih članaka autora iz inostranstva (Nigerija, Kina, Turska, Hrvatska), što je 35,3% od ukupnog broja naučnih članaka objavljenih u Časopisu u 2018.

Pored nesporne činjenice da korporativne inovacije i primena tehnologija doprinose unapređenju poslovanja, *Alphonse Kumaza* istražuje poslovne inovacije u kontekstu društvene odgovornosti i odgovornosti kompanija za ugroženost životne sredine. Rezultati istraživanja pokazuju da poslovno inovativne tehnologije kompanija nisu orijentisane, u dovoljnoj meri, ka promovisanju društvene i ekološke odgovornosti, već da se isključivo opredeljenje njihovih poslovnih politika svodi na promociju, širenje, rast i profitabilnost. Kao jedan od razloga takvog ponašanja kompanija i njihovih slabih ekoloških performansi, autor vidi u tome što menadžment nema potrebno razumevanje za posledice poslovanja, koje se manifestuju u obliku eksternalija, zbog čega kompanije, uprkos kontinuiranom rastu svojih profita, nisu zainteresovane za rešavanje istih. Odsustvo ekološke odgovornosti kompanija manifestuje se u zanemarivanju razmatranja pitanja društvene i ekološke održivosti, što ima implikacije za zagađenje i degradaciju životne sredine.

Polazeći od stava da se organizacije u mnogim zemljama, usled lošeg korporativnog upravljanja,

suočavaju sa ozbiljnim krizama, *Olubunmi Florence Osemene, Joshua Solomon Adeyele i Pauline Adinnu* razmatraju na koji način vlasnička struktura i karakteristike odbora direktora depozitnih banaka u Nigeriji, koje se kotiraju na berzi, utiču na upravljanje zaradama. Analizom upravljanja zaradama u petogodišnjem periodu, 2011-2016, utvrđeno je da privatno, inostrano i akcionarsko učešće države kao i mandat direktora, imaju negativan uticaj na upravljanje zaradama, dok broj članova Odbora direktora, rodna struktura i veličina banke ne utiču značajno. Na osnovu navedenih saznanja, koautori zaključuju da vlasnička struktura bitno utiče na upravljanje zaradama, dok karakteristike Odbora direktora, izuzimajući mandate direktora, ne utiču značajno na politiku zarada. Shodno navedenim zaključcima, u radu se sugeriše da se održi prag 10-procentnog akcionarskog učešća države, a regulatornim i nadzornim agencijama se predlaže da, u cilju zaštite interesa akcionara, posvete adekvatnu pažnju i prate aktivnosti izvršnih direktora banaka.

Na osnovu sagledavanja pozicije Međunarodnog standarda finansijskog izveštavanja (MSFI) za male i srednje entitete, *Vladimir Obradović* testira hipotezu da je za entitete koji nemaju javnu odgovornost, a sastavljaju finansijske izveštaje opšte namene, prihvatljivija opcija primene Međunarodnog finansijskog standarda za male i srednje entitete, nego opcija primene punih MSFI. Prihvatljivost navedene opcije opredeljuje činjenica da ona olakšava finansijsko izveštavanje mnogim preduzećima koja su u ranijem periodu bila u obavezi da primenjuju pune MSFI. Međutim, na osnovu empirijskog istraživanja, koje je sprovedeno na uzorku od 175 preduzeća u Republici Srbiji, utvrđeno je da se menadžment preduzeća češće opredeljuje za primenu punih

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MSFI, a ne za njihovu jednostavniju verziju, što se objašnjava višegodišnjim iskustvom njihove primene. Da bi se računovođe opredelile za Međunarodni standard finansijskog izveštavanje za male i srednje entitete, kao pogodniju opciju, neophodna je i njihova edukacija, u čemu bitnu ulogu imaju profesionalne računovodstvene organizacije.

Shodno značaju robnog tržišta, kao najvećeg „nefinansijskog“ tržišta, *Şakir Sakarya, Feyyaz Zeren* i *Hilmi Tunahan Akkuş* sagledavaju implikacije cena roba za islamske berzanske indekse, imajući u vidu da se radi o finansijskom sistemu koji je zasnovan na načelu deljenja dobiti i gubitka, kao i da on podržava aktivnosti u realnom sektoru. U radu se istražuje kointegracija i uzročno-posledična veza robnih tržišta (zlata i brent nafte) i indeksa učešća-30 u Turskoj, u skladu sa islamskim kriterijumima. Relacije islamskih berzanskih indeksa i robnih tržišta su relevantne kako bi se utvrdilo da li investitori, koji se kotiraju na islamskoj berzi u Turskoj, a u cilju diversifikacije portfolija, da se opredeljuju da ulažu u zlato ili u naftu. Dokazivanjem postojanja kointegracije između Indeksa učešća-30 i robnih tržišta, ističe se da će investitor, ulaganjem u zlato ili naftu, obogatiti i proširiti svoj portfolio i, istovremeno, minimizirati rizik.

Polazeći od rezultata iz prakse, koji pokazuju da se primenom *software*-a, usled različitih grešaka do kojih dolazi tokom njihovog rada, mogu uzrokovati ozbiljne negativne posledice, *Marin Peko, Nikola Komatina, Nikola Banduka* i *Marina Crnjac* razvijaju integrisani

model, zasnovan na *Failure Mode and Effects Analysis* (FMEA) i višekriterijumskoj optimizaciji, čijom primenom se greška može na egzaktan način oceniti i rangirati. Predloženi model, koji je testiran na empirijskim podacima iz prakse, pruža mogućnost detekcije, kao i utvrđivanja učestalosti pojavljivanja grešaka, na bazi čega se definiše prioritet aktivnosti, koje je potrebno preduzeti kako bi se otklonile identifikovane greške. Primenom navedenog modela, greške na finalnom proizvodu bi se eliminisale, ili bi se smanjila mogućnost njihovog pojavljivanja, što je u interesu kako proizvođača, tako i krajnjeg kupca.

Ova Sveska Časopisa sadrži prikaz, *Jelene Nikolić*, V-te međunarodne naučne konferencije: *Contemporary Issues in Economics, Business and Management (EBM 2018)*, koja je, u organizaciji Ekonomskog fakulteta Univerziteta u Kragujevcu, održana 9 i 10. novembra 2018, na Ekonomskom fakultetu Univerziteta u Kragujevcu.

Prilika je da se u ime Uredništva Časopisa i u svoje ime zahvalim, pre svega, autorima priloga koji su objavljeni u ovoj Svesci Časopisa. Takođe, posebnu zahvalnost dugujemo recenzentima koji su, svojim konstruktivnim i kritičkim komentarima i sugestijama autorima podnetih priloga, doprineli podizanju nivoa kvaliteta publikovanih članaka.

Sveska 3 Godište 2018 sadrži sveobuhvatan Predmetni indeks naučnih članaka publikovanih u Časopisu, u 2018, kao i Pregled autora i naslova svih priloga objavljenih u *Ekonomskim horizontima*, u 2018.

Glavni i odgovorni urednik
Vlastimir Leković

Vlastimir Leković je redovni profesor na Ekonomskom fakultetu Univerziteta u Kragujevcu. Doktorirao je na Ekonomskom fakultetu Univerziteta u Kragujevcu, iz naučne oblasti opšta ekonomija i privredni razvoj. Izvodi nastavu iz nastavnih disciplina Komparativni ekonomski sistemi, Ekonomija javnog sektora, Institucionalna ekonomija, Politike tržišne regulative i Metodologije naučnog istraživanja, na osnovnim, master i doktorskim akademskim studijama. Ključne oblasti njegovog naučnoistraživačkog interesovanja su ekonomski sistem, ekonomska politika i institucionalna ekonomija.

Original scientific paper

UDC: 005.35:001.895:502

doi:10.5937/ekonhor1803197K

EXAMINING BUSINESS INNOVATION IN THE SOCIAL RESPONSIBILITY AND ENVIRONMENTAL ACCOUNTABILITY CONTEXTS: EMPIRICAL SYNTHESSES FROM GHANA

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Corporate innovation and technology application for the purpose of improving business profits are a permanent fixation in management. The study explores corporate innovation and its capability to ensure social accountability and environmental responsibility. Innovation is necessary for growth, the maintenance of the market share and for the continual expansion and exploration of business opportunities, yet difficult to secure sustainable communities. The results of an SPSS statistical analysis show that business innovative technology and new thinking capabilities are not so designed to promote environmental accountability and social welfare, but rather to enhance corporations' growth. The insufficient poor understanding of business management of the enterprise's externality contributes to corporations' poor environmental performance. This contribution, which might be the subject matter of possible future research, exposes corporations' inability to promote sustainable stakeholder communities and environmental responsibility, contrary to the perceptions that business innovation works for environmental sustainability.

Keywords: sustainability, corporate responsibility, innovation, corporate governance, pollution, externalities, Ghana

JEL Classification: M14, O31, Q56

INTRODUCTION

Innovation and sustainability are the key strategies that define the competitiveness of a modern

corporation. It suffices to note that sustainability is core to business innovation, knowledge, ideas for better technology deployment, efficient production methods and products, simultaneously ensuring environmental safety. In this way, corporations benefit from the increased market share, growth and profits (Bessant & Tidd, 2007) at different stages of development and organization, though it is difficult

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to experience high profits and large market share simultaneously; most often, an increased market share results from the price reduction, an increased research cost plus advertisement.

Over the last decades, the established frameworks have been developed for business and/or multinational enterprises (MNEs) to adopt and ensure sustainable production without compromising profits. These guiding frameworks, among other things, include the Industrial Product and Services Life-Cycle (Graedel, Allenby & Linhart, 1993), the Ecological Upgrading of the Environmental Reform - by using the market system (Spaargaren & Mol, 1992) and the Triple Bottom Line Structure of Reporting, influenced by social-economic ramifications (Elkington, 1997).

As business is known not to behave responsibly, these guiding principles that corporations pledge to comply with remain a Trojan horse, a white elephant, window dressing and, at best, a charade. Thus, the social change agenda, the sustainable community, and environmental wellbeing have remained peripheral to business, evidencing the catastrophic devastation and pollution of biological systems (Aid, 2004a; Visser, 2010).

Therefore, within the foregoing conceptualization, the paper is aimed at unearthing whether business innovation facilitates environmental sustainability and social accountability or it is not so. The specific objectives include a pursuit of discussion in order to determine the management's understanding of business externalities, the ramifications of an enterprise's operations for host communities and the environment, plus a proof that the self-regulation of corporate commitments is an inadequate strategy for the implementation of a stakeholder initiative and, therefore, should be formalized.

Meanwhile, skepticism abounds that the deployment of contemporary innovations in business production processes incentivizes unsustainable communities and environmental justice. The implications of entrepreneurial innovations for social responsibility also bring to the fore the dreaded complications of the management's scanty understanding the ramifications of innovative technologies for environmental stability, thus representing a gap in the field researched in

this study. Judging from this perspective, whether business innovations can promote and support social accountability and environmental responsibility is highly uncertain.

The uncertainty involving business innovation promoting sustainable environmental practices and the social accountability agenda has provoked the following hypotheses for scrutiny:

- H1 The management's insufficient and poor knowledge and understanding of business externalities lead to environmentally unfriendly production practices.
- H2 Inadequate commitments to corporate responsibility increase environmental degradation and pollution.

The paper argues that entrepreneurial innovation for corporate expansion and growth should take into account environmental accountability and the improvement of livelihoods. Thus, excessive corporate profiting and rent-seeking alone cannot influence a stakeholder support, nor are host communities ready to provide valuable social assets.

The paper uses interviews in order to collate the primary information, while the global online information system provides the secondary data source. An SPSS statistical package via the regression technique is used to analyze the data. In the main, the paper is divided into several sections. The first section is the Introduction, in which the overview, the reasons, the objectives, the gap, and the assumptions are subjected to discussion. The second section deals with the Theoretical Framework including social responsibility institutional theory, multi-national enterprises, the social responsibility construct, and sustainability. In the third section, the Method is elaborated, whereas the fourth, the fifth and the sixth sections are an explanation of the Empirical Results, Discussion and Conclusion, respectively.

In this paper, business is used interchangeably with MNEs and denotes the mother companies whose productive activities transcend national borders. Corporate responsibility is operationalized as those activities aimed at social accountability and environmental sustainability. Corporate governance

signifies business governance systems and the board's responsibility of oversight in managing organizational objectives, plus ensuring social and environmental accountability. The study is constrained by funds, which results in a limited data collation for analyses. Onsite interviews and survey data acquisition are, frankly, financially exhausting.

That innovation, including technology application, increases corporate value, wealth and expansion, but does little for social responsibility and environmental accountability, implies that managers lack understanding for the ramifications of business externalities, underscoring meagre stakeholder commitments. This goes to validate the proposition that corporate responsibility is inadequately compensated for by business disproportionate profits and rent-seeking. It, therefore, invigorates the call for the formalization of the current self-commitment strategy so as to ensure the certainty and security of CSR undertakings.

THEORETICAL FRAMEWORK

Institutional Theory of Social Responsibility

From institutional theory perspectives, corporate citizenship is a governance system which acknowledges stakeholder constituencies' vast interests. In this context, A. B. Carroll (1999) references corporate accountability as an obligatory task through legal compliance or a societal expectation; yet some scholarly articles highlight its benevolent character.

D. Vogel (2006) describes the strategies of the organizations which seek a conducive working atmosphere for their workers, advance communities' concerns and benefit business as constituting social responsibility. This view agrees with the agency theory and likens the explanation of business characteristics in management research (Garriga & Melé, 2004).

Unfortunately, the charity character of corporate responsibility even receives scholarly praiseworthiness in the prominent policy papers

of the leading business groups (Kinderman, 2012), including the Employment Green Paper (2001), which defines the construct as the voluntary commitment of an enterprise seeking stakeholder needs. Nonetheless, the theory seeks to place social responsibility clearly within a broader field of the state-influenced regulation which reduces a business-centered approach; the mechanism considered is, however, inconclusive (Orlitzky & Swanson, 2008).

The theory also frowns on the view that corporations embrace social responsibilities so as to increase their financial performance. This thinking, therefore, blurs the understanding of the construct and undermines the enterprise's motivation for engaging itself in providing social responsibility. Corporate responsibility is an activity which should be upheld to deemphasize the construct's long-standing view as business benevolence, making social undertakings and initiatives mythical for some unheedful corporations.

Furthermore, great differences exist globally amongst regions and countries in understanding the construct and, being mostly global north countries' concept before spreading wild to global south economies, corporate responsibility seeks to moderate business value and profit maximization proposition. To employ efficiency and profit maximization logic in explaining corporate entities' engagement in interventions in host communities does not carry weight because the evidence suggests that most Japanese and European enterprises do not embrace the concept; yet, they are successful and break even (Matten & Moon, 2008).

However, most enterprises rather become apprehensive about social accountabilities (Banerjee, 2000) and encourage unfair environmental practices (Jermier, Forbes, Benn & Orsato, 2006) due to the absence of a policy in supporting corporate commitments (Crouch, 2004). This development demonstrates the fact that enterprises represent entities important, rather than just self-centered and parochially profit-driven and rent-seeking agents in society. Although complying with social responsibilities promotes business financial performance (i.e. quantifying the social license

and legitimacy in monetary value), using this as the foundational rationality for understanding the construct is flawed.

The theory also views corporate bodies as a political creation with an initial "limited liability" to operate and pursue stakeholder's goals and values, gradually, however, taking over the economy (Roy, 1999), making corporate authority an issue of employment and social equality (Parkinson, 2003). Thus, corporate entities are seen penetrating cultures, prompting understandings and practices surrounding such enterprises as McDonalds', Starbucks (Ritzer & Jurgenson, 2010), and Disney in the sphere of consumption (Bryman, 1999) and the immediate gender consideration (Orenstein, 2011).

More so, the theory considers corporate enterprises as having linked political power via informal rules in order to establish legitimacy (North, 1990) while firmly placing social responsibility in the hands of management because it is important to corporations. This, therefore, confirms that the CSR constitutes a key business component for wealth creation, growth and development.

Meanwhile, the so-called capitalism variety dimensions and multi-stakeholder involvement are economic coordination issues, exhibiting themselves in different economic systems and Western and European countries' markets, whereas the institutional distinction is linked to different engagements (Aguilera, Williams, Conley & Rupp, 2006).

It is, however, surprising that organizational theorists spent a lot of time in theorizing the environmental impact on corporations or organizations, rather than the impact of business on environments. However, the time is now for organizational theorists to integrate such efforts and energies for the purpose of unearthing how business organizations also alter the natural environment while creating their own environments and other sectors, which receives little attention from corporate entities.

Some authors indicated that research in the management of the global operations of transnational

conglomerates had been adaptive (Westney & Zaheer, 2001; Geppert, Matten & Walgenbach, 2006). Thus, the interdisciplinary theory that explains business vis-à-vis society should be developed through institutional theory in order to have it better understood. Institutional theory, however, attempts to clarify this phenomenon from a two-pronged approach, namely institutional dynamics and institutional diversity.

Multinational Enterprises

Transnational or MNEs are becoming influential in international manufacturing due to the increased availability of finance movement. International business development and operations have, therefore, altered corporate operating environments by introducing serious ecological ramifications.

Transnational conglomerates are, therefore, firms which manufacture global merchandises, looking for an inexpensive location to increase their profits, and unceasingly revolutionizing through a search for strategic ideas, including technology, product innovation, and novel corporate approaches. Similarly, the ownership, management, the strategy, and the structure are MNEs' key features (Root, 1994) emphasizing the originalities of ownership and transnational enterprises, as in the Unilever and Shell conglomerates owned by the British and the Dutch, respectively. Furthermore, MNEs are to be managed by administrators and CEOs, who are the citizens of the enterprise's country of origin, which is a mandatory requirement.

Typically, the headquarters are staffed with the management who understand the enterprise's country's priorities and the business strategy to be adopted, which includes global profit maximization, plus strategies characteristic of affiliate countries. Most often, promising multinational enterprises utilize a mixed world-oriented strategy which on its part is adaptable to the conditions of the local market.

F. R. Root (1994), therefore, describes an MNE as the mother company of global dimensions, which produces from different countries via its several

divisions upon direct decisions made by its affiliate firms, implements international business strategies, marketing, provides finance and staffing. Moreover, most multinationals owe few obligations to the countries they are amalgamated with.

Business Innovation

Innovation is the knowledge of how to create value, involving the development and execution of new ideas so as to produce an entirely sophisticated, novel and improved products, processes and services (Hon, Bloom & Crant, 2014). Deductively, innovation involves comprehensive and general management programs, including new practices and responsibilities through a revolutionized change of mindsets and values contingent upon necessities for a broad, continuous and systematic transformation.

Developments in technology, coupled with the changing dynamics of know-hows, can springboard innovation and strategic business transformation to the levels that, therefore, might encourage huge profits. However, business willingness to deploy obsolete technologies, which are cheaper and increase profits, although at a huge cost to corporate operating environments and countries, where environmental standards are weak and, most frequently, nonexistent, can increase government surveillance in that transnational conglomerates are forced to declare essential details, including site plans and ramifications for operating environments.

Meanwhile, technology is presumed to transform and facilitate business operations, increase profits and reduce production cost; yet, obsolete technologies are still being deployed in countries. While incessant environmental catastrophes necessitate know-hows for the environmentally sound and friendly methods of production, old technologies continue to be used, partly due to the sheer ignorance of the consequences for the business itself and the very operating environments.

Notwithstanding the foregoing, multinational enterprises are required to be socially acceptable in order for them to undertake legitimate operations

and, therefore, they must embrace such practices and methods that encourage an efficient and effective technology use in order to ensure high returns on production factors and maintain the sustainability of their host environments. Thus, the business innovation recognized in technology must ensure a good and sound energy use for the purpose of achieving environmental safety and the sustainability of business operating environments. Typically, measures must include the introduction of the technologies that ensure cleaner and safer energy utilization. Intuitively, the enterprises that use the landmass involving clearing woodlots and forests are to be supportive of regenerative measures and contribute to providing the support initiatives that are environmentally friendly. Moreover, corporate managements are increasingly encouraged to instill environmentally responsible behavior in their workplaces, making the business innovation agenda meaningful to communities since innovation only transcends technology.

Proper environmental disclosures by and a proper reporting system of an MNE must reflect conditions and practices on the ground while exhibiting high value and responsibility obligations. They must also appropriately implement these values through the communication system in order to allow business human capital to be abreast of compliant injunctions. Audit disclosures, be they good or bad, are key to the continuous innovative practices of a business intended to influence the community understanding, acceptance and legitimacy.

Meanwhile, the international guidelines set forth are unheeded to since corporate ethics are nothing but what business perceives as its responsibility and, very often, depend on moral convictions. Perhaps the most tragic environmental disaster was the Union Carbide's accident in India in 1984, which caused more than 2,500 deaths and impairment to people (Zagury, Bernard, Leonard, Cheynier, Feldman, Sarin & Gallo, 1986). While water pollution occurs primarily due to the discharge of industrial hazardous wastes into local water bodies, thus rendering local rivers unusable, a reduction in the quality of the air due to contamination in industrial centers, which leads to increased respiratory and other diseases.

The foregoing accounts clearly demonstrate a lack of the management's understanding of business externalities since the deployment of old technologies increases the problems of security, safety, and the quality of life, which in turn negatively affects a business and its operating environments.

Corporate Responsibility Construct

Corporate citizenship is an evolving concept defying definitional theories. A body of studies indicate many definitions, without those emerging in methodological identification problems. However, Bowen's definition (1953), which emphasizes the effects of corporate operations on society and communities, for which plans should be afoot in order to remedy them, is important. This definition unquestionably provides us with the leads for the current definitions and establishes a harmony between corporate authority and business responsibility.

While conceptualizing that a company is formed just to amass wealth is one reason, and just as deep thinking reveals other obligations that must be fulfilled, communities in which business activities take place should benefit from the wealth created, the social obligations of the business, according to A. B. Carroll (1999), covers the socio-economic, legal-ethical plus discretionary motivations. Undoubtedly, this definition is widely cited in modern corporate responsibility discussions.

The view that the prosperity of a business hinges high on environmental sustainability is supportive of the argument that a business must embrace the corporate responsibility agenda in order to compensate stakeholder communities. Thus, the social responsibilities agenda recognizes the fact that a business classifies its participants and integrates their values, necessities and ambitions in the policies, strategies and everyday activities of the organization.

To delineate the boundaries of corporate citizenship, A. B. Carroll (1999) establishes a four-pronged CSR principle, which includes economic, legal, ethical and philanthropic obligations. Economic responsibilities relate to the productive capacity of a business with

respect to the creation of opportunities and ensuring optimal wages. To achieve these value creation objectives, other resources, including technology, are deployed. As the beneficiary of production proceeds, the business must fulfill its tax obligations for the purpose of developing the infrastructure of the country of its incorporation. Therefore, the economic responsibility of the business relates to delivering products and being profitable. Indeed, seven economic activities are delineated, which include satisfying customers by providing them with real-value commodities; earning profits for investors; creating new wealth; promoting social values (as their wages rise) through new jobs; defeating envy, treating people equitably and improving lives; promoting innovation; and avoiding the exploitation of the poor and underprivileged majority (Novak, 1996).

It is necessary that laws should be passed in order to regulate business behavior because corporations cannot be trusted for acting lawfully; hence the basis for legal responsibility. However, laws have a limited scope and only cover what is known and what is about to happen, since human actions determine the present circumstances of the law, and mere provision of a legal minimum for business conduct (which is reactive, instructing doing things) is inadequate.

Again, ethical responsibilities are people's moral rights exercised (Smith & Quelch, 1993) and inclusive of social norms, institutions, and decisions, either expected (positive) or prohibited (negative), in society, although not written laws (Carroll & Shabana, 2010). These injunctions, therefore, constitute business ethical obligations in stakeholder communities. Nowadays, society disregards productivity as moral justification for a business's generation of wealth, but as non-economic effects on society, which includes the employee and customer welfare system, stakeholders and business operating environments.

Discretionary obligations are the voluntary services that compensate people and societies because corporations operate in communities and their activities impact social values. Businesses are considered to be good citizens not by their economic

performances, but rather by their social contributions that lift the poor from poverty and squalor. The contract of engagement is changing, and a business must serve wide-ranging social needs (Chewning, Eby & Roels, 1990).

That corporate decision-making negatively affects communities and lives support an implied corporate/social contract - a position strongly conceived by theorists, which spells out the social expectations of a business and business decision-makers' specific responsibilities (Beuachamp & Bowie, 1983) because it has links with people's welfare and better living standards.

It further posits that social progress should weigh equal in balance with an enterprise's economic progress, and as social institutions, corporations must join hands and build structures amongst which are the family and the educational system to improve living conditions (Chewning *et al*, 1990). The modern corporate world is characterized by professional managers, whose decisions impact communities (Miller, 1993), while exploiting societal resources so as to enrich corporate industrial objectives.

A growing consensus, therefore, suggests that a business must assist in solving corporate externalities since an enterprise's taxes alone are insufficient (Jamal & Bowie, 1995) to ameliorate appalling environmental pollution. Indeed, a business possesses massive economic resources, including know-how and financial power (Lippke, 1996), to develop host communities if it so wishes.

Sustainability

Sustainability is variously defined by emphasizing preservation, thus entailing the satisfaction of the present needs of today's generation without compromising those of future generations (Visser, 2007) and long-term operation and envisioning a "more measured view" of resource consumption, simultaneously promoting growth (Hawkins, 2006). This implies a generation's capability to sustain and keep the balance between the present and future needs (Blowfield & Murray, 2008). Economist Robert

Repetto's "Natural Capitalism" observes that when nation states deplete their mineral wealth, extinct the existing tree population, fishes, and wildlife, and cause the erosion of the soil and pollute springs and wells for mankind's immediate gains, a business should endeavor to adopt the production methods that encourage the stability of its operating environments (Abuyuan, Hawken, Newkirk & Williams, 1999).

METHODS

The methodology is so designed to place the study in the scientific supposals and approaches reflecting the imperatives of research traditions. The field information and the secondary data obtained from the global online information system generated the overall dataset for the analysis. Indeed, the established (secondary) data provide the baseline for empirical data gathering, without which, however, empirical data collation is impossible.

Interviews were conducted with the representatives of the four mining transnational conglomerates (namely, Goldfields Ghana, Asanko Gold Ghana, Golden Star Resources, and African Mining Services) selected from the study's population. The interviewees include the corporate heads and their deputies, together with a host of the management officers manning the Security, Environment and Human Resource, and other portfolios. However, the investigation goes an extra mile to gather individual-level data from the community opinion leaders, the representatives of the institutions, as well as the non-governmental actors in mining exploration and development aimed at authenticating and cross-referencing the obtained company-level data.

The focused/semi-structured interview technique is deployed so as to gather field data for a thorough scrutiny, which encourages the investigation of interview details and processes. The onsite interviews also make the investigation investigate the studied objects. Macro-level information is obtained from the 30 management staffers of the mining transnational enterprises. Information on the impacts of mining

on the communities is vigorously elicited, pursued and recorded. This information aims to discover the enterprises' management's understanding of the prospecting ramifications for social life and the environment, the safeguards and/or strategies adopted to curb these challenges, and how innovative technologies (whether old or new) alter business operating environments and natural ecological biodiversity. Information on the community-support and future considerations are also pursued. The investigation used the prepared questions subsequently altered for the purpose of dynamism of and adequate responses by the respondents.

In order to validate and cross-examine the company-level data, the key fifty (50) participants were interviewed in the investigation. Although the individual-level information is merely aimed at cross-referencing the corporate data, it legitimizes the data collation process and empowers the investigation to identify misleading responses for the reconciliation purpose.

The research employs regression analysis in deriving the predictors and the unknown variables for the predictions of the study. The deployment of this technique, as an SPSS statistical package, stems from its measure for the cause and the effect within and among the variables. Meanwhile, as a statistical prediction tool used for the prediction of variables, given another when those variables are interrelated, it shows the mathematical average measurement of the relationships between the variables, and as such includes the measure which is the unknown variable predicted from the known. It reveals the estimates of the dependent variable from the independent ones, and also indicates the error involved in such approximations.

Moreover, regression identifies the correlation and the actual relationship that enables the estimation of the value which it is valid for. The dependent variable is chosen at random, whereas those fixed are the independent variables. In the regression calculation, one dependent measure is selected, but many independent variables are subjected to consideration. The research study indicates that the regression

analysis only provides the confidence levels to the investigation that the predictions are all right and correct, instead of proving the claim.

In the main, the information collected and obtained from the interviews and the survey data are triangulated in the data analysis for obtaining the results. The triangulation methodology is justified and credited for integrating methods (Denzin, 1970; Denzin, 1992). Indeed, this method becomes an excellent starting point for an empirical research study and receives a much authorial acknowledgement (Sayer, 2000; Danermark, Ekström, Jakobsen & Karlsson, 2002) hence its deployment for this study to incentivize the investigation into wide-ranging techniques and dissimilar phenomena.

EMPIRICAL RESULTS

The statistical experimental outcomes are intended to highlight the instruments and measures that are necessary for the authentication of the study's overarching aims and objectives, together with the assumptions in the other, for the purpose of synergizing the measurement findings. Indeed, the "Model Summary", which shows associations between the predictor and the outcome, indicates statistical significance, whereas the "Analysis of Variance" reports the regression equation and the variable inconsistency demonstrating the significance of the model significance and the predictive capability of the outcome variables. Supporting the aforementioned credibility, the p-values in the regression coefficients are statistically significant and, therefore, strengthen the predictors' predictive ability for unknown outcomes.

The R column (Table 1) represents the variable, where $r = 0.977^a$, demonstrating the strong relationships between the variables (the predictor and the outcome). In a similar fashion, the R^2 (0.955), which is statistically significant, determines the variance proportion of the outcome. It, therefore, means that the model predictor has the capability of predicting the outcomes. The overall standard error (0.30060)

shows an insignificant value, and makes the variables closer to the regression limit.

Table 1 Model Summary

Mode	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.977 ^a	.955	.952	.30060

a. Predictors: (Constant), The board’s diversity ensures an effective CG for the CSR, Decoupling the CSR from the Corporate Affairs Department attracts a better response from the management, A disregard for the CG rules negatively affects the CSR.

Source: Author

The analysis of variance (Table 2), also called ANOVA, describes the regression equation and the variability (inconsistency). The Source column includes regression, both residual and total, where the corresponding values (69.722 and 3.253) denote the variability of the response variance. Thus, ANOVA determines the model significance and the predictive capability of the outcome variables. The $p < .001$ is statistically significant and, therefore, makes the model outcome predictor a suitable measure, where $F(3, 36) = 257.20, p < .001$.

The R (Table 4) shows an association between the variables, where $r = 0.886^a$, and signifies the

predictor, and the reaction variables are comparable. Additionally, $R^2 (0.785)$ is the determinant of the variability of the variance, which is also statistically significant, meaning that the model can predict the research outcomes. Likewise, the entire standard error (0.21822) shows an insignificant value, which means the measures are nearer the regression domain.

Table 5 describes the computed equation and the variable inconsistency. The matrix consists of the Regression, Residual and Total, where the corresponding values (6.261 and 1.714) denote the unevenness of the response measure. Thus, ANOVA determines the model significance and the predictive capability of the outcome variables. The $p < .001$ indicates statistical significance and, therefore, makes the regression model a valid predictor of the outcome, where $F(3, 36) = 43.83, p < .001$.

DISCUSSION

This study examines the innovation of a business and its ramification with respect to its social accountability and environmental responsibility. It further discusses whether the innovation in and technological improvements of a business in the domain of the production practices and other management procedures lead to natural environment sustainability and stakeholder constituents. Evidence shows that corporate innovation is internalized for

Table 2 ANOVA^a (Analysis of Variance)

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	69.722	3	23.241	257.203	.000 ^b
Residual	3.253	36	.090		
Total	72.975	39			

a. Dependent Variable: The management have the insufficient knowledge of the business externalities and the impacts on the communities.

b. Predictors: (Constant), The board’s diversity ensures an effective CG for the CSR, Decoupling the CSR from the Corporate Affairs Department attracts a better response from the management, A disregard for the CG rules negatively affects the CSR.

Source: Author

the benefits of a business, not the external stakeholder constituencies, deflating and negating the paper's overarching objective that business innovation facilitates environmental sustainability and/or responsibility, and social accountability.

Contrary to the general perception that, through research and development (R&D), the know-how and innovation of a business advances the host communities' interest in involving itself in ecologically sound practices, an enterprise's innovation, alas, is found to be purposefully designed to seek the expansion, growth, and capital accumulation of such a business. The ensuing deliberations validate the suppositions alleged in the study.

Table 3 contains the p-value of each term and the statistical tests for the constructs and the coefficients. The p-value (.001, .001 and .002) of each term is

statistically significant, showing the predictor is prominent to be interpreted because the variations in the predictor are related to the changes in the response variables. That the selected variables are statistically significant, whereas the abundant evidence that the constructs are monotonically correlated and, therefore, validate the extrapolations of the research means that the results are assumptions-supportive. Additionally, the t-values (-22.756, 24.515, -3.368) indicate the variations of little significance relative to the constructs and are comparable and suitable for making predictions. Likewise, the standard errors (.135, .107 and .098) show the insignificant values that are indicative of the fact that the measures are closer to the regression limit, thereby supporting the research expectations.

Meanwhile, the single-unit change of the constant of the model (9.924) results in this measure (-3.082) of

Table 3 Regression Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	9.924	.724		13.711	.000
A disregard for the CG rules negatively affects the CSR	-3.082	.135	-.913	-22.756	.000
1 Decoupling CSR from Corporate Affairs Department attracts better management	2.629	.107	.968	24.515	.000
The board's diversity ensures an effective CG for the CSR	-.329	.098	-.121	-3.368	.002

a. Dependent Variable: The management have the insufficient knowledge of the business externalities and the impacts on the communities.

Source: Author

Table 4 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.886 ^a	.785	.767	.21822

a. Predictors: (Constant), A disregard for the CG rules negatively affects the CSR, A weak corporate board disincentivizes the CSR, Decoupling CSR from the Corporate Affairs Department attracts better management.

Source: Author

Table 5 ANOVA^a (Analysis of Variance)

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	6.261	3	2.087	43.825	.000 ^b
1 Residual	1.714	36	.048		
Total	7.975	39			

a. Dependent Variable: The CSR is an inadequate compensation for corporate profiting and rent-seeking.

b. Predictors: (Constant), A disregard for the CG rules negatively affects the CSR, A weak corporate board disincentivizes the CSR, Decoupling the CSR from the Corporate Affairs Department attracts better management.

Source: Author

change in “A disregard for the CG rules negatively affects the CSR”. Likewise, the single-unit change of the constant of the model (9.924) leads to a change in the measures (2.629 and -.329) and confirms the “Decoupling the CSR from the Corporate Affairs Department attracts better management” and “The board’s diversity ensures an effective CG for the CSR”, respectively.

The ordinary interpretation of the statistical results shows that little is done about business externalities and their ramification for the stakeholder communities and the environment because the management possess the knowledge and understanding that are scanty, which corroborates the proof that the self-regulation of corporate commitments is an inadequate strategy for the implementation of the stakeholder initiative and, therefore, should be formalized.

A conclusion is, therefore, drawn that the leadership of business management, including transnational ones, hardly understand the practical implications of corporate activities for sustainability. Intuitively, pollution is an after-effect observable in the illness of humans, a loss of the fauna and flora, and a reduction in the quality of the aquatic resource, which regrettably are noticeable only to the human eye. Thus, with an adequate knowledge and understanding, concrete steps will be taken in order to reduce the causative factors and also lessen the impacts. No doubt, transnational enterprises externalize the production cost, resulting in horrific and catastrophic environmental ramifications, poverty, and health problems (Aid, 2004b; Armstrong, 2005; Visser, 2010).

Again, the result also demonstrates a huge piece of evidence showing that the current self-regulation of corporate commitments and undertakings is informal, ad hoc, and unsystematic, and that it delivers scanty outcomes, validating the proposition for formalizing the strategy to incentivize appropriate and compensatory outcomes.

In a nutshell, the paper demonstrates that the corporate management has the insufficient knowledge of the deleterious activities of the business and their impacts on the sustainability of the communities, as a disservice to corporations, themselves, and the stakeholder communities, since the cost of externalities affects both the business and its operating environments alike.

Similarly to Table 5, Table 6 shows the regression results including the p-values and the coefficients. The statistically significant p-value (< 0.05) demonstrates that the predictor has to be taken into consideration and reported since changes in the predictors’ variables affect the response variables.

Therefore, the three coefficients (.429, .429 and .571) indicate statistical significance (.001 × 3), meaning the constructs are monotonically related. Moreover, the t-values (3.674, 4.409, 5.060) indicate the difference of small significance in the variables of the model, suggesting that the constructs share a high degree of association. Furthermore, the standard errors (.117, .097 and .113), which are the average distance from the regression line, show insignificant measures, indicating the measures are closely related.

Table 6 Regression Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-.857	.505		-1.697	.098
A weak corporate board disincentivizes the CSR	.429	.117	.365	3.674	.001
1 Decoupling the CSR from the Corporate Affairs Department attracts better management	.429	.097	.478	4.409	.000
Disregard for CG rules negatively affects CSR	.571	.113	.512	5.060	.000

a. Dependent Variable: The CSR is an inadequate compensation for corporate profiting and rent-seeking.

Source: Author

More importantly, the value of the constant (-.857) implies that the model takes the mathematical value of -0.857 given to the independent predators. Therefore, the unit change in the constant (-.857) results in this measure (.429) of change in "A weak corporate board disincentivizes the CSR". Furthermore, a unit change of the model's constant (-.857) changes the measures (.429 and .571) and confirms the validity of the "Decoupling the CSR from the Corporate Affairs Department attracts better management" and "The board's diversity ensures an effective CG for the CSR", respectively.

The foregoing means that, on the pretext of corporate commitments, which are woefully scanty (Frynas, 2005) owing to the absence of the policy on the regulation and implementation of initiatives, corporate taxes and royalties are insignificantly negligible for any development of the infrastructure that make the communities in which a business operates worse off. Additionally, certain transnational conglomerates do not even pay taxes at all (Akabzaa, 2009), either due to weak or due to non-existent policies and regulations (Auty, 1998). This, therefore, supports the consensus that the discussion on the management of the resource wealth has shifted from the needed, careful and measured industrial policy to the propositions for independent institutions and investment funds (Harberger, 1994; McMahon, 1997;

Auty & Gelb, 2001; Frezzolini, Teofoli, Cianchini, Barduagni, Ruffelli, Ferranti, Puddu & De Pita, 2002).

The above confirms the fact that the business does little to ensure its social accountability and environmental responsibility, though corporate profits continue to grow. The exploitation of the stakeholder resources for the purpose of making profits hardly serves the interest of the business since the increased financial performance might be perceived as less socially good, resulting in rising income in favor of the investor and the upper management (Barnett, 2007), and may motivate cynicism and violence from the local population.

The call for the formalization of self-regulation is for the purpose of ensuring the sincerity of the business, which otherwise will sanction the stereotypes for increased profits and business externalities. No wonder T. M. Devinney (2009) argues that environmental sustainability and corporate accountability to its stakeholder constituencies have been carelessly managed.

CONCLUSION

Business innovation and its effects on environmental sustainability and social accountability were

examined. We were determined to discover whether managers understand business negative implications for stakeholder communities and the environment or not, and whether the self-regulation of corporate commitments is a poor strategy for the execution of the stakeholder's initiative. Statistical evidence proves that, contrary to the generally held opinion, corporate innovation seeks to benefit the environments in which a business operates and support environmental accountability, and the gains are rather internalized so as to promote the expansion, growth, and profitability of an enterprise.

Since innovation, which provides new knowledge and thinking, is skewed towards the success of a business, there is little room for managers to be motivated for pursuing environmental sustainability and social accountability concerns because corporate learning is becoming innovation for the success of a business. In this view, the assumption that "The management's insufficient and poor knowledge of business externalities and insufficient understanding lead to environmentally unfriendly production practices" is validated, and the reason why social development, sustainability, and business ethics have remained peripheral, and why the standards having been adopted by the majority of companies, including the internationally recommended regimes and sets of initiatives and guidelines, have all failed to halt the destruction of the natural environment and host communities (Visser, 2010).

In another development, the unification of social responsibility and environmental accountability has received some modest treatment in the literature with a rather casual alignment. This is for the reason of the fact that corporations desire to adopt guidelines, ethics and standards, and also adhere to the aspirations of external stakeholder constituencies while transiting to the existing economic and political scene and practically accommodating and internalizing environmental externalities (Hertel, 2009) so as to increase the commitments of a business towards a conducive working atmosphere and the preservation of ecology via the acquisition of wealth (Mandelbaum, 2007), thereby rendering the considerations of social and environmental sustainability mutually exclusive.

The result establishes the fact that CSR initiatives have been scanty and disproportionately minor in comparison with corporate profits, thus confirming the assumptions.

The continuous viability of a business, including multinational enterprises on the global market, is reliant on innovation for the development of processes and methods, and the reformulation of the development of the product. Given that a business always does the right thing, the growing voice to maintain its operating communities and be environmentally accountable is needless and timewasting. For instance, environmental degradation and/or the complicated market inadequate measurements for corporate externalities continue to diminish social-ecological resources. However, the analysis reveals that business managers hardly understand corporate externalities and, therefore, do not plan their reduction. This means that business innovation in production processes, methods, and research and development is, at best, internalized for increased profits against environmental sustainability. Astonishingly, corporate innovation correlates with the social accountability and environmental sustainability agenda; yet, managers have an insufficient knowledge of and understanding for business externalities, for which reason the prospects of innovation have no relevance for host communities and the environment.

Indeed, deploying knowledge for the purpose of creating value for entirely sophisticated novel and improved products, processes and services also means that such undertakings should be socially and environmentally sustainable. The paper, unfortunately, wonders whether business innovation is an inversion of environmental pollution and degradation.

Again, the results encapsulating corporate responsibility cannot compensate for the wealth generated from stakeholder communities because social responsibility initiatives are poorly funded and implemented. In this regard, environmental responsibility suffers as commitments are scanty and underfunded, affecting environmental initiatives

and CSR interventions. In order to make the CSR compensate for business profits and rent-seeking, the ineffectual self-regulation strategy for social accountability and environmental responsibility should be supported through the stakeholder governance model for results.

Empirical data collation is expensive, especially when involving onsite interviews that require inexhaustible funds to conduct. Thus, the funds inadequacy together with human capital restricts and constrains large data for analysis. Managers' insufficient knowledge of and understanding for externalities leads to poor corporate commitments and poor environmental accountability and/or sustainability, which is novel in contemporary research and we hope it will be the focus of further academic scrutiny.

To conclude, the research regrets the comment made by a powerful individual on Earth that "environmental pollution and degradation are a hoax", which reflects a bigger picture of ignorance amongst the majority of the world's nearly 7 billion population; that is a reason why it is increasingly difficult to cure environmental malice and ensure the stability and ecological sustainability of stakeholder communities.

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Received on 3rd November 2018,
after revision,

accepted for publication on 12th December 2018

Published online on 28th December 2018

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ISPITIVANJE POSLOVNIH INOVACIJA U KONTEKSTU DRUŠTVENE I EKOLOŠKE ODGOVORNOSTI: EMPIRIJSKE SINTEZE IZ GANE

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Korporativne inovacije i primena tehnologija za poboljšanje poslovnih dobiti predstavljaju trajni fokus kojem gravitira menadžment. U ovoj studiji se istražuju inovacije i njihova sposobnost da obezbede društvenu i ekološku odgovornost. Inovacije su neophodne za rast, održavanje udela na tržištu i neprekidno širenje i istraživanje poslovnih prilika, što ipak i dalje predstavlja poteškoću u obezbeđivanju održivih zajednica. Statistički rezultati sprovedene SPSS analize pokazuju da poslovno inovativne tehnologije i nove sposobnosti razmišljanja nisu zamišljene tako da se njima promovišu ekološka odgovornost i društveno blagostanje, već da se korporacijama obezbedi veći rast. Slabo razumevanje eksternalija preduzeća od strane menadžmenta privrednog društva doprinosi slabim ekološkim performansama istog. Ovaj doprinos, koji je istovremeno i predmet potencijalnih budućih istraživanja, otkriva i nesposobnost korporacija da promovišu održive zajednice interesnih grupa i ekološku odgovornost, što je u suprotnosti sa percepcijama po kojima poslovne inovacije rade u korist ekološke održivosti.

Ključne reči: održivost, korporativna odgovornost, inovacije, korporativno upravljanje, zagađenje, eksternalije, Gana

JEL Classification: M14, O31, Q56

Original scientific paper

UDC: 005.958:336.71(669)
doi:10.5937/ekonhor18032150

THE IMPACT OF THE OWNERSHIP STRUCTURE AND BOARD CHARACTERISTICS ON EARNINGS MANAGEMENT IN NIGERIA'S LISTED DEPOSIT MONEY BANKS

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In many countries, there are a certain number of organizations going through severe crises due to a failure in corporate governance. In this study, the main aim is to determine how the ownership structure and the characteristics of the boards of Nigeria's listed deposit money banks (DMBs) affect aggressive earnings management for a period of 5 years (2011-2016). The panel least-square method was used to analyze the data collected. The findings revealed that private, foreign and government shareholdings have a negative and significant impact on aggressive earnings management. Also, directors' tenures status has a significant effect on aggressive earnings management, while the board size, the gender and the size of the firm have no such significant effect in the period observed. Based on these findings, the study concludes that the ownership structure has a significant impact on aggressive earnings management, whereas the characteristics of the board, excluding directors' tenures status, do not have any significant effect. Hence, the study recommends that the 10% threshold imposed by the CBN on the government shareholding should be maintained, while regulatory and supervisory agencies are advised to pay adequate attention and conduct the monitoring of the activities performed by the CEOs of the banks, especially upon expiry of the directors' tenure, so as to protect shareholders.

Keywords: corporate governance, ownership structure, earnings management, board characteristics

JEL Classification: G28, G32, G38

INTRODUCTION

The annual report is a medium through which an organization's financial and non-financial objectives

are disseminated to the public. Its content is specified in the underlying principles and standards guiding the accounting profession. An important content of the financial report is the earnings reported at the end of each operating period. Earnings, also known as the net income or the bottom line, are the amount remaining after operating expenses,

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taxes, dividends on preference stock and interest charges have been deducted. Consequently, based on the importance of earnings to every organization, their management becomes imperative. To manage earnings may be reasonable or legal for managerial decision-making and, at the same time, it could also be fraudulent, unethical and illegal. While reasonable and legal earnings management reporting intends to achieve sustainable and foreseeable financial results, fraudulent and illegal earnings management is geared towards reporting the results that do not reflect economic activities (Mckee, 2005; Osemene, Muritala & Olawale, 2014; Crumbley, Heitger & Smith, 2015). Aggressive earnings management can be either beneficial or harmful, depending on how it is conducted. Beneficial earnings management is that conducted within the ambit of the accounting standard, whereas the harmful is unethical and is beyond the context of the accounting standard.

It is imperative that ownership should be separated from control in an organization for checks and balances, so that the managers who do not own a small portion of stock in the firm are checked as there is a possibility for them to deviate from the objectives of the firm due to their selfish interest. The ownership structure differs from one organization to another as a result of differences in either the economy of scale, regulation or the environment stability, among other things. As reported by S. R. Kole (1995), the ownership structure of different sizes will differently impact earnings management. In Nigeria, the ownership structure can be in the private (family), managerial (insider or outsider), institutional, block, government and foreign forms. This study considers private, foreign and government shareholding as stated in the Nigerian Deposit Insurance Corporation (NDIC) reports leaving out institutional ownership and the other forms of the ownership structure because of the accessibility and authenticity of the data. Apart from the ownership structure, the characteristics of the board are suspected to have an influence on earnings. The characteristics of the board broadly grouped into the following categories: the board demography (the gender, the ethnicity, the years of age) and the board structure (the size, committees, independence, meetings, and the tenure) have their bearing in one

way or another on the earnings reported by the corporation (Fitriya & Stuart, 2012; Osemene, Abogun, Olaoti & Ahmed, 2017).

Over the years, a certain number of organizations throughout the world have collapsed or have otherwise experienced severe crises due to a failure in corporate governance. This could be so as a result of manipulations in the financial statements and a financial statement fraud. Some cases in point are the Enron scandal - USA, WorldCom - USA, Toshiba - Japan, Tesco - UK, Cadbury - Nigeria, and Afribank - Nigeria (Dibia & Onwuchekwa, 2014; Alzoubi, 2016; Saidu, Ibrahim & Muktar, 2017). The reasons for the manipulations cut across personal interests, tax evasion, stock prices, etc. Earnings are the one area where this manipulation is obvious.

As opined in the study by M. S. Yorke, M. Amidu and C. A. Boateng (2016), managers, who are also utility maximizers, will act in such ways so as to maximize their selfish interests. Their personal satisfaction will be their ultimate goal to the detriment of the shareholders. What characterizes the management board also influences how earnings are managed; how the board tenure, the gender diversity and the board size affect earnings is of a specific interest here. The Board of Directors performs the functions ranging from monitoring, recruitment, the disengagement of staff and the management, as well as the provision of resources, direction and the promulgation of strategic decisions (Fitriya & Stuart, 2012). Where the board characteristics are lopsided, the aforementioned functions will be shortchanged, especially the board's monitoring role.

The Nigerian deposit money banks (DMBs) have been characterized by restructuring. Since 2005, THE Central Bank of Nigeria has forced commercial banks to undergo a series of mergers, acquisitions and restructurings (in 2011, the Sterling bank acquired the Equatorial Trust bank, whereas the First City Monument bank acquired the First Inland bank in 2012; the Mainstreet bank was issued a license to operate in 2011, whereas by 2014, it was 100 per cent acquired by the Skye bank), thus reducing the total number of the banks to twenty four (NDIC, 2016).

As a sequel to the above reasons, the main aim of this study is to determine how aggressive earnings management is affected by the ownership structure and the characteristics of the board in Nigeria's DMBs. The specific objectives of the study are to determine the impact of private, foreign and government shareholdings on aggressive earnings management and investigate the impact of the Chief Executive Officers' (CEOs) tenure, the availability of female board members and directors, as well as the board size, on aggressive earnings management.

The formulated hypotheses in line with the specific objectives are as follows:

- H1 Private, foreign and government shareholdings have no significant impact on earnings management.
- H2 The CEOs' tenure, the availability of female board members and directors, as well as the board size, have no significant impact on aggressive earnings management.

Both formulated hypotheses were tested at the 0.05 level of significance.

A series of studies on aggressive earnings management, the ownership structure and the characteristics of the board have been conducted outside the Nigerian context. A vast majority of the studies have been dealing with the ownership structure, the characteristics of the board and the performance of firms, with the major emphasis on the board size, meetings and the composition. This study, however, has added the board's tenure to the other characteristics (the gender diversity and the board size) in Nigerian DMBs and its effect on the earnings generated by corporations. There are three types of the ownership structure in the banking business climes that were studied. In no small way does this study add to the literature on earnings management in Nigerian DMBs, especially not to how it is influenced by the ownership structure and the characteristics of the board.

The rest of this paper is organized into the four sections comprising the review of the literature with a

reference to the relevant studies addressing earnings management as the explanatory variable (Section 2). The third section describes the methodology, whereas the fourth discusses and presents the results obtained. The last segment of the paper (Section 5) provides the conclusions the study has come to and proffers the policy recommendations.

LITERATURE REVIEW

Due to the information asymmetry on the side of companies' shareholders, the CEOs of enterprises often declare the earnings resulting in a conflict of interest between CEOs and shareholders. A conflict of interest is associated with the agency cost, such as the management decisions that do not optimize a shareholders' interest (Kazemian & Sanusi, 2015). A probable agency problem occurs if managers can significantly influence earnings management in order to satisfy their own respective self-interests to the detriment of their shareholders (Shu, Yeh Chiu & Yang, 2015). Agency theory is a term coined by A. J. Berle and G. Means (1932) in order for them to explain the relationship that exists between the owners who are the principals in the contractual agreement with the agents who act on behalf of the owners. The theory suggests that monitoring mechanisms can improve the alignment of the management's and the shareholders' interests, and simultaneously mitigate any opportunistic behavior resulting from a conflict of interest (Kazemian & Sanusi, 2015). They focused on the agency conflict that ensues between professional managers and outside investors (Kim & Yi, 2006). Managers are hired and given a commensurate authority for the production purpose, basically reflecting in their being responsible for the shareholders' wealth maximization (Chen & Chu, 2005). It is the principal/agent relationship involving the delegation of the decision-making authority to the agent. Where this relationship is contrary to the principal/agent relationship i.e. both parties are utility maximizers there is every possibility for the agent not to act in the best interest of the principal. This is said to be opportunistic behavior, thus giving rise to a conflict of interest. As a result of the information

asymmetries existing between the principal and the agent, the principal may need to put up mechanisms in order to regain or reinforce trust and confidence. This gives rise to agency costs, which includes monitoring and compensation costs.

The Ownership Structure and Aggressive Earnings Management - The ownership structure is a proportion of the shares held by different parties in the equity (ordinary shares) of the company. These parties are known as the owners of the corporation, ranging from promoters, individual and institutional investors, private and public corporations and foreign owners. The ownership structure of DMBs in Nigeria is predominantly categorized into the three categories, namely: government, private (Nigerian) and foreign. These structures have been varying over the years due to certain restructuring in the banking sector (NDIC, 2016).

Aggressive earnings management is the term used to describe managers' intentional act to manipulate the reported net income by relying on specific accounting methods in order to make changes that favored their respective interests (Smith, Lapin & Naj, 1994; Jensen, 2004). This action thus affects companies' credibility, reputation and stock performance of. Aggressive earnings management also arises as a result of the use of the discretionary measures available under the generally accepted accounting principles (GAAP) that permit managers to generate or make the required accounting figures available for investors and stakeholders, while simultaneously hiding the actual facts (Yorke *et al*, 2016).

In Nigeria, the Companies and Allied Matters Act - CAMA (2004) specifies the membership of a company, its right and duties. Each category of owners has different economic motives, different consequent power as regards participation in strategic decision-making, thus affecting the performance of the organization. With divergent interests arising between managers (agents) and owners (principals), agency theory tries to solve the problem as it adversely affects the performance of a corporation through supervision, monitoring and controlling the owners' group, usually the board of directors.

The Characteristics of the Board and Aggressive Earnings Management - The board of directors has certain features that distinguish it from the owners and the management officers of the organization. These features are categorized into the board demography (the gender, the ethnicity, the years of age) and the board structure (the size, committees, independence, meetings, the tenure) (Fitriya & Stuart, 2012). The demography of the board explains the physiological and sociological attributes of the directors (both executive and non-executive), whereas the structure explains the composition, terms and operations of the board. The board tenure could have an impact on a corporation's earning. CEOs with a short-term or minor tenure report earnings more aggressively than those with a long-term tenure, except for the penultimate year prior to their leaving (Hu, Hao, Liu & Yao, 2015). In order to inject fresh ideas, the code of corporate governance for banks in Nigeria stipulates that directors may serve continuously for the maximum of three terms amounting to twelve years on the board (CBN, 2006)

The board is the major vehicle when conducting corporate governance in any organization is concerned. In the banking industry, the board constitutes the highest policy-making body, and what transpires at that level has a significant impact on their operations and activities. The board must ensure the credibility of the financial report they present to the public through ensuring that the procedures for maintaining the integrity of the financial statements and ensuring compliance with the stipulated laws and ethics (NDIC, 2016). Anything short of this could result in inadequate earnings management, especially where there is inadequate monitoring and supervision.

A Discretionary Loan Loss Provision and Aggressive Earnings Management - One of the components of banks' earnings subject to manipulation is the discretionary loan loss provision (Beatty, Bin & Petroni, 2002). As stated in the CBN's Prudential Guideline (2010), loan loss provisions are the expense items listed on the income statement reflecting the management's current period assessment of the level of future loan losses. The provisions are general

and specific in nature. General provisions are made because even a performing loan harbors a certain inherent risk of becoming bad, whereas specific provisions must be put in place based on the perceived risk of default or failure to pay as and when due. The timing for increasing and the amount of an increase in loan loss provisions are at the discretion of managers because they are expected to have all and firsthand information about their customers (debtors). Even more so, interest income or expense, service revenues or operating costs are non-discretionary, and as such cannot be easily twisted. On this note, managers use such timing to manage their earnings. This special feature has no doubt made it a natural choice of bank managers' discretion regarding earnings since investors and bank regulators would hardly be able to pin down the managers on the decisions made on such loan loss provisions.

Several studies have been carried out on earnings management practice and activities in corporations, the ownership structure and the characteristics of the board. For instance, O. R. Uwuigbe and A. S. Fakile (2012) studied the effects of the board size on the financial performance of the listed banks in Nigeria. The board size and returns on equity were used as the explanatory and the explained variables, respectively. They noted that the banks with the board size of fewer than 13 members appeared to be more viable than those exceeding the number of 13 members. Furthermore, the banks having the boards consisting of a large number of members recorded lower profits when compared with those with a smaller number of members. Thus, the board size of between 6 and 8 members was recommended for the better financial performance of banks in Nigeria, as they opined it would reduce the problem of free-rider directors and enhance effective monitoring and decision-making. In their study, however, S. M. Chtourou, J. Bedard and L. Courteau (2001) used two sets of US firms. The one set had the relatively high and the other had the relatively low levels of discretionary accruals in 1996. They were of the view that earnings management was significantly associated with certain corporate governance practices (the audit committee and the board of directors). They pointed out the fact that less income increasing income smoothening occurs in

the organizations whose outside board members had an experience as the board members with the firm and with other firms, whereas the larger board size seemed to be reducing earnings management.

In their study of corporate governance, the characteristics of the board and the performance of a firm, D. Pradeep, G. Pamarathne and H. Siriya (2014) (Sri Lanka) used Tobin's Q as the proxy for measuring the performance of the firm. It was revealed that the CEO duality, the board composition, interlocking directorates and the gender diversity had a negative influence on the performance of the firm, but adjudged that a small board size and independence influenced the performance of the firm. The study, therefore, concludes that the separation of the management from ownership might not encourage a better performance of the firm, as agency theory suggests, but their unification might enhance the performance of the board. This agreed with the prior study carried out by A. S. Omoeye and P. O. Eriki (2014), but was contrary to J. U. Madugba and A. K. Ogbonnaya's (2017) study of corporate governance and earnings management in Nigerian deposit money banks, which revealed that corporate governance mechanisms positively influenced the financial performance of the banks.

E. S. Alzoubi (2016) conducted a study in Jordan which spanned a period of eight years, namely from 2006 to 2013, on the samples of listed companies. Jordan is characterized by a high concentration of the ownership on the family-investor basis. The findings revealed that a greater family ownership presented a lower level of discretionary accruals. The study concluded that the proportion of insider managerial ownership, institutional ownership, external block holders, family and foreign ownerships could reduce earnings management. His results agreed with the prior studies by V. Ratnawati, M. A. Hamid and O. M. J. Popoola (2016), and N. Teshima and A. Shuto (2008).

O. R. Uwuigbe, T. O. Fagbemi and U. F. Anusiem (2012) carried out a study of the effects of the audit committee and the ownership structure on income smoothening in Nigeria. They used ordinary least square regression and revealed that the banks with

a higher proportion of non-executive directors on the committee tended to have a positive influence on their banks. They also posited that as the directors' percentage of ownership increased, the ownership structure of the firm changed from the one being manager-controlled to the other being manager-owner controlled. Therefore, as managerial ownership increases, there is a corresponding increase in the managers' discretionary ability to modify the revenue generating process through the use of an accounting choice.

The findings of the study by H. Saidu, O. Ibrahim and J. O. Muktar (2017) of the five sampled banks in Nigeria in the period 2011-2015 revealed that earnings management was in place in the DMBs in the country. The study measured a loan loss provision as the proxy for earnings management, the size of the firm and the years of age of the firm on return on assets (ROA), which was the proxy for the performance measurement. It was established that there was a negative association between earnings management and ROA, which suggests that banks decrease ROA in order to smooth earnings.

A study of the effect of creative accounting on the Nigerian banking industry, carried out by N. B. Ijeoma (2014), focusing on the reasons for creative accounting in the industry, found that creative accounting had a major effect on banks' distress in Nigeria. Furthermore, the author added that the major reason for earnings management practice is to inflate the cost in order to reduce the tax exposure and maintain or boost the share price.

In India, a study conducted by J. K. P. Kumari (2017) presented an analysis supportive of the substantial income-increasing earnings management practices in commercial banks. The study reiterated that the corporate governance practices (such as the characteristics of the board, audit practices and a performance-based remuneration) basically worked as the restricting variables for the earnings management practices. Their findings were in tandem with those of A. L. Beatty *et al* (2002), and O. Ugbede, M. Lizam and A. Kaseri (2013).

The findings of the study of the 500 large companies in India using data for 2003 and 2004 carried out by J. Sarkar, S. Sarkar and K. Sen (2008) suggested that responsible boards were associated with a low level of earnings management, whereas the directors of the boards with several designations demonstrated a high level of earnings management. With respect to inside directors, their results indicated that the chief executive officer (CEO) duality and the presence of controlling shareholders on the board increased earnings management. The study also found that the domestic institutional owners act was the compensating control mechanism for checking the damaging effects of controlling shareholders on earnings management.

M. A. Ratab, A. A. Zakaria and A. Thankom (2017) studied the effect of CEOs' characteristics on earnings management in Jordan by applying the random effect model to the 201 companies listed on the Asian Stock Exchange (ASE). The study established the fact that there was no relationship between the gender and the earnings management practices; the years of age and the earnings management practices, although overconfidence was positively significant with earnings management as the managers' physiological and sociological characteristics might affect their decision-making. This view is supported in the studies by C. M. Schrand and S. L. Zechman (2012), and G. V. Krishnan and L. M. Parsons (2008).

The relationship between creative accounting and a managerial decision in the seven selected financial institutions in Nigeria in the time period from 2006 to 2011, as studied by O. F. Osemene, T. A. Muritala and A. A. Olawale (2014), revealed that the two dependent variables tested (Return on Equity - ROE and Dividend Pay Out) were significantly associated with creative accounting. The study further revealed that ROE was negatively associated with net income before tax, the cash flow ratio and the gearing ratio indicating a possible existence of income-decreasing earnings management. Non-performing loans and net income after tax were, however, positively associated with ROE, indicating the fact that there was creative accounting when operational risk was high.

RESEARCH METHODOLOGY

Research Design and Data Collection - This study employed the *ex-post facto* research design as it permits the examination of independent variables in retrospect for their possible relationship with dependent variables. The study's population comprised the fifteen quoted banks on the Nigerian Stock Exchange from 2011 to 2016, while fourteen banks were used as the sample for the study. Skye Bank was dropped due to the unavailability of data. The panel least square method was used in order to analyze the data collected.

Model Specification - This study adapted the methodology applied by R-D. Chang, W-H. Shen and C-J. Fang (2008) to estimate loan loss provisions as a proxy for aggressive earnings management with the variables: loan charge-offs and the beginning balance of the allowance for bad debts. The loan loss provision is equal to the sum of the ending balance of the allowance for bad debts and the loan charge-offs, then deducting the beginning balance of the allowance for bad debts is modeled as follows:

$$DLLP_{it} = (PRIV_{it}, FRGN_{it}, GOVT_{it}, CEOTEN_{it} + GENDER_{it} + BDSIZE_{it} + SIZE_{it}) \quad (1a)$$

Discretionary loan loss provisions cannot be directly observed; hence it is estimated by regressing the loan loss provisions on the explanatory variables in Equation (1a); hence the residual estimated as the discretionary loan loss provisions. Subjecting the explained variables in (1a) to the regression model, the required equation is given as follows:

$$DLLP_{it} = \alpha_0 + \beta_0 PRIV_{it} + \beta_1 FRGN_{it} + \beta_2 GOVT_{it} + \beta_3 CEOTEN_{it} + \beta_4 GENDER_{it} + \beta_5 BDSIZE_{it} + \beta_6 SIZE_{it} \varepsilon_{it} \quad (1b)$$

DLLP denotes the discretionary loan loss provision (aggressive earnings management); *PRIV* denotes a private shareholding in percentages; *FORGN* denotes a foreign shareholding in percentages; *GOVT* represents a government shareholding in percentages; *BDSIZE* denotes the number of the directors on the board. *CEOTEN* are assigned the dummy of external

financing the value of 1, when the underlying firm has an external financial plan; otherwise, it is assigned the value of 0; *GENDER* denotes the number of the female directors on the board; *SIZE* denotes the natural log of the total assets, where *i* and *t* represent the sample, and the *t* of the quoted firms. The coefficient of the independent variables is expected to be β_0 to $\beta_6 > 0$

RESULTS AND DISCUSSION

This section deals with the presentation of the descriptive results in respect of the ownership structure and the other characteristics. As can be seen in Table 1, the private shareholding in the Nigerian DMBs constitutes 81% of the ownership structure, with the foreign shareholding accounting for 15% and the remaining 3% accounting for the government shareholding. This structure does not exceed the threshold of 10% of the Government's equity holdings (both direct and indirect) (CBN, 2006). The results also show that the discretionary loan loss provision has a small mean value of 7.4%, with the maximum value of 97%, and the minimum value of 1.2%. Thus, it shows that Nigerian DMBs manage their earnings, on the average.

The result of the mean of 0.13 for *CEOTEN* implies that the CEO tenure affects earnings about 13% on average. The Jarque-Bera large values satisfy the normality test for the result with the *p* value of 0.000 showing that the values are normally distributed. The standard deviation of the whole independent variables is relatively larger compared with the mean. This implies that different levels of pressure are borne by different banks. It thus shows a large and material divergence between the banks' behavior regarding the loan loss provision, the ownership structure and the board tenure.

Table 2 shows that there are both the negative and the positive relationships amongst the variables. As can be seen in the Table 2, there is a very strong and inverse relationship between the foreign and the private shareholdings ($r = -0.963$). This means that a unit increase in the private shareholding leads to a

Table 1 The descriptive statistics of the Nigerian banking ownership structure

	DLLP	PRIV	FORGN	GOVT	CEOTEN	GENDER	BDSIZE	SIZE
Mean	7.456310	81.32976	15.49560	3.180476	0.130952	2.142857	14.05952	7.170411
Median	4.400000	91.38000	0.115000	0.330000	0.000000	2.000000	14.50000	7.124040
Maximum	97.00000	100.0000	100.0000	35.00000	1.000000	5.000000	19.00000	8.463581
Minimum	1.200000	0.000000	0.000000	0.000000	0.000000	0.000000	10.00000	5.407172
Std. Dev.	11.47776	26.15163	25.09820	7.025393	0.339374	1.406892	2.743453	0.755223
Skewness	6.018422	-1.705193	1.830367	3.073275	2.187932	0.110323	-0.083688	-0.285533
Kurtosis	45.76172	5.069848	5.611682	12.15105	5.787049	2.201521	1.833384	2.247219
Jarque-Bera	6907.076	55.70249	70.77648	425.3262	94.20542	2.401884	4.861525	3.124783
Probability	0.000000	0.000000	0.000000	0.000000	0.000000	0.300911	0.087970	0.209634
Sum	626.3300	6831.700	1301.630	267.1600	11.00000	180.0000	1181.000	602.3145
SumSq. Dev.	10934.34	56764.34	52283.35	4096.560	9.559524	164.2857	624.7024	47.34004
Observations	84	84	84	84	84	84	84	84

Source: Authors

Table 2 The correlation matrix of the explained and the explanatory variables

	DLLP	PRIV	FORGN	GOVT	CEOTEN	GENDER	BDSIZE	SIZE
DLLP	1							
PRIVATE	-0.068	1						
FOREIGN	-0.003	-0.963	1					
GOVT	0.264	-0.282	0.015	1				
CEOTEN	0.313	-0.131	0.123	0.048	1			
GENDER	0.050	-0.347	0.335	0.092	0.112	1		
BDSIZE	0.175	-0.358	0.281	0.332	0.173	0.429	1	
SIZE	-0.220	0.043	0.063	-0.385	0.072	0.061	0.326	1

Source: Authors

reduction in the government shareholding, and *vice versa*.

The Test of the Hypotheses - This subsection shows the inferential results in respect of the formulated hypotheses in order to make a policy recommendation with respect to the statistical pieces of evidence.

Table 3 shows the effect of the ownership structure and the characteristics of the board characteristics of the Nigerian banks. With respect to the ownership structure, the regression outputs reveal that the private (*PRIV: Beta = -1.42235; t = -4.430098, p < 0.0001*), the foreign (*FORGN: Beta = -1.482719; t = -4.464672; p <*

0.0000) and the government (*GOVT: Beta = -1.03732, t = -3.667092; p < 0.0006*) shareholdings have a significant impact on earnings management. This implies that a unit increase in any of the independent variables significantly leads to a reduction in aggressive earning management. Based on these results, the null hypothesis (H1) is rejected, and we conclude that private, foreign and government shareholdings have a significant impact on the aggressive ownership structure. These results agree with those of the earlier studies carried out by E. S. Alzoubi (2016), V. Ratnawati *et al* (2016) and N. Teshima and A. Shuto (2008), but they differ from O. R. Uwuigbe and A. S. Fakile (2012).

Table 3 The panel regression result regarding the ownership structure and the Characteristics of the Boards of Nigerian banks

Variable	Coefficient	Std. Error	Statistic	Prob.
C	-36.31809	56.20954	-0.64612	0.5212
PRIV	-1.42235	0.321065	-4.430098	0.0001
FORGN	-1.482719	0.3321	-4.464672	0.0000
GOVT	-1.03732	0.282873	-3.667092	0.0006
CEOTEN	7.60359	3.064378	2.481284	0.0166
GENDER	-2.813337	1.654602	-1.700311	0.0954
BDSIZE	-0.966747	1.110189	-0.870795	0.3881
SIZE	9.267763	7.866869	1.178075	0.2445
Effects Specification				
Cross-section fixed (dummy variables)				
R-squared	0.690634	Mean dependent var	7.670143	
Adjusted R-squared	0.564362	S.D. dependent var	12.46398	
S.E. of regression	8.226585	Akaike info criterion	7.295944	
Sum squared resid	3316.158	Schwarz criterion	7.970493	
Log likelihood	-234.358	Hannan-Quinn criter.	7.563883	
F-statistic	5.469418	Durbin-Watson stat	1.852773	
Prob(F-statistic)	0.000001			

Source: Authors

In order to test the level of significance in the second hypothesis, the regression outputs in Table 3 reveal that, with the exception of the tenure of the directors' status (*CEOTEN*: $Beta = 7.60359$, $t = 2.481284$, $p < 0.0166$) that show a positive and significant relationship with aggressive earning management, the other explained variables, such as the board size (*BDSIZE*: $Beta = -0.966747$, $t = -0.870795$, $p > 0.3881$), the gender (*GENGER*: $Beta = -2.813337$, $t = -1.700311$, $p < 0.0954$) and the size (*SIZE*: $Beta = 9.267763$, $t = 1.178075$, $p > 0.2445$) have no significant effect on aggressive earnings management. The positive result in the directors' tenure status indicates that their tenure has expired, which suggests a possibility of an aggressive earning declaration. Based on the

foregoing results, we conclude that the directors' tenures status has a significant effect on aggressive earning management, whereas the board size, the gender and the size of the firm do not have any significant effect on aggressive earning management in the selected banks for the period considered. This result agrees with the outcome of N. Hu *et al* (2015) stating that CEOs with a short-term and minor tenure report earnings more aggressively than those with long-term tenures, except for the penultimate year prior to their leaving. It also agrees with the agency theory that posits that managers' convergent interest gives rise to a conflict of interest. These results are also at variance with the study carried out by S. M. Chtourou *et al* (2001) and D. Pradeep *et al* (2014).

CONCLUSION

This study has established the fact that private, foreign and government shareholdings have an inverse relationship with aggressive earnings management. Also, the directors' tenures status has a significant effect on aggressive earning management, whereas the board size, the gender and the size of the firm do not have any significant effect for the investigated period. These findings clearly show that the influence of independent board members, which is also an important characteristic of the board, is excluded as a part of the variables investigated. Also, the small sample size of 84 and the 5 years period of investigation are rather too short. Nevertheless, the short time period, the sample size and the inclusion of the other characteristics of the board in this study provide a research focus for future research studies.

In line with the findings of the study, it is therefore recommended that the 10% threshold established by the CBN on the government shareholding should be maintained and adequate supervisory role should be put in place in order to ensure that the threshold is not faulted. Furthermore, foreign ownership should be encouraged for the purpose of providing external monitoring and expertise. Also, the study recommends that adequate attention and monitoring should be paid and conducted, respectively, by regulatory and supervisory agencies with respect to banks, especially upon expiry of the CEO tenure so as to discourage any personal interest that might likely influence decisions made by the board.

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Received on 12nd October 2018,
after revision,
accepted for publication on 12th December 2018
Published online on 28th December 2018

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UTICAJ VLASNIČKE STRUKTURE I KARAKTERISTIKA ODBORA DIREKTORA NA UPRAVLJANJE ZARADAMA U DEPOZITNIM BANKAMA U NIGERIJU KOJE SE KOTIRAJU NA BERZI

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U mnogim zemljama postoje organizacije koje se suočavaju sa ozbiljnim krizama zbog lošeg korporativnog upravljanja. Ova studija ima za cilj da utvrdi kako vlasnička struktura i karakteristike Odbora direktora depozitnih banaka u Nigeriji, koje se kotiraju na berzi (DB), utiču na agresivno upravljanje zaradama u periodu od pet godina (2011-2016). Prilikom analize prikupljenih podataka, korišćena je panel metoda najmanjeg kvadrata. Saznanja do kojih smo došli pokazala su da privatno, inostrano i akcionarsko učešće države ima negativan i značajan uticaj na agresivno upravljanje zaradama. Mandat direktora, takođe, značajno utiče na agresivno upravljanje zaradama, dok broj članova Odbora direktora, rodna struktura i veličina firme nemaju značajan uticaj u posmatranom periodu. Na osnovu tih saznanja, u studiji se zaključuje da vlasnička struktura ima značajan uticaj na agresivno upravljanje zaradama, dok, s druge strane, karakteristike Odbora direktora, izuzimajući mandat direktora, nemaju značajan uticaj u tom smislu. Stoga je preporuka ove studije, da se održi prag od 10-procentnog akcionarskog učešća države, dok se regulatornim i nadzornim agencijama savetuje da posvete adekvatnu pažnju i prate aktivnosti izvršnih direktora banaka, posebno nakon isteka mandata direktora, kako bi se zaštitili akcionari.

Ključne reči: korporativno upravljanje, vlasnička struktura, upravljanje zaradama, karakteristike Borda direktora

JEL Classification: G28, G32, G38

Izvorni naučni članak

UDK: 657.1:658.1

doi:10.5937/ekonhor18032290

MEĐUNARODNI STANDARD FINANSIJSKOG IZVEŠTAVANJA ZA MALE I SREDNJE ENTITETE U REPUBLICI SRBIJI

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Rad je posvećen sagledavanju položaja Međunarodnog standarda finansijskog izveštavanja (MSFI) za male i srednje entitete (MSE) u regulativi i praksi finansijskog izveštavanja u Republici Srbiji. Nakon razmatranja globalnog značaja ovog standarda, analizira se njegov položaj u regulatornom okviru finansijskog izveštavanja Republike Srbije, u koji je uključen od 2013, dok se dublji uvid u položaj standarda u praksi ostvaruje empirijskim istraživanjem na uzorku od 175 preduzeća. Pošto ima potencijal da olakša finansijsko izveštavanje mnogim preduzećima koja su ranije morala da primenjuju pune MSFI, njegovo usvajanje u Republici Srbiji je korisno, ali potencijalni problem proističe iz činjenice da on nije usvojen na nivou Evropske unije (EU). Istraživanjem u radu je utvrđeno da preduzeća u Republici Srbiji, koja mogu da biraju između MSFI za MSE i punih MSFI, ipak, češće biraju pune MSFI. Ovaj nalaz treba posmatrati u kontekstu dugogodišnje primene punih MSFI pre implementacije MSFI za MSE. Zavisna preduzeća ređe biraju MSFI za MSE nego preduzeća koja nemaju to svojstvo.

Ključne reči: mali i srednji entiteti, IFRS za MSE, puni IFRS, Zakon o računovodstvu

JEL Classification: M41

UVOD

Međunarodni standardi finansijskog izveštavanja (MSFI) dugo su se razvijali, prevashodno, uz uvažavanje informacionih potreba investitora i kreditora velikih kompanija koje se kotiraju na tržištu kapitala. Početkom XX-og veka, njihov donosilac, tj. Međunarodni odbor za računovodstvene standarde

(*International Accounting Standards Board - IASB*), proširio je fokus svojih aktivnosti, tako što je posvetio veću pažnju specifičnostima ostalih profitno orijentisanih entiteta koji sastavljaju finansijske izveštaje opšte namene (Obradović, 2016, 165-166) i informacionim potrebama korisnika njihovih finansijskih izveštaja. S tim u vezi, IASB je 2009. objavio, nakon rasprave započete 2004, izradom preliminarnog dokumenta (Quagli & Paoloni, 2012, 148), a 2015. modifikovao, Međunarodni standard finansijskog izveštavanja za male i srednje entitete (MSFI za MSE).

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IASB je namenio MSFI za MSE onim entitetima koji sastavljaju finansijske izveštaje opšte namene, a koji nemaju javnu odgovornost, odnosno, čijim hartijama od vrednosti (akcijama i obveznicama) se ne trguje na javnim tržištima i koji, obavljajući svoju primarnu delatnost, ne raspolažu sredstvima šireg kruga eksternih lica (International Accounting Standards Board, 2015, 10). Stav IASB-a u vezi sa namenom standarda ima samo karakter preporuke, jer IASB, kao međunarodno privatno telo, ne može nikome da nametne svoje standarde. Nacionalni regulatori finansijskog izveštavanja odlučuju o tome da li da prihvate MSFI za MSE i koji entiteti imaju obavezu, ili mogućnost da primenjuju ovaj standard.

MSFI za MSE predstavlja sažetu verziju MSFI u širem smislu, kao skupa dokumenata sa oznakama MSFI, MRS (standardi), IFRIC i SIC (tumačenja), utemeljenih u Konceptualnom okviru finansijskog izveštavanja. Za razliku od punih MSFI, MSFI za MSE je jedinstveni dokument (oko 240 strana), koji je znatno manje obiman od dokumenata koji čine pune MSFI posmatranih zajedno - oko 3.000 strana (Chand, Patel & White, 2015, 139), ali i napisan pristupačnijim jezikom (Tan, Chatterjee, Wise & Hossain, 2016, 57). U njemu se drugačije definiše cilj finansijskog izveštavanja nego u punim MSFI - dok se u punim MSFI cilj prevashodno vezuje za informacione potrebe investitora i kreditora kao snabdevača kapitalom, u MSFI za MSE cilj se vezuje za informacione potrebe šireg kruga interesenata (Obradović, 2016, 167). Pored toga, MSFI za MSE:

- ne pruža smernice za neke računovodstvene probleme kojima se puni MSFI bave - "rezultat po akciji, kratkoročno finansijsko izveštavanje, izveštavanje po segmentima, osiguranje i sredstva koja se drže radi prodaje" (Seifert & Lindberg, 2010, 34);
- pruža jednostavnije i delimično modifikovane smernice u odnosu na pune MSFI (*goodwill* se, prema MSFI za MSE, otpisuje redovno, dok se prema punim MSFI otpisuje samo ako se utvrdi da je obezvređen);
- zahteva obelodanjivanje manje količine informacija u odnosu na pune MSFI (Pacter, 2017, 27).

Pomenute simplifikacije uslovljene su činjenicom da su puni MSFI, kao obiman set dokumenata koji zahteva obimna obelodanjivanja (Melville, 2017, 417), komplikovani i skupi za mnoge MSE, pri čemu korisnicima njihovih finansijskih izveštaja nisu potrebne sve informacije koje zahtevaju puni MSFI.

MSFI za MSE je relativno skoro inkorporiran u regulatorni okvir finansijskog izveštavanja u Republici Srbiji (RS). Iskustva u vezi sa primenom ovog standarda u upravo su predmet istraživanja u ovom radu.

Cilj istraživanja je da se ispita da li je odluka o uključenju ovog standarda u regulatorni okvir finansijskog izveštavanja RS ispravna i da li on predstavlja atraktivnu opciju za profitno orijentisane entitete u RS koje je IASB imao u vidu kada ga je doneo.

S tim u vezi, a polazeći od navedenog stava IASB-a u vezi sa namenom MSFI za MSE, formulisana je istraživačka hipoteza:

H Za entitete koji nemaju javnu odgovornost, a sastavljaju finansijske izveštaje opšte namene, MSFI za MSE je prihvatljivija opcija od punih MSFI.

Hipoteza se testira primenom kvantitativne metodologije istraživanja, koja se zasniva na deskriptivnoj statističkoj analizi i neparametarskim testovima za poređenje grupa. Pored toga, metodom indukcije, na bazi slučajeva pojedinih zemalja, stiče se predstava o opštim odlikama procesa globalnog širenja MSFI za MSE. U radu se primenjuje i metoda komparacije, koja se zasniva na upoređenju relevantnih propisa u RS sa odredbama MSFI za MSE.

U nastavku, najpre se razmatra globalni značaj MSFI za MSE, kako bi se stvorila osnova da se sagleda ispravnost odluke da se ovaj standard uključi u regulatorni okvir finansijskog izveštavanja RS. Nakon toga, razmatra se položaj MSFI za MSE u regulatornom okviru finansijskog izveštavanja RS. U poslednjem segmentu rada, prezentuju se i razmatraju rezultati empirijskog istraživanja u vezi sa položajem MSFI za MSE u praksi finansijskog izveštavanja u RS.

GLOBALNI ZNAČAJ MSFI ZA MSE

Mala i srednja preduzeća su bitni nosioci savremene ekonomije (Marinkovic & Senic, 2012, 15). Prema proceni IASB-a, ona čine preko 95% ukupnog broja preduzeća i na njih se odnosi više od 65% zaposlenosti u svetu (Bonito & Pais, 2018, 116). To znači da MSFI za MSE ima prostor da postane veoma značajan na globalnom planu, tj. da bude znatno više zastupljen u praksi nego puna verzija MSFI. F. K. Jermakowicz i B. J. Epstein (2010, 72), konstatuju da je IASB doneo ovaj standard reagujući na snažne zahteve kako iz razvijenih zemalja, tako i iz zemalja u razvoju, nakon petogodišnjeg procesa razvoja i uz široke konsultacije sa malim i srednjim preduzećima širom sveta. Kada se ima u vidu prethodno, opravdano je očekivati da standard postane široko zastupljen u svetu. Ipak, put MSFI za MSE do entiteta kojima je namenjen nije jednostavan. Da bi mogao da se koristi u jednoj zemlji, ovaj standard treba da bude usvojen, ili barem, ne treba da bude zabranjen, od strane nacionalnih institucija nadležnih za regulisanje finansijskog izveštavanja.

Dobra osnova za sagledavanje aktuelnog globalnog značaja MSFI za MSE jesu profili jurisdikcija (koje se uglavnom, ali ne isključivo, poklapaju sa državama) u vezi sa primenom MSFI (u punoj i sažetoj verziji), koje izrađuje i ažurira MSFI Fondacija (IFRS Foundation, 2018), kao telo koje bira članove IASB-a i finansira i nadgleda rad IASB-a. U oktobru 2018, raspoloživo je 166 profila, pri čemu se primena MSFI u Evropskoj uniji (EU) razmatra kroz profil EU i profile svih država članica. Kako bi se izbeglo dupliranje podataka, iz analize je isključen profil EU, a razmatraju se svi profili država članica. Tabela 1 pokazuje da MSFI za MSE nije zvanično usvojen ni u polovini razmatranih jurisdikcija. U nekim jurisdikcijama, entiteti mogu da primenjuju ovaj standard iako nije zvanično usvojen. Radi se, pre svega, o jurisdikcijama koje nemaju jasno definisan okvir finansijskog izveštavanja za MSE, zbog čega se ne može reći da je MSFI za MSE zabranjen. U pojedinim jurisdikcijama on je poslužio kao osnova za razvoj nacionalnog standarda za MSE. Od jurisdikcija u kojima MSFI za MSE nije zvanično usvojen (90), u 20 se razmatra usvajanje, dok je u još tri jurisdikcije usvajanje preporučila Svetska banka.

U 11 jurisdikcija u kojima je usvojen, uključujući RS, standard je manje ili više modifikovan. Mada u profilu koji je izradila MSFI Fondacija, RS nije označena kao zemlja u kojoj se primenjuje modifikovani MSFI za MSE, analiza prezentovana u narednom delu rada pokazuje da je standard, ipak, modifikovan. Konačno, u većini jurisdikcija u kojima se MSFI za MSE primenjuje (preko 50), malim i srednjim entitetima je dopušteno da biraju između njega i punih MSFI.

Tabela 1 Status MSFI za MSE po jurisdikcijama

Status MSFI za MSE	Broj jurisdikcija	Procenat
Zvanično usvojen	74	44,8
Nije zvanično usvojen, ali barem neki entiteti imaju pravo da ga primenjuju	13	7,9
Nije usvojen, ali je poslužio kao osnova za nacionalni standard	6	3,6
Nije usvojen i ne primenjuje se	72	43,6
Ukupno	165	

Izvor: Autor, na osnovu IFRS Foundation (2018)

Prethodna analiza pokazuje da MSFI za MSE, tokom nepune prve decenije po objavljivanju, nije postao jedinstvena globalna osnova finansijskog izveštavanja MSE. U mnogim jurisdikcijama, ovaj standard se ne primenjuje i ne postoji namera da se usvoji. MSFI za MSE je znatno manje rasprostranjen po jurisdikcijama nego puni MSFI, koji su usvojeni u 149 od 165 razmatranih jurisdikcija (90,3%). U značajnom broju jurisdikcija, usvojena je puna verzija MSFI, ali ne i njihova sažeta verzija, tj. MSFI za MSE. U tom kontekstu, izdvajaju se dve grupe zemalja - zemlje EU i zemlje Zapadne i Centralne Afrike.

U EU je, još 2010, nakon što je IASB doneo prvu verziju MSFI za MSE, izvršena evaluacija ovog standarda, koja je pokazala da on nije u skladu sa tadašnjim računovodstvenim direktivama (IV i VII), kojima je data prednost. Evropska komisija je zauzela stav da je MSFI za MSE previše kompleksan i da bi

njegovo usvajanje donelo previsoke troškove (Masca, 2012, 574). Kasnije, 2013, doneta je nova (jedinствена) računovodstvena direktiva, koja je manje različita od MSFI za MSE nego direktive koje je zamenila (Obradović, 2016, 258-259). Prema G. Kaufhold-u (2013, 1945), iako se smanjuju razlike između MSFI za MSE i regulative EU, ostaje problem kompleksnosti ovog standarda. Ipak, isti autor smatra da će rastući značaj standarda u svetu, verovatno, uticati na institucije EU da ponovo razmotre njegovo usvajanje. Za entitete u EU koji ne primenjuju pune MSFI (koji su usvojeni u EU), merodavni su nacionalni propisi (standardi), bazirani na računovodstvenoj direktivi. Direktiva ne zabranjuje eksplicitno MSFI za MSE, što znači da države EU mogu da ugrade u svoje propise (standarde) sve one delove MSFI za MSE koji nisu u suprotnosti sa njom (Obradović i Karapavlović, 2015, 419). Četiri države EU su izgradile nacionalne standarde za MSE tako što su modifikovale MSFI za MSE, a još tri države razmatraju da to učine (IFRS Foundation, 2018).

U 17 zemalja Zapadne i Centralne Afrike, članica Organizacije za harmonizaciju poslovnog prava u Africi (OHADA), mali i srednji entiteti primenjuju regionalni standard, koji je razvila pomenuta organizacija. Standard (sa oznakom SYSCOHADA) objavljen je 2017. na francuskom jeziku i znatno je obimniji od MSFI za MSE, mada nije obiman kao puni MSFI - 1.246 strana (IFRS Foundation, 2018).

U analiziranim jurisdikcijama u svetu, u kojima MSFI za MSE nije usvojen, mali i srednji entiteti uglavnom primenjuju nacionalne (npr. u zemljama EU) ili regionalne standarde (u pomenutim afričkim zemljama). U tri jurisdikcije primenjuju se samo puni MSFI, što znači da mali i srednji entiteti nemaju mogućnost da primenjuju jednostavniji standard.

Istraživanje koje su sprovele H. Bohušová i V. Blašková (2012) u prvim godinama po objavljivanju MSFI za MSE otkrilo je da je bruto domaći proizvod (BDP) po stanovniku u zemljama koje su usvojile standard generalno znatno niži nego isti pokazatelj u zemljama koje standard nisu usvojile. Tabela 2, zasnovana na povezivanju podataka o statusu MSFI za MSE po jurisdikcijama sa raspoloživim podacima o BDP-u *per capita* po jurisdikcijama, pokazuje da je i danas

situacija ista. To znači da postoji veza između nivoa ekonomske razvijenosti i zainteresovanosti zemlje za MSFI za MSE.

Tabela 2 BDP *per capita* i status MSFI za MSE

Status MSFI za MSE	Broj jurisdikcija	Aritmetička sredina BDP-a <i>per capita</i>	Medijana BDP-a <i>per capita</i>
Zvanično usvojen	69	12.336,36 \$	5.589,40 \$
Nije usvojen i ne primenjuje se	69	20.626,98 \$	13.294,50 \$
Ukupno	138		

Izvor: Autor, na osnovu IFRS Foundation (2018) i World Bank (2018)

H. Bohušová i V. Blašková (2012), su utvrdile i da je usvajanje MSFI za MSE u vezi sa nivoom kvaliteta sistema finansijskog izveštavanja zemlje merenim pomoću jačine revizije, pri čemu zemlje koje su usvojile MSFI za MSE imaju niži kvalitet sistema finansijskog izveštavanja. Rezultati istraživanja koje su sprovedi A. Bonito i C. Pais (2018), pružaju objašnjenje za prethodne nalaze. Naime, istraživanje je pokazalo da su zemlje koje nisu razvile standard finansijskog izveštavanja za MSE posebno zainteresovane za MSFI za MSE. Prema tome, što je zemlja ekonomski razvijenija, veća je verovatnoća da ima svoj standard finansijskog izveštavanja za MSE i da, zbog toga, bude manje zainteresovana za MSFI za MSE. A. Bonito i C. Pais (2018) su utvrdili da su i zemlje sa iskustvom u primeni punih MSFI i zemlje sa običajnim pravom posebno zainteresovane za MSFI za MSE, kao i da verovatnoća da zemlje EU usvoje ovaj standard nije velika. Pomenuti autori konstatuju da se MSFI za MSE pretežno koristi u zemljama u razvoju, kao i da je njegova primena češće opcija nego obaveza, što se uočava i iz istaknute činjenice da u velikom broju jurisdikcija mali i srednji entiteti mogu da biraju između njega i punih MSFI. Takođe, P. Chand, A. Patel i M. White (2015) ističu da je primena MSFI

za MSE u vezi sa nepostojanjem ili neadekvatnošću nacionalnog standarda za MSE. Istraživanje koje su sproveli Y. M. Sellami i Y. Gafsi (2018, 34), na uzorku od 70 zemalja, pokazalo je da „značaj MSE, oslanjanje zemlje na eksterno finansiranje i stepen eksterne otvorenosti pozitivno utiču na usvajanje MSFI za MSE“, dok poreski sistem i kvalitet korporativnog upravljanja imaju negativan uticaj. Isto istraživanje, za razliku od onog koje su sproveli A. Bonito i C. Pais (2018), otkrilo je da prethodno usvajanje punih MSFI ne utiče značajno na odluku o usvajanju MSFI za MSE i da na tu odluku ne utiče ni nivo obrazovanja u zemlji.

Analiza profila jurisdikcija pokazuje da, pored prethodnih faktora, na spremnost zemlje da prihvati MSFI za MSE utiče pripadnost regionalnoj ekonomskoj grupaciji. Osim slučajeva zemalja članica EU i zemalja Zapadne i Centralne Afrike, kao pripadnica grupacija koje nisu prihvatile standard, upečatljiv je slučaj zemalja pripadnica Organizacije država Istočnih Kariba, koje su usvojile MSFI za MSE i ponudile ga malim i srednjim entitetima kao jednu od alternativa (druga alternativa su puni MSFI).

Činjenica da se MSFI za MSE ne primenjuje u značajnom delu sveta, govori da ne postoji opšta saglasnost da je globalni standard finansijskog izveštavanja za MSE potreban. J. Strouhal, M. Pasekova i Z. Crhova (2015, 237), sublimiraju faktore za i protiv potrebe za globalnim standardom finansijskog izveštavanja za MSE, konstatujući da, s jedne strane, mali i srednji entiteti ne igraju značajnu ulogu „u svetu globalizacije i međunarodne trgovine“, dok, s druge strane, takvi entiteti često nastoje da privuku inostrane investitore, a tim investitorima su potrebni finansijski izveštaji u obliku podobnom za konsolidovanje. Pored toga, primena MSFI za MSE olakšava eventualno kasnije izveštavanje na bazi punih MSFI, sa kojim će se entitet suočiti ako od malog ili srednjeg preraste u veliki.

Delimičan uspeh MSFI za MSE na globalnom planu može se dovesti u vezu i sa zamerka koje mu se upućuju. Pored određenih tehničkih teškoća, koje proističu iz razlika u kapacitetima finansijskih tržišta i regulatornih aranžmana širom sveta, D. Perera i

P. Chand (2015) ukazuju na teškoće konceptijske prirode, koje donosi standard. Jedna od njih se odnosi na činjenicu da se on ne razlikuje od punih MSFI samo po obimu obelodanjivanja, već i po smernicama za priznavanje i merenje. U situaciji kada koegzistiraju puna i sažeta verzija MSFI, različite po ovim smernicama, derogira se princip „istinitog i poštenog prikaza“, jer različite verzije MSFI (puna i sažeta) dovode do različitih „istinitih i poštenih prikaza“. Ovaj stav se podudara sa stavom koji su izneli M. J. Aitken i M. A. Islam (1996, 55), još u vreme kada MSFI za MSE nije bio ni u najavi. Naime, oni su konstatovali da informacije u finansijskim izveštajima MSE mogu da se razlikuju od onih u izveštajima velikih entiteta po obimu, ali da ne treba da se razlikuju po svojoj prirodi. Zbog primene različitih računovodstvenih postupaka, informacije generisane na bazi MSFI za MSE mogu se, ipak, razlikovati i po prirodi od onih generisanih na bazi punih MSFI. D. Perera i P. Chand (2015), dodatno konstatuju da, iako je MSFI za MSE jednostavniji od punih MSFI, on je srednjim, malim i, posebno, mikro entitetima pretežak za primenu. P. Walton (2011, 131), ukazuje na prisutno mišljenje da je standard kompleksan i ističe da je IASB prilikom njegovog razvoja zanemario informacione potrebe menadžera preduzeća i poreskih vlasti, uprkos tome što istraživanja pokazuju da su pomenuti interesenti veoma važni korisnici finansijskih izveštaja malih i srednjih preduzeća. H. Bohušová i V. Blašková (2012, 39), polazeći od činjenice da se IASB, kada je kreirao MSFI za MSE, fokusirao na preduzeće sa oko 50 zaposlenih, konstatuju da standard „ne može da bude podoban za sve vrste entiteta iz dijapazona malih i srednjih, posebno za veoma male entitete (mikro) entitete“, jer „ova vrsta entiteta sastavlja finansijske izveštaje prevashodno za poreske svrhe“.

Koegzistencija pune i sažete verzije MSFI u istoj zemlji, u smislu da neki entitet slede pune, a neki sažete MSFI, ne utiče samo na verodostojnost kao kvalitativnu karakteristiku finansijskih izveštaja (tako što se nameće pitanje koji prikaz je zaista „istinit i pošten“), već utiče i na uporedivost kako između entiteta (jer različiti entiteti primenjuju različite osnove finansijskog izveštavanja), tako i u vremenu (jer isti entitet može da menja osnovu, tj. da pređe sa

punih MSFI na MSFI za MSE, ili obratno, na primer, zbog pristupanja berzi ili izlaska sa nje). Kada menja osnovu finansijskog izveštavanja, entitet se može suočiti sa potrebom da promeni računovodstvene politike i da, iz tog razloga, preračuna komparativne iznose u finansijskim izveštajima i reklasifikuje finansijske izveštaje, čime se ublažava problem vremenske uporedivosti, ali se entitet izlaže dodatnim troškovima.

Istražujući stavove iznete u procesu javnih konsultacija o usvajanju MSFI za MSE u EU, A. Quagli i P. Paoloni (2012) su otkrili da su mišljenja o ovom standardu podeljena. Dok su sastavljači finansijskih izveštaja protiv standarda, korisnici ga podržavaju. Pored toga, on ima veću podršku u Velikoj Britaniji, Holandiji i zemljama Skandinavije, nego u Nemačkoj, Austriji, Francuskoj, Luksemburgu, Belgiji, Španiji, Italiji, Portugaliji i Grčkoj. Stavovi ispitanika, otkriveni ovim istraživanjem, koincidiraju sa potezima regulatora. Naime, upravo u Velikoj Britaniji i Švedskoj (uz Irsku i Estoniju), MSFI za MSE poslužio je kao osnova za nacionalni standard, dok Danska i Holandija (uz Mađarsku, ali i Norvešku, Island i Lihtenštajn, kao tri zemlje koje nisu članice EU, ali su blisko povezane sa EU kao deo jedinstvenog tržišta), razmatraju da usvoje ovaj standard. E. Masca (2012), je razmatrala stavove institucija (državnih vlasti, donosilaca standarda, asocijacija računovođa, revizora i drugih interesenata), iznete u procesu evaluacije MSFI za MSE u EU i utvrdila da su stavovi raznovrsni i da se nalaze pod uticajem računovodstvene kulture i geografskog područja. Nalazi ovih dvaju istraživanja navode na zaključak da se MSFI za MSE ne uklapa podjednako dobro u svaki nacionalni ambijent. H. Bohušová (2011), takođe, na bazi analize stavova iznetih u procesu evaluacije MSFI za MSE u EU, konstatuje da standard najviše podržavaju kompanije koje imaju filijale u različitim zemljama EU, kompanije koje nastoje da privuku inostrani kapital i kompanije koje se kotiraju na neregulisanim tržištima, naglašavajući da primena ovog standarda olakšava konsolidovanje. S druge strane, prema istom autoru, primena MSFI za MSE u EU učinila bi finansijsko izveštavanje kompleksnijim i povećala troškove sastavljanja i revizije finansijskih izveštaja, naročito za male kompanije.

A. Uyar i A. H. Güngörmüs (2013) su istraživali znanja i percepcije računovođa u Turskoj u vezi sa MSFI za MSE i otkrili da je veći broj onih koji ga podržavaju nego onih koji su protiv njega, ali i da ispitanici nisu sasvim informisani o standardu. Istraživanje je ukazalo na značaj profesionalnog usavršavanja računovođa, u organizaciji profesionalnih računovodstvenih asocijacija, za adekvatnu implementaciju standarda. Razmatrajući primenu MSFI za MSE u zemljama u razvoju, N. Albu i C. N. Albu (2012), takođe, ukazuju na značaj kontinuirane edukacije računovodstvenih profesionalaca.

Problemi u vezi sa implementacijom MSFI za MSE nisu podjednako izraženi u svim zemljama. Pored toga što pomenuti standard nije podjednako prilagođen svim zemljama, veliki značaj u datom kontekstu ima prethodni regulatorni aranžman, tj. regulatorni aranžman pre njegovog usvajanja. Ako su, pre nego što je on usvojen, mali i srednji entiteti primenjivali nacionalni standard, problemi u vezi sa verodostojnošću i uporedivošću, zapravo, postaju blaži, jer je on, verovatno, bliži punim MSFI nego nacionalni standard. S druge strane, ako su, pre usvajanja MSFI za MSE, ovi entiteti primenjivali pune MSFI (što je karakteristično za RS), pomenuti problemi se pojavljuju. Takođe, treba imati u vidu da finansijsko izveštavanje MSE u jednoj zemlji nakon usvajanja MSFI za MSE postaje kompleksnije i skuplje samo ako su odnosni entiteti prethodno sledili jednostavniji standard.

MSFI ZA MSE U REGULATORNOM OKVIRU FINANSIJSKOG IZVEŠTAVANJA REPUBLIKE SRBIJE

MSFI za MSE zvanično je usvojen u RS 2013, kada je donet Zakon o računovodstvu, pri čemu ovaj standard važi počev od finansijskih izveštaja za poslovnu godinu koja se završava 31. decembra 2014. Pošto je standard počeo da se primenjuje u RS pet godina nakon što je objavljen od strane IASB-a, to znači da u relativno dugom periodu mnogi entiteti u RS nisu imali mogućnost da sagledaju koristi od primene standarda (Obradović, 2014, 237).

Primena punih MSFI u RS počela je deceniju ranije, od 2004. U nekim zemljama, puni MSFI su postepeno implementirani, tako što se postepeno širio krug preduzeća koja ga primenjuju. Nasuprot tome, RS se odlikuje sveobuhvatnim uvođenjem punih MSFI, uz kasnije smanjenje opsega njihove primene. U početku su sva preduzeća primenjivala pune MSFI, da bi kasnije, a pre uvođenja MSFI za MSE, mala preduzeća dobila mogućnost da primenjuju poseban propis, tj. Pravilnik Ministra finansija, „koji je, u suštini, nacionalni standard“ (Obradovic, Cupic & Dimitrijevic, 2018, 50-51).

Prema Zakonu o računovodstvu, iz 2013, član 6 (Službeni glasnik Republike Srbije, 2013), entiteti se, na bazi prosečnog broja zaposlenih, poslovnih prihoda i prosečne vrednosti sredstava u tekućoj poslovnoj godini, razvrstavaju u mikro, male, srednje i velike, a to razvrstavanje tangira osnovu finansijskog izveštavanja u narednoj godini. MSFI za MSE je obavezan za male entitete, srednji entiteti mogu da biraju između njega i punih MSFI, dok mikro entiteti (uključujući preduzetnike, koji se u Zakonu o računovodstvu tretiraju kao mikro entiteti), mogu da biraju između njega i Pravilnika Ministra finansija, čija je aktuelna verzija („Pravilnik o načinu priznavanja, vrednovanja i prezentacije i obelodanjivanja pozicija u pojedinačnim finansijskim izveštajima mikro i drugih pravnih lica“) objavljena 2013. Puni MSFI su ostali obavezni za velike entitete, kao i za kotirane entitete (entitete čijim hartijama od vrednosti se trguje na tržištu kapitala), i entitete u postupku pripreme za kotiranje, finansijske institucije i entitete koji, kao matični, sastavljaju konsolidovane finansijske izveštaje, bez obzira na veličinu. Srednji entiteti koji odaberu pune MSFI treba da ih slede u kontinuitetu, kao što mali entiteti koji odaberu MSFI za MSE treba ovaj standard da slede u kontinuitetu (Zakon o računovodstvu, 2013, članovi 20-22). S obzirom na regulatorni okvir finansijskog izveštavanja u RS koji je prethodio uvođenju MSFI za MSE, T. Đukić i M. Pavlović (2014, 477) izražavaju očekivanje da će odnosni standard olakšati finansijsko izveštavanje malim i srednjim entitetima.

Prema Zakonu o računovodstvu (član 3), prevod MSFI za MSE (kao i prevode punih MSFI) objavljuje

Ministarstvo finansija. Krajem 2013, Ministarstvo finansija je objavilo prevod ovog standarda, čime su stvoreni uslovi da se počne sa njegovom primenom u roku koji je predviđen Zakonom. Nedugo nakon toga, tokom 2015, IASB je publikovao revidirani MSFI za MSE, istakavši da isti stupa na snagu za finansijske izveštaje koji se sastavljaju za „godišnje periode koji počinju 1. januara 2017, ili nakon tog datuma“ (International Accounting Standards Board, 2015, 219). Međutim, prevod izmenjenog standarda, objavljen je tek u oktobru 2018. U novembru 2016, Ministarstvo finansija Republike Srbije (2016, 155), izdalo je mišljenje da entiteti koji imaju „mogućnost i neophodne kapacitete“ mogu primeniti revidirani MSFI za MSE pre objavljivanja njegovog prevoda. Isto važi za pune MSFI, čiji prevodi nisu objavljivani od 2014, iako ih IASB stalno menja i dopunjuje. Mišljenjem Ministarstva finansija, praktično je otvoren prostor za koegzistenciju starog i aktuelnog MSFI za MSE, u smislu da su entiteti mogli da biraju verziju koju će da primenjuju, isto kao što je otvoren prostor za koegzistenciju starih i aktuelnih punih MSFI. Bitna razlika između starog i aktuelnog MSFI za MSE je u tome što aktuelni daje mogućnost primene modela revalorizacije za naknadno merenje nekretnina, postrojenja i opreme (Obradović, 2016, 168), a drugačije su i smernice za otpisivanje nematerijalnih ulaganja sa neodređenim vekom trajanja, uključujući *goodwill* (Obradović, 2018, 718).

Pravilnikom o sadržini i formi obrazaca finansijskih izveštaja za privredna društva, zadruge i preduzetnike (Službeni glasnik Republike Srbije, 2014), neke opcije koje nudi MSFI za MSE su stavljene van snage. Tako, entiteti u RS nemaju pravo da:

- ukupan rezultat prikažu putem jednog izveštaja (već moraju da ga prikažu putem dva izveštaja);
- rashode u bilansu uspeha klasifikuju po funkcijama (već moraju da ih klasifikuju po prirodi);
- sastave jedinstveni izveštaj o rezultatu i neraspoređenom dobitku umesto izveštaja o ukupnom rezultatu i izveštaja o promenama sopstvenog kapitala; i

- primene indirektnu metodu za prikazivanje novčanih tokova iz poslovnih aktivnosti (već moraju da primenjuju direktnu metodu).

Pored toga, u originalnom MSFI za MSE, kako u inicijalnom iz 2009, tako i revidiranom iz 2015, u paragrafu 4.2, gde se navode minimalne pozicije izveštaja o finansijskom položaju (bilansu stanja prema regulativi u RS), uz odložena poreska sredstva i obaveze, se u zagradi ističe da se prikazuju kao netekuće pozicije. U prevodima inicijalnog i revidiranog standarda, tekst u zagradi je izostao, a navedene pozicije se, prema Pravilniku, prikazuju zasebno, i to između stalne (netekuće) i obrtne (tekuće) imovine (odložena poreska sredstva), odnosno, dugoročnih (netekućih) i kratkoročnih (tekućih) obaveza (odložene poreske obaveze), što nije u skladu sa originalnim standardom. Iz toga sledi da u RS praktično važi modifikovani MSFI za MSE.

U okviru procesa reformi finansijskog izveštavanja u RS, koji je u toku, može se očekivati da se redefiniše mesto MSFI za MSE. S tim u vezi, Centar za reformu finansijskog izveštavanja Svetske banke, u svojoj studiji o finansijskom izveštavanju u RS (Centre for Financial Reporting Reform 2015, 43), označava aktuelni zakonski zahtev da mali entiteti primenjuju MSFI za MSE kao opterećujući i nerealan. U istoj studiji se ističe da treba ispitati da li je opravdano da sve velike kompanije primenjuju pune MSFI. Navedeni stavovi, iza kojih stoji institucija koja ima značajno učešće u projektu reforme finansijskog izveštavanja (Svetska banka), nagoveštavaju promenu opsega primene MSFI za MSE u RS.

MSFI ZA MSE U PRAKSI FINANSIJSKOG IZVEŠTAVANJA U REPUBLICI SRBIJI

U cilju sagledavanja položaja MSFI za MSE u praksi finansijskog izveštavanja u RS, sprovedeno je empirijsko istraživanje. Fokus istraživanja je na entitetima koji imaju pravo da biraju između punih MSFI i MSFI za MSE, a to su nekotirani entiteti srednje veličine koji ne sastavljaju konsolidovane finansijske izveštaje, različiti od finansijskih institucija. S obzirom

na to da je MSFI za MSE kraći, manje zahtevan i jeftiniji za primenu od punih MSFI, može se pretpostaviti da je isti rado prihvaćen od entiteta koji imaju pravo da biraju između njega i punih MSFI. U skladu sa tim, formulisana je hipoteza prezentovana u uvodnom delu rada.

Istraživanje je sprovedeno na uzorku od 175 slučajno odabranih preduzeća, koja su, prema podacima za 2016, razvrstana u srednja, a ispunjavaju sve ostale napred date uslove. U analizi su korišćeni podaci raspoloživi na internet sajtu Agencije za privredne registre RS (www.apr.gov.rs). Struktura uzorka sa aspekta pravne forme prikazana je u Tabeli 3. Pošto, prema Zakonu o računovodstvu, razvrstavanje entiteta po veličini važi za narednu godinu, za svako preduzeće je, na bazi napomena uz finansijske izveštaje, ispitano koja je osnova finansijskog izveštavanja - puni MSFI ili MSFI za MSE - primenjena u finansijskim izveštajima za 2017. U dva slučaja, iz napomena uz finansijske izveštaje nije moglo da se razazna koja osnova je primenjena, što je neprihvatljiva praksa. U jednom slučaju, preduzeće navodi da uvažava i pune MSFI i MSFI za MSE, što je, takođe, neprihvatljivo, s obzirom na to da, po Zakonu, entitet treba da se opredeli između punih i skraćenih MSFI, što znači da može da sledi samo jednu osnovu.

Tabela 3 Struktura uzorka sa aspekta pravne forme

Pravna forma	Broj preduzeća	Procenat
Društvo sa ograničenom odgovornošću	135	77,1
Javno preduzeće	39	22,3
Društveno preduzeće	1	0,6
Ukupno	175	

Izvor: Autor

Prema empirijskim podacima prikazanim u Tabeli 4, samo petina preduzeća u uzorku sa jednom i jasnom osnovom finansijskog izveštavanja primenjuje MSFI za MSE, a četiri petine pune MSFI. Iz toga sledi

da se polazna hipoteza ne može prihvatiti. MSFI za MSE nije, bar do sada, uspeo da se nametne kao dominantna osnova finansijskog izveštavanja onih srednjih preduzeća koja mogu da biraju osnovu finansijskog izveštavanja. Mnoga preduzeća su, dakle, odlučila da (nastave da) primenjuju pune MSFI iako su, po Zakonu o računovodstvu, imala pravo da odaberu njihovu sažetu verziju.

Tabela 4 Primena punih i sažetih MSFI

Osnova finansijskog izveštavanja	Broj preduzeća	Procenat u uzorku	Procenat u preduzećima sa jednom i jasnom osnovom
Puni MSFI	137	78,3	79,7
MSFI za MSE	35	20,0	20,3
Nejasno	2	1,1	
I jedno i drugo	1	0,6	
Ukupno	175		

Izvor: Autor

Kada se pođe od aktuelnog regulatornog okvira finansijskog izveštavanja u RS, struktura vlasništva nad preduzećem nameće se kao faktor izbora osnove finansijskog izveštavanja (puni ili sažeti MSFI). Prema Zakonu o računovodstvu, preduzeća u RS koja sastavljaju konsolidovane finansijske izveštaje treba da slede pune MSFI. Važna pretpostavka za sastavljanje konsolidovanih izveštaja je da sva preduzeća uključena u krug konsolidovanja primenjuju jednake računovodstvene politike. Računovodstvene politike se mogu razlikovati ako preduzeća primenjuju različite osnove finansijskog izveštavanja, odnosno, ako slede različite standarde. Ako se računovodstvene politike razlikuju, pojedinačni finansijski izveštaji moraju da se, pre nego što se pristupi konsolidovanju, svedu na istu osnovu. Pošto matična preduzeća u RS moraju da primenjuju pune MSFI, može se očekivati da ona, koristeći moć kontrole, utiču na izbor osnove finansijskog izveštavanja zavisnih entiteta. Neka preduzeća u uzorku su zavisni entiteti domaćih, a

neka inostranih preduzeća (koja možda ne primenjuju MSFI ni u kojoj verziji). U svakom slučaju, može se generalno očekivati da zavisni srednji entiteti češće poštuju pune MSFI od srednjih entiteta koji nisu zavisni. Empirijski podaci potvrđuju napred iznetu pretpostavku. Tabela 5 pokazuje da je MSFI za MSE zastupljeniji kod onih entiteta u RS koji nemaju svojstvo zavisnog entiteta nego kod entiteta koji imaju to svojstvo.

Tabela 5 Primena punih i sažetih MSFI u entitetima sa i bez svojstva zavisnog

Kategorija	Primenjuje pune MSFI	Primenjuje MSFI za MSE	Ukupno
Zavisni entitet	59 (90,8%)	6 (9,2%)	65
Nije zavisni entitet	78 (72,9%)	29 (27,1%)	107
Ukupno	137	35	172

Izvor: Autor

Da bi se utvrdilo da li je uticaj svojstva entiteta u pomenutom smislu (zavisni / nije zavisni) statistički značajan, sproveden je hi-kvadrat test nezavisnosti. Uslovi za sprovođenje ovog testa su ispunjeni, jer nijedna ćelija nema očekivanu vrednost manju od 5. Pošto i jedna i druga promenljiva (svojstvo entiteta i osnova finansijskog izveštavanja) ima dve kategorije (zavisni / nije zavisni, odnosno, puni MSFI / MSFI za MSE), primenjena je tzv. Jejtsova korekcija. Test je pokazao da status entiteta ima statistički značajan, ali i mali uticaj na izbor osnove finansijskog izveštavanja ($\chi^2_{(1, n=172)} = 6,904; p = 0,009; phi = 0,215$). Drugim rečima, zavisni entiteti nešto ređe biraju MSFI za MSE.

Tabela 6 pokazuje da je zastupljenost MSFI za MSE nešto veća kod društava sa ograničenom odgovornošću nego kod javnih preduzeća (društveno preduzeće je isključeno iz ove analize). Hi-kvadrat test nezavisnosti (uslov je ponovo ispunjen, jer nijedna ćelija nema očekivanu vrednost manju od 5), pokazuje (uz Jejtsovu korekciju) da uticaj pravne forme nije statistički značajan, kao i da je veoma mali ($\chi^2_{(1, n=171)} = 0,047; p = 0,827; phi = -0,034$).

Tabela 6 Primena punih i sažetih MSFI u entitetima različite pravne forme

Kategorija	Primenjuje pune MSFI	Primenjuje MSFI za MSE	Ukupno
Društvo sa ograničenom odgovornošću	104 (78,8%)	28 (21,2%)	132
Javno preduzeće	32 (82,1%)	7 (17,9%)	39
Ukupno	136	35	171

Izvor: Autor

Činjenica da ubedljiva većina srednjih entiteta u RS nije prešla na MSFI za MSE, mada ima zakonsko pravo na to, može se objasniti dejstvom mnogih faktora. Desetogodišnja primena punih MSFI, koja je prethodila uvođenju MSFI za MSE, učinila je da se preduzeća u RS naviknu na njih. Mada MSFI za MSE može da donese niže troškove finansijskog izveštavanja, taj efekat dolazi do izražaja u dugom roku. U kratkom roku, situacija može biti sasvim drugačija. S tim u vezi, u studiji Centra za reformu finansijskog izveštavanja Svetske banke navodi se da neki sastavljači finansijskih izveštaja u RS smatraju da tranzicija sa punih MSFI na MSFI za MSE može doneti probleme u vezi sa reklasifikacijom određenih pozicija i, uopšte, prilagođavanjem različitim smernicama za izveštavanje (Centre for Financial Reporting Reform, 2015, 40). Kratkoročni problemi i troškovi mogu, prema tome, da stvore odbojnost kod preduzeća prema MSFI za MSE iako bi dugoročne koristi mogle da prevaziđu ove troškove. Treba imati u vidu i da, s obzirom na odredbe Zakona o računovodstvu, srednji nekotirani entitet koji nije matični može da primenjuje MSFI za MSE sve dok ne počne da se kotira, dok ne postane veliki, ili dok ne postane matični. Kada se desi bilo šta od navedenog, srednji entitet mora da pređe na pune MSFI. Za srednji entitet koji je godinama unazad primenjivao pune MSFI (i navikao se na njih), a koji bi u budućnosti (na primer, zato što raste) mogao da dođe u situaciju da ponovo mora iste da primenjuje, kontinuirana primena punih MSFI može da bude jeftinija opcija, jer se izbegavaju problemi u vezi sa promenama računovodstvenih

politika i reklasifikovanjima finansijskih izveštaja prilikom prelaska sa punih MSFI na MSFI za MSE i kasnijim povratkom na pune MSFI. Inercija, otpor promenama i nedovoljno poznavanje MSFI za MSE i njegovih prednosti mogu, takođe, da doprinesu da entiteti nastave da primenjuju pune MSFI.

ZAKLJUČAK

Istraživanje u radu je pokazalo da je Međunarodni standard finansijskog izveštavanja za male i srednje entitete, kao sažeta, ali i modifikovana verzija Međunarodnih standarda finansijskog izveštavanja, usvojen u velikom broju zemalja sveta, ali i da u nemalom broju zemalja on još nije usvojen, već mali i srednji entiteti primenjuju domaće ili regionalne standarde. Ekonomski razvijene zemlje, sa razvijenim sistemom finansijskog izveštavanja, uglavnom su razvile svoj standard finansijskog izveštavanja za MSE kome daju prednost u odnosu nad MSFI za MSE. Za one zemlje koje nemaju adekvatan sopstveni standard za MSE, usvajanje MSFI za MSE je način da brzo, lako i jeftino dođu do potrebnog standarda. Odluka jedne zemlje u vezi sa usvajanjem ovog standarda nalazi se i pod uticajem pripadnosti regionalnoj grupaciji. MSFI za MSE se ne uklapa podjednako dobro u svaki nacionalni ambijent. Iako je jednostavniji od punih MSFI, mnogi smatraju da je previše kompleksan, posebno za male i mikro entitete. Proces širenja ovog standarda u svetu ukazuje na to da još ne postoji opšta saglasnost ni o potrebi za jednim standardom finansijskog izveštavanja za sve MSE širom sveta.

Kada se ima u vidu da RS pre uvođenja MSFI za MSE nije imala adekvatan standard finansijskog izveštavanja za odnosne entitete, odnosno, da nije imala na raspolaganju adekvatnu nacionalnu alternativu za MSFI za MSE, a da je imala desetogodišnje iskustvo u primeni punih MSFI, što je primoralo sastavljače finansijskih izveštaja da usvoje filozofiju MSFI (koja je u značajnoj meri prenetna na MSFI za MSE), odluka o usvajanju ovog standarda može se smatrati ispravnom i logičnom. S druge strane, usvajanje MSFI za MSE u RS treba posmatrati i u kontekstu pridruživanja ove zemlje EU, gde

standard nije usvojen. Ako EU ostane pri stavu u vezi sa MSFI za MSE, a ne eliminišu se neusaglašenosti između odnosnog standarda i regulative EU (promenama regulative EU i/ili promenama MSFI za MSE), RS će, pre nego što konačno pristupi EU, morati da usvoji drugačiji standard za MSE, pri čemu upravo MSFI za MSE može da bude osnova za razvoj tog standarda.

Neke opcije koje nudi MSFI za MSE stavljene su van snage podzakonskim aktom (pravilnikom), čime su entiteti u RS ostali bez mogućnosti da svoje finansijsko izveštavanje dodatno pojednostave, posebno kada je reč o izveštavanju o uspehu i drugim promenama sopstvenog kapitala. Podzakonskim aktom, ali i kroz prevod standarda, standard je praktično modifikovan. Značajno se kasnilo sa objavljivanjem prevoda revidiranog MSFI za MSE u Republici Srbiji.

Najznačajniji rezultat istraživanja u radu je da entiteti u RS, koji imaju pravo da biraju između punih MSFI i MSFI za MSE, radije biraju pune MSFI, što znači da se polazna istraživačka hipoteza ne može prihvatiti. Tome je, bez sumnje, doprinelo dugogodišnje prethodno iskustvo u primeni punih MSFI. Iako je MSFI za MSE ponuđen kao jednostavnija, pristupačnija i, za primenu, jeftinija verzija MSFI, te koristi možda nisu uvek dovoljno uočljive ili značajne za entitete u RS koji imaju pravo izbora. Naviknuti na pune MSFI i upoznati sa njima, entiteti se nerado odlučuju da ih zamene njihovom jednostavnijom verzijom, naročito kada se ima u vidu da sam prelazak na tu sažetu verziju, ali i kasniji eventualni povratak na pune MSFI, može da donese probleme i troškove. Istraživanje je pokazalo i da entiteti koji nemaju svojstvo zavisnog radije biraju MSFI za MSE nego zavisni entiteti. Uticaj svojstva entiteta u opisanom smislu je statistički značajan, ali relativno mali. Pravna forma entiteta ne utiče na izbor između punih i sažetih MSFI. U datom kontekstu, a u skladu sa iskustvima drugih zemalja, edukacija računovođa, u smislu upoznavanja sa prednostima (ali i nedostacima) MSFI za MSE i suštinom ovog standarda, može da bude veoma značajna. Ključnu ulogu u tome imaju profesionalne računovodstvene organizacije.

Osnovni doprinos rada je u sagledavanju preferencija entiteta koji mogu da biraju između punih MSFI i MSFI za MSE, kao i uticaja svojstava entiteta na te preferencije. Doprinos rada se ogleda i u sagledavanju aktuelnog položaja MSFI za MSE u svetu i, posebno, Evropskoj uniji, kao i faktora koji su uslovili taj položaj. Konačno, doprinos rada je i u sveobuhvatnom sagledavanju položaja MSFI za MSE u regulativi i praksi finansijskog izveštavanja u RS u prvim godinama nakon njegovog usvajanja.

Najznačajnije ograničenje empirijskog istraživanja u radu je što se opredeljenje entiteta za pune ili sažete MSFI sagledava na bazi napomena uz finansijske izveštaje, gde se može pronaći informacija o tome kako se entitet opredelio, ali ne i zašto se tako opredelio. Daljim istraživanjima, metodom anketiranja, treba istražiti koji faktori su naveli sastavljače finansijskih izveštaja da odaberu jednu ili drugu osnovu finansijskog izveštavanja, kao i da li su osetili koristi i da li se suočavaju sa problemima zbog svoje odluke. S obzirom na to da je istraživanje u ovom radu sprovedeno u periodu kada je MSFI za MSE još relativno nov element regulatornog okvira finansijskog izveštavanja RS, slično istraživanje treba ponoviti u budućnosti, kako bi se uočile eventualne promene.

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Primljeno 24. oktobra 2018,
nakon revizije,
prihvaćeno za publikovanje 12. decembra 2018.
Elektronska verzija objavljena 28. decembra 2018.

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THE INTERNATIONAL FINANCIAL REPORTING STANDARD FOR SMALL AND MEDIUM-SIZED ENTITIES IN THE REPUBLIC OF SERBIA

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The paper is devoted to the review of the position of the International Financial Reporting Standard (IFRS) for Small and Medium-sized Entities (SMEs) in the financial reporting regulation and practice in the Republic of Serbia. After considering the global importance of this standard, its position in the regulatory framework for financial reporting in the Republic of Serbia, in which it was included in 2013, is analyzed, while a deeper insight into the position of the standard in practice is achieved by the empirical research on a sample of 175 enterprises. Since it has the potential to facilitate financial reporting to many companies that had previously had to apply the full IFRSs, its adoption in the Republic of Serbia is useful, but the potential problem arises from the fact that it is not adopted at the European Union (EU) level. The research in the paper reveals that the enterprises in the Republic of Serbia that can choose between the IFRS for SMEs and the full IFRSs, however, are more likely to choose the full IFRSs. This finding should be considered in the context of the long-term application of the full IFRS before the implementation of the IFRS for SMEs. Subsidiary enterprises less often choose the IFRS for SMEs than the enterprises that do not have this characteristic.

Keywords: small and medium-sized entities (SMEs), IFRS for SMEs, full IFRSs, Accounting Law

JEL Classification: M41

Original scientific paper

UDC: 339.13:336.76(560)
doi:10.5937/ekonhor1803243S

THE RELATIONSHIP BETWEEN ISLAMIC INDICES AND COMMODITY MARKETS IN TURKEY: EVIDENCE FOURIER-BASED APPROACHES

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Affecting a significant portion of the world economy, the commodity market is the world's largest "nonfinancial" market. In addition to the other macroeconomic variables, commodity prices have a special importance for Islamic stock indices, which have improved in recent years because Islamic finance is a financial system based on the profit/loss sharing principle and supports the real sector's activities. In this study, cointegration and the causality relationship between commodity markets (the Gold ounce and Brent oil) and the Participation-30 Index established by taking Islamic criteria into account were investigated in Turkey. As a result of the analysis, no cointegration relation was found between the Participation-30 Index and the commodity markets. According to these results, an investor investing in gold or oil will, in addition to the Participation-30 Index, diversify its portfolio with this commodity investment and minimize its risk. The fact that there is no relation between the variables according to the causality results indicates that the Participation-30 Islamic Indices' structure is independent of commodity markets and conventional stock markets.

Keywords: Participation-30 Islamic Indices, commodity markets, Fourier-based approaches, portfolio diversification

JEL Classification: G11, G15

INTRODUCTION

The fact that the stock market performance can be affected by commodity markets makes the relationship between commodity markets and stock markets significant. In addition to the other

macroeconomic variables, commodity prices have a special importance for Islamic stock indices, which have improved in recent years because Islamic finance is a financial system based on the profit/loss sharing principle and is especially supportive of the real sector's activities. In addition, the quantitative criteria needed in the formation of Islamic stock indices require that some ratios related to liquidity, interest rates, indebtedness and undesirable gains should be

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provided. This situation may force the enterprises included in the index to turn to real markets. Therefore, the relationship between Islamic indices and commodity markets is expected and considered to be important.

After the dot.com bubble burst in 2000, i.e. the collapse of high-tech companies' (mainly Internet companies') shares, commodity prices and commodity investment levels increased significantly. Commodity markets enable investors to benefit more from the commodity markets that have a negative price relationship with bonds and stocks in order to diversify their portfolios and also provide investors with the return they seek (Doyle, Hill & Jack, 2007, 5).

Apart from the low returns obtained from bonds and volatile stock markets, what can make commodity markets advantageous in terms of their attracting investors and preserving the existing investment is a negative correlation between commodities and bonds and stocks, on the one hand, and a positive correlation between commodities and inflation (Doyle *et al*, 2007, 45). Commodity markets affect an important part of the world economy and are considered to be the world's largest "nonfinancial" market (Doyle *et al*, 2007, 15; Junkus, 2010, 89). Each one of the commodities in these markets includes a wide range of products with specific demand and supply fundamentals

(Junkus, 2010, 89). Some important commodities that can be traded in both over-the-counter and organized commodity markets are shown in Table 1.

Amongst the mentioned commodities, petroleum from energy products and gold from precious metals come to the fore, more in terms of their effect on markets. These commodities are of a great interest to researchers and investors in terms of both high price levels and excessive volatility in prices. Crude oil prices affect almost all economic sectors (Abdullah, Saiti & Masih, 2016, 219). Gold is seen as the leading investment instrument and the leading commodity on the metal markets. In addition, gold is seen as a reliable port in order to avoid excessive risk on financial markets and an important risk management tool in hedging and portfolio diversification since it is less sensitive to the exchange rate fluctuations (Hussin, Muhammad, Razak, Tha & Marwan, 2013, 162). In fact, gold is an entity possessing the desired properties of money. This is because, unlike many other commodities, gold is durable, easily distinguishable, storable, portable and divisible and easily standardized (Baur, 2013, 5).

Islamic banks have a share of approximately 73% in the global Islamic finance sector. However, the general trend in this field is shifting from banking to Islamic capital market instruments with higher growth rates.

Table 1 The types of commodities

Energy Products	Precious Metals	Other Metals & Minerals	Agricultural Products	Soft Commodities / Other Plants	Animal Products
Brent oil	Gold	Aluminum	Wheat	Coffee	Livestock
Crude oil	Silver	Copper	Corn	Cocoa	Milk
Natural Gas	Platinum	Zinc	Cotton	Sugar	
Electric	Palladium	Lead	Potato		
Kerosene		Tin	Rice		
Heating fuel			Orange juice		
Carbon emissions					

Source: Koy, 2018, 23.

The most common of these instruments are Islamic stock indices and Islamic investment funds (Buğan, 2016, 250). In short, Islamic stock indices (Buğan, 2016, 251), which can be defined as the indices of the enterprises that meet the determined Islamic criteria, or participation indices with the name used in our country are one of the most important instruments of Islamic capital markets (Hussin *et al.*, 2013, 167). The less risky nature of Islamic stock markets and the extraordinary growth rate of these indices increase demand for these indices and are considered as one of the biggest innovations in the financial field (Raza, Ibrahimy & Ali, 2015, 4).

In general, Islamic indices (participation indices) must be in line with the Islamic criteria, unlike conventional indices. These criteria consist of the two stages: as the main activity area criteria and the financial criteria. According to the main activity area criteria, firms' main activities to be included in the index should only be in the areas deemed appropriate by Islam. In order to be able to enter the index according to financial criteria, companies should provide certain financial ratios calculated as Total Interest Loans/Market Value, Interest Income Cash and Securities/Market Value and Income from the Activities Specified in the First Criterion/Total Value (www.katilimendeksi.org). However, these criteria for Islamic indices are not completely standard for each country or each index calculator. The mentioned criteria may differ in terms of the determined values for the activity and the financial ratios (Derigs & Marzban, 2008, 289; Buğan, 2016, 252-255).

The analysis of the linkages between commodities and Islamic capital markets attracts financial actors' attention, especially as commodities are included in many investment portfolios together with a raw material and stock classes (Khan & Masih, 2014, 4). According to the ICD - Thomson Reuters (2017) Interest-Free Finance Development Report, the total assets of the global interest-free finance system grew by almost 10% compared to the previous year, having reached \$2.417 billion by the end of 2017. According to the estimates, the total Islamic finance assets are anticipated to reach \$3.8 trillion by 2022. This corresponds to an average annual growth of

approximately 10%. The total value of the capital market products in Islamic financial assets was determined to be \$509 billion by the end of 2017, and is expected to exceed US \$1 trillion by 2022. Demonstrating the interaction between such a fast-growing sector and commodity markets will enable the provision of important information to both investors and portfolio managers.

The first aim of this study is to determine whether the investors who invest in Islamic stock indices in Turkey can invest in gold or Brent oil for the purpose of their portfolio diversification. The other aim of the study is to determine whether Islamic stock index returns can be predicted by using the commodity market data. Thus, whether the Islamic markets operating on the basis of asset-based financing are related to commodity markets will be revealed.

In this context, the hypotheses of the study will be as follows:

- H1: An investor investing the Participation-30 Islamic Stock Index in Turkey can invest in gold and Brent oil for the purpose of his portfolio diversification.
- H2: Gold and Brent oil price data can be used to predict the Participation-30 Islamic Stock Index in Turkey.
- H3: There is a relationship between Islamic markets and the commodity markets operating in accordance with the principle of asset-based financing.

In order to attain the goals of the study, long-term cointegration and the causality relationship between the Participation-30, as one of the Islamic stock indices in Turkey, on the one hand, and commodity markets, on the other, are being tested. The papers on this subject matter have been written in Far-East Asian countries such as Malaysia, which has developed Islamic markets, and in Gulf countries. However, the Turkey's example has not previously been seen in any paper. This situation reveals the specificity of the study. In terms of the method, the fact that it is the first study to be examining the relationship between

the participation indices and commodity markets by using the Fourier form tests that take into account many transient structural breaks with smooth transition reveals yet another unique aspect of the study.

The study consists of five chapters. Following the introduction part, a review of the literature is given in the second section. In the third chapter, the scope and methods of the study are explained. After the findings have been presented in the fourth section, the results and the suggestions are given in the final section.

LITERATURE REVIEW

The relationship between commodity markets and stock markets has never lost its importance and has been included in a wide research area. In the literature, the relationships between oil and conventional stock returns have been researched more heavily than commodity markets (Jones & Kaul, 1996; Sadorsky, 1999; Basher & Sadorsky, 2006; Büyüksahin, Haigh & Robe, 2008; Narayan & Sharma, 2011; Fahami, Haris & Mutalib, 2014). On the other hand, the relationships between the conventional stock market indices and the Islamic stock market indices have been studied in a significant number of studies in terms of portfolio diversification (Saiti, Bacha & Masih, 2014; Nazlioglu, Hammoudeh & Gupta, 2015; Bahloul, Mroua & Naifar, 2017; Jebran, Chen & Tauni, 2017). In this study, the relationships between commodity prices and Islamic indices are discussed. Previous studies of these relationships are presented in this part of the study.

The first studies to have been investigating the relationship between Islamic markets and commodity prices are those conducted by Hussin and his colleagues. M. Y. M. Hussin, F. Muhammad, K. Noordin, N. F. Marwan and A. A. Razak (2012a) focused on the impact of shocks in oil prices and macroeconomic variables on the Islamic stock market in Malaysia. In the study, the VAR model, the Johansen-Juselius Cointegration Test and the VECM Granger Causality Test were applied to the January 2007 - December 2011 period. According to

the findings, cointegration between the Islamic stock prices, the oil price and the selected macroeconomic variables was established. According to the Granger causality, no relation was found between the Islamic stock prices and the crude oil price.

M. Y. M. Hussin, F. Muhammad, M. F. Abu and A. A. Razak (2012b) investigated the relationship between the Islamic stock markets, the oil price and the macroeconomic variables for Malaysia. The VAR model, the Johansen-Juselius Cointegration Test and the Granger Causality Test were used in the study. As a result of the paper, the Islamic stock prices were seen as being cointegrated together with the exchange rate and the oil price variables. Based on the cointegration analysis, the Islamic stock price was positively and significantly correlated with the oil price variable. According to the Granger Causality Test Analysis, the oil price variable was the Granger cause of the Islamic stock market return in Malaysia.

Hussin *et al* (2013) investigated the relationship between the FTSE Bursa Malaysia Emas Shariah Index and strategic commodities (crude oil and Kijang gold). The study covered the January 2007 - December 2011 period, and included the VAR model, the Johansen-Juselius Cointegration Test and the Granger Causality Test. According to the findings, no cointegration relationship was found between the FTSE Bursa Malaysia Emas Shariah Index and strategic commodities. Moreover, a two-way causality relationship between this index and crude oil prices was established, whereas no causality among the Kijang gold prices was found.

A. Khan and M. Masih (2014) investigated the relationships between energy indices, precious metals, agricultural products, non-ferrous metals and soft products spot indices with the Dow Jones Islamic Index. In addition, the Dow Jones Spot Commodity Index was included as the total commodity price index. The MGARCH-DCC model was used in the study covering the period from January 3, 2001 to March 28, 2013. According to the findings of the study, the relations between the commodity and the Islamic stock markets were seen to have developed over time and to have been quite variable, especially since the

2007-2008 global financial crisis. While an uncertain level of speculation was highlighted for the energy sector (oil), the safe haven role of the precious metal (gold) sector was proven.

The main purpose of the study conducted by S. H. M. Rithuan, A. M. Abdullah and A. M. M. Masih (2014) was the examination of the causal nexus between the crude oil price and the Islamic Stock Index in the Gulf Cooperation Council member countries (the UAE, S. Arabia, Qatar, Kuwait, Bahrain and Oman). The prices of the other commodities, such as corn and gold prices, were also included in the study as the control variables and the robustness tests. According to the results of the study, cointegration between the Islamic stock indices and commodities was identified by applying the Vector Error Correction Model (VECM), the Johansen Cointegration Test and the Wavelet (Wavelet) Approach. The Islamic stock indices and the crude oil prices in Saudi Arabia and Oman were found to lead to the other Islamic stock indices and commodities. According to the Discrete Wavelet Transform (MODWT) technique, the crude oil price leads to the other Islamic indices in the short run. According to the Continuous Wavelet Transform (CWT) technique, if the investor's investment period is less than 128 days, they will benefit from portfolio diversification.

T. Chebbi and A. Derbali (2015) investigated the links between Islamic capital markets (the QE Al Rayan Islamic Index) and strategic commodities (crude oil and natural gas). The GARCH-DCC method was used in the study and the results showed that the volatility in commodity returns was strongly related to the QE Al-Rayyan Islamic Index, and this result affected the financialization of commodity markets.

While investigating the role of safe-haven assets in the fields of time and frequency, N. Raza, A. Ibrahimy and A. B. Ali (2015) compared gold and the Dow Jones Islamic World Emerging Market Index for two different crisis periods. Kao Panel Cointegration Tests, the Pooled Mean Group (PMG) Estimator, and the Wavelet Approach were applied in the study. According to the findings, the Islamic

emerging markets and the BRICS stock markets were cointegrated and gold would be the portfolio diversifier of the Islamic stock markets.

The main purpose of the study conducted by A. M. Abdullah, B. Saiti and M. Masih (2016) was to investigate the dynamic causal relationship between commodity prices (crude oil, corn and gold) and the Islamic Stock Indices in Southeast Asian countries (Singapore, Philippines, Indonesia, Thailand and Malaysia). Gold and corn prices were included in the study as the control variables and the robustness tests. In the study, the Johansen Cointegration Test, the VECM-Granger Causality Test, the Wavelet Technique (MODWT and CWT), and the MGARCH-DCC model were applied. According to the findings, the Islamic stock indices and the commodity prices in the Southeast Asian countries were moving together in the long run. The Malaysian Islamic stock market indices had the lowest volatility.

M. K. Nejad, F. Jahantigh and H. Rahbari (2016) investigated the relationship between the oil price risk and the Tehran stock return for the January 2003-October 2014 period. The Gregory-Hansen, Saikkonen-Lütkepohl and Johansen-Juselius Cointegration Tests were done and a long-term relationship between Tehran Stock Index and the oil price was found.

In their study, K. M. Kisswani and M. I. Elian (2017) used the non-linear ARDL (NARDL), the Johansen-Juselius Cointegration Test, the Error Correction Model and the Granger Causality Tests to investigate the relationship between the Kuwait Stock Market (10 main sectors) and oil prices (West Texas and Brent). According to the study's findings, the oil prices and some Kuwaiti sectoral stock prices showed asymmetric long-term effects. In addition, while the empirical results for these sectors demonstrated a short-term asymmetric effect in the case of the WTI price measure, no evidence of an asymmetric effect was found, but there was a symmetric effect in the case of the price of Brent oil.

The studies mentioned are summarized in Table 2.

Table 2 The literature review

Source	Data (Frequency)	Variables		Econometric Method	Empirical findings	
		Stock exchange	Commodity		Cointegration	Causality
Hussin <i>et al.</i> , (2012a)	January 2007 - December 2011 (Monthly)	FTSE Bursa Malaysia Emas Shariah Index	Crude Oil	Johansen-Juselius cointegration test VECM Granger causality test	=	No relationship
Hussin <i>et al.</i> , (2012b)	January 2007 - December 2011 (Monthly)	FTSE Bursa Malaysia Emas Shariah Index	Crude Oil	Johansen-Juselius cointegration test Granger causality test	=	EP → ISP
Hussin <i>et al.</i> , (2013)	January 2007 - December 2011 (Monthly)	FTSE Bursa Malaysia Emas Shariah Index	Crude Oil Kijang Gold	Johansen-Juselius cointegration test Granger causality test	≠	ISP ↔ EP (Petrol)
Khan and Masih (2014)	03.01.2001-28.03.2013 (Daily)	DJ Islamic Price Index	DJ Commodity Indices	MGARCH-DCC	This analysis has not been conducted.	This analysis has not been conducted.
Rithuan, Abdullah and Masih (2014)	01.01.2000-28.02.2014 (Daily)	Gulf Cooperation Council Members Islamic Markets	Crude Oil Gold Corn	Johansen cointegration test, Wavelet approaches (MODWT and CWT)	=	ISP (S. Arabia and Oman) and EP (Petroleum) → Other ISP and EP
Chebbi and Derbali (2015)	15.03.2011 - 25.12.2014 (Daily)	Qe Al Rayan Islamic Index	Crude Oil Natural Gas	GARCH-DCC	This analysis has not been conducted.	This analysis has not been conducted.
Raza, Ibrahimy and Ali (2015)	01.01.1996 - 31.12.2014 (Daily)	DJ Islamic World Emerging Market Index, BRICS Commodity Exchanges	Gold	Kao Panel cointegration tests Wavelet approach	=	This analysis has not been conducted.
Abdullah, Saiti and Masih (2016)	01.06.2007-28.02.2014 (Daily)	Southeast Asian Islamic Stock Markets	Crude Oil Gold Corn	Johansen cointegration test, Granger causality test, Wavelet approaches (MODWT and CWT), MGARCH-DCC method	=	EP → ISP (Singapore, Philippines and Thailand)
Nejad, Jahantigh and Rahbari (2016)	January 2003-October 2014 (Daily)	Tehran Stock Market	OPEC Oil Basket	Cointegration tests (GH, Saikkonen-Lütkepohl and Johansen)	=	This analysis has not been conducted.
Kisswani and Elian (2017)	03.01.2000-09.11.2015 (Daily)	Kuwait Stock Exchange (10 Main Sector)	Crude Oil	N-ARDL Granger causality tests	=	There are different results according to the sector.

Note: ISP represents Islamic stock prices and EP represents commodity prices. In addition, “→” sign indicates one-way causality relationship, “↔” sign indicates two-way causality relationship, “=” sign indicates cointegration relationship, and “≠” sign indicates that there is no cointegration.

Source: Authors

According to the report presented in Table 2, the studies of commodity markets and Islamic markets or Islamic indices are quite limited. In addition, there is almost no study regarding this issue in Turkey. In this context, the fact that it is the first study to examine these relations in Turkish markets reveals the originality of the paper. Almost all of the studies have identified the cointegration relationship between commodity markets and Islamic markets or Islamic indices. The findings of causality were found to vary according to the country and the indices examined.

ECONOMETRIC METHODOLOGY

Structural changes are very important in a time series analysis. Structural improvements in time series can be caused for various reasons, such as economic crises, wars and political changes. The important issue at this point is that the structural changes cannot be determined by conventional econometric methods. For example, serious structural changes in time series are ignored when the ADF, the PP and the KPSS Unit Roots, the Johansen Cointegration, Granger and Toda-Yamamoto causality tests are applied. This situation may lead to false or inaccurate findings (Çil Yavuz, 2015, 308).

In this context, the literature shows us that both the unit root and the cointegration applications that take structural breaks into consideration are used. Thus, serious structural changes in data will not be overlooked. However, the disadvantage of these tests reflects in their not being capable of accounting for a large number of smooth-transition structural breaks. The authors identified shortcomings in the literature, and developed the Fourier unit root, cointegration and causality tests (Becker, Enders & Lee, 2006; Enders and Jones, 2015; Tsong, Lee, Tsai & Hu, 2015).

A Fourier series is an expansion of a periodic y_t function in the form of an infinite sum of cosines and sines. The Fourier KPSS tests developed by R. Becker *et al* (2006) use trigonometric functions to capture changes larger than the mean of the dependent variable. The advantage of this test is that it

takes into account many smooth-transition structural breaks with smooth transition. The econometric model of this test, which is the Fourier extension of the KPSS (1992) Unit Root Test, can be explained in the following manner:

$$y_t = \lambda_0 + \lambda_1 \sin\left(\frac{2\pi kt}{T}\right) + \lambda_2 \cos\left(\frac{2\pi kt}{T}\right) + v_t$$

where T represents the sample size, λ_1 and λ_2 are the Fourier coefficients, π is 3.1416, and k is the frequency used to find the optimal value that makes the sum of the residual squares the smallest.

In order to carry out this test, it is first necessary that k , which is the total of the smallest residual squares, should be determined. After determining the appropriate frequency (k), whether the F statistic obtained from this model is meaningful or not is decided by making comparisons with the critical values given by R. Becker *et al* (2006). In the final stage, the residual series of the selected model k is created and the traditional KPSS test is applied to the residual series of the series. In this way, the Fourier KPSS test is performed. According to this test, the null hypothesis indicates that the series is stationary and the alternative hypothesis indicates the existence of the unit root in the series (Beşel & Uygun, 2017).

The second method used in the study is the Fourier Cointegration Test developed by C. C. Tsong *et al* (2015). This method uses the same mathematical structure as the FKPSS Unit Root Test. In this context, in the absence of the independent variable and the Fourier function, the results of the FKPSS Unit Root Test are obtained. In the absence of the Fourier function when there is an independent variable, the results of the Y. Shin (1994) Cointegration Test will appear. According to the test, the null hypothesis indicates the existence of cointegration and the alternative hypothesis shows that there is no cointegration (Yılancı, Aslan & Özgür, 2017).

The last method used in the study was the Fourier Causality Test developed by W. Enders and P. Jones (2015). As the name implies, this test is the Fourier form of the traditional Granger Causality Test. While

almost all of the causality tests in the literature fail to take into account structural breaks, this method takes such structural breaks into consideration in a smooth transition form. This test also operates in the same econometric logic as the Fourier Unit Root and the Fourier Cointegration Tests. The difference between the Fourier methods used in the study is in terms of the hypotheses. The null hypothesis indicates that there is no causality between the series, whereas the alternative hypothesis indicates the existence of such causality.

DATA AND EMPIRICAL FINDINGS

Data

The Participation-30 Index, which has the longest time interval amongst the Islamic indices in Turkey, was used in the study as a data set representing the Islamic indices, whereas the other variables were the Brent oil price expressed in dollars per barrel and the gold ounce as the basis of dollars. As can be seen in the literature in Table 2, oil and gold were generally used to represent the commodity variable. Therefore, the commodities mentioned in the literature were preferred in this study.

The data set ranges between 7th Jan. 2011 and 4th June 2018, on a daily basis. When the studies in the literature are examined, it is determined that the observation frequency is mostly used on a daily basis. The data for the Participation-30 Index were obtained from the Foreks website (www.foreks.com), the Brent oil data were available on the US Energy Information Management’s website (www.eia.gov), whereas the gold ounce basis data were obtained from the World Gold Council’s website (www.gold.org). In order to keep the data range broad, the other İstanbul Stock Market (Borsa İstanbul) Islamic Indices, the Participation-50 and the Participation Model Portfolio, whose historical data reach back in the year 2014, were not included in the study.

The logarithmic transformations of the series data were taken so as to prevent return volatility prior

to performing the analysis. Moreover, during the Fourier Causality Tests, the findings were obtained by a 10,000 Monte Carlo Bootstrap Simulation.

The logarithmic time series graphs in the data ranges studied for the Participation-30, Brent Oil and Golden Ounce series are presented below (Figures 1, 2 and 3).

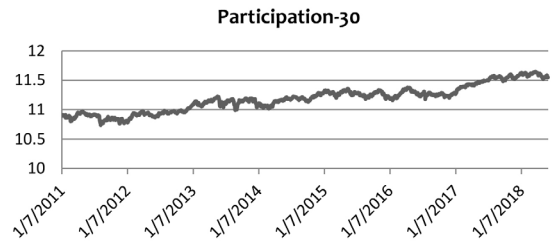


Figure 1 Participation-30 Index (Logarithmic)

Source: Authors

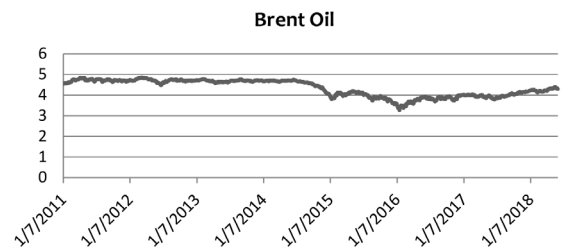


Figure 2 Brent Oil (Logarithmic)

Source: Authors

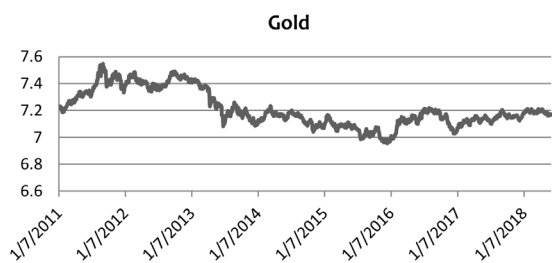


Figure 3 Gold Ounce (Logarithmic)

Source: Authors

Empirical Findings

Following the disclosure of the data used, the first procedure is to determine the stationary order of the series. According to the results in Table 3, it is seen that all the three indices have the unit roots in the level forms and become stable as a result of the first difference-taking process. Because the level-value test statistics are higher than the critical values in R. Becker *et al* (2006), the test statistics obtained as a result of the first difference are lower than those critical ones.

Table 3 The Fourier KPSS Unit Root Test results

Variables	F (k)	Level	1 st Difference
Participation-30	3	5.00	0.014***
Brent Oil	1	4.64	0.029***
Gold Ounce	1	3.49	0.014***

Note: The critical values were obtained from R. Becker *et al* (2006).

Source: Authors

It would be appropriate to investigate the cointegration relationship in such a case where the series are stationary in the first differences. The results of the Fourier SHIN Cointegration Test performed in this context are accounted for in Table 4. The H1 hypothesis, which indicates that there is no cointegration relationship for both matches, is accepted. In this context, an investor investing in the Participation-30 Index can invest in gold or Brent oil while diversifying its portfolio in order to reduce its risk.

Following the analysis of the unit root and the cointegration tests in the Fourier form, the causality test in the Fourier form is appropriate to use. According to the results of the Fourier Causality Test presented in Table 5 and developed by W. Enders and P. Jones (2015), no evidence of causality was found.

Table 4 The Fourier SHIN Cointegration Test results

	MinSSR	F (k)	Fm (k)	Tm (k)
Gold Ounce and Participation-30	19.98	2	14.80	0.67
Brent Oil and Participation-30	38.91	3	3.55	2.39

Note: The critical values for the Participation-30 and the gold ounce mapping were 0.078, 0.099 and 0.163, at the level of significance of % 1, 5 and 10, respectively. The critical values for the Participation-30 and the Brent oil mapping were 0.090, 0.114 and 0.170 at the level of significance % 1, 5 and 10, respectively. These values were obtained from C. C. Tsong *et al* (2015).

Source: Authors

Table 5 The Fourier Granger Causality Test results

The Direction of Causality	Wald Statistics	Asymptotic p-value	Bootstrap p-value
Participation-30 → Brent Oil	0.068	0.795	0.800
Brent Oil → Participation-30	1.239	0.266	0.263
Participation-30 → Gold Ounce	2.679	0.102	0.103
Gold Ounce → Participation-30	1.340	0.246	0.236

Source: Authors

CONCLUSION

The commodity market is the largest non-financial market in the world affecting a significant part of the world economy. The fact that the stock market performance can be affected by commodity markets makes the relationship between commodity markets and stock markets important. In addition to the other macroeconomic variables, commodity prices have

been bearing special importance to the Islamic stock indices or the participation indices in our country in recent years because Islamic finance is a financial system based on the profit/loss sharing principle and is supportive of the activities carried out in the real sector in particular.

In this study, long-term cointegration and the causality relationships between the Islamic indices and the commodity markets in our country were investigated. Financial cointegration reveals the long-term relationships of the variables and provides investors with important pieces of information for their portfolio diversification. By means of the causality tests, the important other financial assets or market data forecasting clues are possible to obtain from a particular financial asset or market data. The daily data covering the period between 7th Jan. 2011 and 4th June 2018 were used in the study. In terms of the methodology, the relationship between the Participation-30 Index and commodity markets was examined by performing the Fourier form tests. In this context, the stability structures of the time series were examined through the Fourier KPSS Unit Root Test; the long-term relationships between the variables were investigated by applying the Fourier SHIN Cointegration Test, whereas the causality relations between the variables were examined by doing the Fourier Granger Causality Test.

According to the Fourier KPSS Unit Root Test used in the study, all of the three series (the Participation-30, Brent Oil and Ounce Gold) evidently have the unit roots in the level values and become stable as a result of the first difference-taking process. According to the Fourier SHIN Cointegration Test results, there is no long-term relationship between the Participation-30 Index and the ounce gold and Brent oil. In other words, an investor investing in the Participation-30 Index will be able to invest in gold or Brent oil while diversifying its portfolio in order to reduce its risk because an investor can diversify its portfolio by investing in the financial assets that do not act together in the long run. According to these results, the H1 hypothesis, assuming a portfolio diversification benefit amongst the variables, is accepted. The Fourier Granger Causality Test indicates no causality relationship to

have been found between the Participation-30 Index and the ounce gold and Brent oil commodities. Thus, these variables will not be used together in making revenue estimates among financial assets. According to these results, the H2 and H3 hypotheses, assuming a relationship between the variables, are rejected. The results obtained by the Fourier SHIN Cointegration Test were compatible with Hussin *et al* (2013). On the other hand, the results obtained by the Fourier Granger Causality Test were in line with Hussin *et al* (2012a) and Hussin *et al* (2013) only for the gold ounce.

The study's most important result is that an investor investing in the Participation-30 Islamic Stock Indices in Turkey will be able to invest gold and Brent oil for his portfolio diversification. Another important result of the study is that, although the gold and the oil commodity markets are the world's largest nonfinancial markets, there is no causal relationship between the Islamic markets operating in the context of asset-based financing and the commodities mentioned. Thus, the gold and Brent oil price data cannot be used in the prediction of the Islamic Participation-30 Stock Index in Turkey.

There are several limitations of this study. First, as Islamic markets, especially so the Islamic Stock Indices, are relatively new in Turkey, the number of the observations that can be used in analysis is limited. On the other hand, the fact that the market is still very new also raises the question of the effectiveness of the market. For this reason, similar studies can be done again in subsequent periods, when these restrictions have been eliminated. Moreover, the relationship between the two other indices in our country (the Participation-50 and the Participation Model Portfolio) or the international Islamic indices and other commodities other than gold and Brent oil or international commodity indices can be investigated in future studies. In addition, the causality test performed in this study is related to causality in the mean. Future studies, however, may generate important pieces of information about the analysis of causality in variance or causality in frequency tests.

ENDNOTE

This paper was expanded from notification presented at the 22nd Finance Symposium with international participation on 10-13 October 2018, Mersin, Turkey.

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Received on 27th October 2018,
after revision,
accepted for publication on 12th December 2018
Published online on 28th December 2018

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RELACIJA ISLAMSKIH INDEKSA I ROBNIH TRŽIŠTA U TURSKOJ: PRISTUP ZASNOVAN NA FURIJEOVOM UČENJU

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Robno tržište, koje utiče na značajan segment svetske ekonomije, predstavlja najveće svetsko nefinansijsko tržište. Pored makroekonomskih varijabli, cene robe su posebno bitne za islamske berzanske indekse, koji su se poboljšali u poslednjih nekoliko godina, zato što islamske finansije predstavljaju finansijski sistem koji je zasnovan na načelu deljenja dobiti i gubitka i koji podržava aktivnosti koje se preduzimaju u realnom sektoru. U ovoj studiji je istraživana kointegracija i uzročno-posledična veza robnih tržišta (unce zlata i brent nafte) i Indeksa učešća-30 u Turskoj, koji je uspostavljen uzimanjem u obzir islamskih kriterijuma. Kao rezultat analize, nije dokazano postojanje kointegracije između Indeksa učešća-30 i robnih tržišta. Prema tim rezultatima, investitor koji ulaže u zlato ili naftu će, pored Indeksa učešća-30, diversifikovati svoj portfolio, sa ovom robnom investicijom, svodeći time rizik na najmanji mogući nivo. Činjenica da, prema rezultatima analize uzročno-posledične veze, ne postoji nikakav odnos između različitih varijabli, ukazuje na to da je struktura islamskih Indeksa učešća-30 nezavisna od robnih tržišta i konvencionalnih berzi.

Ključne reči: islamski Indeksi učešća-30, robna tržišta, pristupi koji se zasnivaju na Furijeovom učenju, diversifikacija portfolija

JEL Classification: G11, G15

Review paper

UDC: 004.4

doi:10.5937/ekonhor1803257P

THE ASSESSMENT AND RANKING OF FAILURES IN THE INFORMATION TECHNOLOGY INDUSTRY BASED ON FMEA AND MCDM

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In the course of global trends, the development and application of information technologies have emerged as a valuable source of the economy at both the micro and the macro levels. According to the results of the best practice, the application of a piece of software with failures is known to possibly to serious consequences. The analysis and elimination of potential failures in commercial software is the problem that represents one of engineers' most important tasks. In this paper, a new integrated model for the evaluation and ranking of software failures is proposed. The cost aspect is integrated into the traditional severity index. The assessment of the severity indices, as well as a possibility of detection, is based on the Failure Mode and Effects Analysis - FMEA framework. The weights of the overall severity index, the occurrence of failures, and the possibilities of detection are calculated by applying the best-worst method. The determination of the rank of the identified failures is given by applying conventional Technique for Order of Preference by Similarity to Ideal Solution - TOPSIS. The priority of the activities that are undertaken in order to eliminate the identified failures corresponds to the obtained rank of the failures. The proposed model is illustrated by real-life data.

Keywords: software development, Failure Mode and Effects Analysis, Best-Worst method, Technique for Order of Preference by Similarity to Ideal Solution

JEL Classification: C6, I2

INTRODUCTION

The development of the information technology (IT) sector has significantly been changing the habits and

needs of people. Nowadays, people are completely surrounded by information technologies, starting from smartphones, computers, smart TVs, via other new-generation home appliances, to their jobs, where work is unimaginable without information technologies. Today, the information technology sector is one of the main drivers of the development

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of the economy (Papaioannou & Dimelis, 2007) because the products and services in this domain are very much required on the market. Many countries highlight the IT sector as one of the pillars of their economic development and invest in the education of the necessary staff (Dedrick, Kraemer & Shih, 2013).

According to the lean concept of enterprise management and the results of good practice, it is known that if the final product, a piece of software in this particular case, has a failure in itself and reaches the customer it can bring about catastrophic consequences to the company, such consequences reflecting in a decrease in the profit, lesser market competitiveness, a loss of customers, etc. Therefore, the identification, analysis and elimination of a failure which may be found on a piece of software as a product is one of the most important tasks of both programmers and other engineers from within IT companies.

One of the most-used methods for failure analysis is the Failure Mode and Effects Analysis (FMEA), primarily in the automotive and airline industries. In the literature, there are papers treating the problem of the failure analysis of products and processes in the IT sector based on the FMEA framework (Signor, 2002; Silva, de Gusmão, Poletto, e Silva & Costa, 2014). In conventional FMEA, the rank of failures is obtained according to the Risk Priority Number (RPN), which on its part is obtained as a product of all of the three considered criteria (severity, occurrence and detection). For the automotive industry, the values of these criteria and the rules for undertaking corrective actions are defined by the Automotive Industry Agency Group. The RPN range is (1-1000), whereas the values of the severity, occurrence and detection criteria have a range of (1-10). Corrective actions should be undertaken at any time, but especially when the RPN value exceeds 100, or one of the risk indices value exceeds 8.

In the conventional FMEA method, the severities of consequences are assessed by observing the quality aspect. Many authors think it is necessary to consider the other aspects, primarily the cost aspect (Carmignani, 2009; Abdelgawad & Fayek,

2010; Banduka, Tadić, Mačuzić & Crnjac, 2018). Cost estimation is made by using new calculation formulas as in G. Carmignani (2009). In the paper of M. Abdelgawad and A. R. Fayek (2010), the overall severity index is considered with respect to the three dimensions, namely: the cost, the time, and the quality/scope. N. Banduka *et al* (2018), define a new scale for cost assessment.

On the other hand, in the traditional FMEA method, all of the considered criteria are assumed to have equal relative importance. With respect to the results of the best practice, this assumption can be said not to be completely accurate. Hence, many authors suggest that the values and the rank of failures should be stated as a multi-criteria optimization (MCDM) problem (Song, Ming, Wu & Zhu, 2014; Liu, You, Li & Su, 2016). This problem can be solved by using one or a combination of several MCDM methods. The most used methods are the Analytic Hierarchy Process - AHP, the Technique for Order of Preference by Similarity to Ideal Solution - TOPSIS, etc.

The subject of this research is the evaluation of potential failures in software used for business process management problems.

The aim of the research study is to develop a new multi-criteria optimization model based on the FMEA framework for the estimation and ranking of failures in the IT sector.

According to the defined goal, the following hypotheses can be formulated:

- H1 The evaluation and ranking of failures can be performed in an exact manner.
- H2 By using the proposed method, the priority of the activities that need to be employed in order to eliminate a possibility of delivering the final product with a failure to the customer is determined in an exact manner.

Every solution obtained in an exact manner is known to be less burdened with decision-makers' subjective assessments and can be considered as more precise. On the other hand, the use of resources (human,

time-related and financial) for failure elimination is significantly reduced, which further leads to a reduction in business expenses, i.e. to an increase in a profit.

The instrumentarium used in this paper can be described as follows: the severities-based and detection scenarios are defined according to the relevant literature and the expert opinion; the relative importance of severity, occurrence and detection is determined by applying the Best-Worst method (Rezaei, 2015); the ranking of failures can be performed by applying the Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS) method (Hwang & Yoon, 1981).

This paper is organized in five sections. In Section Two, a literature review of the relevant literature in the domain of the FMEA method and the MCDM method based on the FMEA framework for the assessment and selection of failures is given. Section Three presents the proposed model. In Section Four, the proposed model is tested by means of the literature data, whereas the conclusion is given in Section Five.

LITERATURE REVIEW

In the literature, there are a few papers addressing the problem of failure priority determination, which may occur in different products and in different sectors of information technology processes. Furthermore, a short analysis of the considered papers is shown, the main topic of these papers being the application of the FMEA analysis in the information technology domain.

M. C. Signor (2002) developed a model for risk priority determination, i.e. the Failure-Analysis Matrix (FAM), which is conceived as an alternative to the FMEA analysis in the information technology domain. The FAM matrix is based on the detection of the key failures, after which all potential solutions to the elimination of one single failure at least are necessary to find. Then, such alternative solutions are presented in rows, whereas the estimated costs of such solutions, the priority of a solution and a reduction in defects

expressed in percentages are given in columns. The application of the created matrix reflects in the determination of the extent to which each such solution is effective when the elimination of each such failure is concerned. It depends on the extent to which the considered solution is good for the treatment of the considered failure, and such reduction in defects expressed in percentages is determined. It should be noted that the FAM matrix is significantly simpler and less extensive in comparison with the FMEA. That can be marked as the main advantage of FAM in comparison with the FMEA. When the FMEA is used, each potential failure is assumed to be taken into consideration, whereas in the FAM matrix, only a few failures with the biggest impact are considered. This is a significant disadvantage of the FAM matrix.

M. M. Silva *et al* (2014), employed the FMEA analysis and the fuzzy sets theory in order to identify and reduce the occurrence of failures in the information safety and data protection domain(s). By this approach, the five basic dimensions of information safety are analyzed, namely: access to information and systems, communication security, the infrastructure, security management, and secure information systems development. Each of these dimensions includes several (from 3 to 6) identified failure modes. Experts estimate the Occurrence, Severity and Detection of each such identified failure by using pre-defined linguistic expressions. They are modeled by trapezoidal type-1 fuzzy sets. The fuzzy value of each considered dimension is calculated as a sum of the fuzzy values of all of the identified failures under the considered dimension. By applying the defuzzification procedure, and according to the fuzzy rules (Belohlavek & Klir, 2001), the fuzzy values of dimensions are described by crisp values. In this way, the framework for the application of the FMEA analysis in the information system domain was developed.

In the paper by A. C. F. Guimaraes *et al* (2011), the authors employed the FMEA analysis for the estimation of the digital system safety (feedwater systems) in nuclear power plants. The analysis developed in this paper is based on the conventional FMEA, where the RPN (Risk Priority Number) is calculated as the multiplication of the O, S and D factors. For each

considered digital controller, an RPN is determined. According to the rank of the obtained RPN values, the priority of the failures and the priority of the actions are determined, which need to be implemented for the purpose of eliminating these failures at the level of each controller. A comparison of the RPN values obtained in two manners is also performed. The considered values are determined by using: standard measure scales, and the Expert's estimations modeled by applying the fuzzy If-Then rules (Zadeh, 1992). The authors have concluded that the fuzzy approach is better than simple data collecting from records and by applying the traditional FMEA measure scales because this approach combines the knowledge and experience of experts, and can be better in the case of the unreliability of the data obtained from the records and the values of the analyzed parameters. One of the most important advantages of this approach is the simplicity of obtaining values for each RPN factor (O, S and D), which is very complex to do in the standard approach.

The use of the FMEA analysis is, among other things, based on the assumption that S, O and D have the same relative importance. According to the results of the best practice in any economy domain, this fact is not always quite exact. Respecting this fact, in order to improve decision-making, many authors consider the integration of the FMEA with the multi-criteria optimization methods necessary to perform (Song *et al*, 2014; Liu *et al*, 2016). In the papers by H. C. Liu *et al* (2015) and H. C. Liu *et al* (2016), the authors developed a new model for failure priority determination, which is based on the FMEA framework, and is implemented through three phases. In Phase One, the identification of the ways of a failure occurrence is performed using by applying the VIKOR method (Opricović & Tzeng, 2004). In Phase Two, an influential relation map is created by using DEMATEL. In Phase Three, the authors use the AHP method (Saaty, 1990) for the determination of weights for each identified failure. In the paper by W. Song *et al* (2014), the integration of the TOPSIS method and the FMEA analysis is performed. All of the existing uncertainties are described by the rough sets theory (Pawlak, 1982). This model mainly lacks a limited possibility of being applied in practice because it requires additional expertise when the rough sets theory is concerned. In H. C.

Liu *et al* (2015), uncertainties are modeled into S, O, or D by applying Interval-Valued Intuitionistic Fuzzy Sets. A Multi-Attributive Border Approximation Area Comparison is used for ranking the manners in which failures occur. In the paper by R. Aslani *et al* (2014), the weights of S, O, and D are presented by applying the fuzzy AHP (Chang, 1996). These authors suggest a new procedure for the calculation of the RPN. According to the calculated RPN values, the rank of such identified failures is given. A. C. Kutlu and M. Ekmekcioglu (2012) have integrated the fuzzy AHP and the fuzzy TOPSIS methods, so that the weights S, O and D are determined by using the fuzzy AHP (Aslani *et al*, 2014), and the rank of failures is determined by applying the fuzzy TOPSIS method. Imprecise and uncertain data are described by triangular type-1 fuzzy numbers.

In this paper, a new FMEA-framework-based multi-criteria optimization model for ranking failures is developed. The severity index is considered from the two aspects: the quality and the cost. The authors of this paper consider that the proposed scale can be used to determine the severity of the consequences occurring due to the realization of failures in the IT sector with sufficient accuracy.

The weights of S, O, and D are determined by applying the BWM (Rezaei, 2015). Compared to other methods, e.g. to the AHP (Saaty, 1990), the BWM method has certain advantages, such as: the logical framework of the BWM is closer to the human way of thinking than the AHP method, for which reason this method is more useful for solving problems in practice. Therefore, the determination of weights by using the BWM method can be said to be simpler, clearer and more precise. The rank of identified failures is determined by using the TOPSIS method (Kutlu & Ekmekcioglu, 2012; Song *et al*, 2014).

THE PROPOSED MODEL

The analysis of the failures that can occur in software products is conducted based on the criteria defined according to the FMEA. In general, possible failures can formally be presented by a set of indices

$\gamma = \{1, \dots, k, \dots, K\}$. The index for a criterion is denoted as a small k , and the capital K is the total number of the considered criteria. In this case, the treated criteria are severity, occurrence and possible detection. All the identified failures can be formally presented as $G = \{1, \dots, g, \dots, G\}$. The failure index is denoted as a small g , $g=1, \dots, G$. The total number of failures is denoted as the capital G .

The treated problem can be stated as a multi-criteria optimization (MCDM) task. The relative importance of the risk factors is assessed by the decision-maker, whose assessments are based on the literature data and the results of good practice and who uses the standard measurement scale (Saaty, 1990). By applying the BWM (Rezaei, 2015), the optimal risk factor weights are calculated. The elements of the decision matrix represent the values of the criteria obtained by the decision-maker's rating and the evidence data. The decision-makers base their assessments on the scales defined in this paper. The authors of this paper have proposed the scales for the information technologies sector. The rank of possible failures may be given by using the conventional MCDM method. In this paper, the authors suggest that the TOPSIS method should be used because it has a wide application in solving the problem of failure ranking.

The quality severity index, the cost safety index, the index of error occurrence and the possibility of failure detection are assessed in accordance with the proposed scales presented in following tables (Table 1, 2, 3 and 4).

Table 1 The scenario-based table for the quality severity quality index

Grade	Linguistic expressions
1	Without an impact on the quality
2	A very low impact on the quality
3	A low impact on the quality
4	A medium impact on the quality
5	A high impact on the quality
6	A very high impact on the quality
7	An extremely high impact on the quality

Source: Authors

Table 2 The scenario-based table for the cost severity quality index

Grade	Linguistic expressions
1	Very low costs
2	Low costs
3	Medium costs
4	High costs
5	Very high costs

Source: Authors

Table 3 The scenario-based table for occurrence

Grade	Linguistic expressions
1	Very rarely
2	Rarely
3	Periodically
4	Frequently
5	Very frequently

Source: Authors

Table 4 The scenario-based table for detection

Grade	Linguistic expressions
1	Not possible to detect
2	An extremely low possibility of detection
3	A very low possibility of detection
4	A low possibility of detection
5	A medium-low possibility of detection
6	A medium-high possibility of detection
7	A high possibility of detection
8	A very high possibility of detection
9	An extremely high possibility of detection

Source: Authors

The Proposed Algorithm

The algorithm of the proposed model is presented as follows:

Step 1. Determine the best (the most important) and the worst (the least important) risk factor.

Step 2. Determine the preference of the best risk factor over all the other risk factors. Formally, it can be written as the matrix $A_B = [a_{b1'} \dots a_{bk'} \dots a_{BK}]_{1 \times K}$. The preference of the worst risk factor over all the other risk factors is similarly defined and presented by the matrix $A_W = [a_{1W'} \dots a_{kW'} \dots a_{KW}]_{1 \times K}$. The values of the constructed matrices are defined in a common measurement scale (Saaty, 1990).

Step 3. The calculation of the optimal risk factors weights can be stated as a linear programming problem:

The objective function

$$\min \max_k \left\{ \left| \frac{w_B}{w_k} - a_{Bk} \right|, \left| \frac{w_k}{w_W} - a_{kW} \right| \right\} \quad (1)$$

s.t.

$$\sum_{k=1}^K w_k = 1$$

$$w_k \geq 0, k = 1, \dots, K$$

Step 4. Transform the constructed LP model in the following LP problem suitable for the use of the simplex method:

$$\min \{ \zeta \} \quad (2)$$

s.t.

$$\left| \frac{w_B}{w_k} - a_{Bk} \right| \leq \zeta, k = 1, \dots, K$$

$$\left| \frac{w_k}{w_W} - a_{kW} \right| \leq \zeta, k = 1, \dots, K$$

$$\sum_{k=1}^K w_k = 1$$

$$w_k \geq 0, k = 1, \dots, K$$

Step 5. By solving the problem (Eq. 2), the optimal weights vector is obtained:

$$[w_1^*, \dots, w_k^*, \dots, w_K^*]_{1 \times K} \quad k = 1, \dots, K \quad (3)$$

Step 6. The quality severity index, $S_{g1'}$, the cost severity index, $S_{g2'}$, the failure occurrence index, $O_{g'}$, and the index of a possibility of detection, $D_{g'}$, at the level of each failure g , $g = 1, \dots, G$ are determined according to the proposed scales.

Step 7. Calculate the overall severity index for each failure g , $g = 1, \dots, G$ by using the averaging method:

$$S_g = \frac{1}{2} \cdot (S_{g1'} + S_{g2'}) \quad (4)$$

Step 8. Determine the positive-ideal solution (PIS), v_k^+ , and the negative-ideal solution (NIS), v_k^- , for all of the criteria:

$$v_k^+ = \max_{g=1, \dots, G} r_{gk}, \quad v_k^- = \max_{g=1, \dots, G} r_{gk} \quad (5)$$

where $r_{gk} = S_{g'}, O_{g'}, D_{g'}, g = 1, \dots, G$

Step 9. Calculate separation measures.

$$d_g^+ = \sum_{k=1}^K w_k \cdot |v_k^+ - r_{gk}|, \quad d_g^- = \sum_{k=1}^K w_k \cdot |v_k^- - r_{gk}| \quad (6)$$

Step 10. Calculate the coefficient of relative closeness to the ideal solution, defined as:

$$c_g = \frac{d_g^-}{d_g^- + d_g^+} \quad (7)$$

Step 11. Failures are ranked according to the level of trust in the descending order.

Step 12. The priority of the management initiatives corresponds to the obtained rank.

AN ILLUSTRATIVE EXAMPLE

The developed method is tested on the data obtained from the CIM center (Computer Integrated Manufacturing) located at the Faculty of Engineering in Kragujevac. In this center, the business process management models and the correspondent software are being developed. The failures that occur in the software development process and that can be identified in the software testing process are obtained based on the data generated from the records, as well as on the basis of the knowledge of and the estimations made by the software engineers working in this center.

The estimations of severity, occurrence and detection values for the identified failures are shown in Table 5.

Table 5 The estimations of the severity, occurrence and detection values for each identified failure

Failure	S		O	D
	Q	C		
Software inflexibility to different operative systems	5	4	3	6
Upgrade inability	6	5	2	7
Inability to meet customer demands and dysfunctionality	7	5	4	8
Inadequate graphical user interface design	5	2	2	2
Low operative performance and bagging problems during execution	6	4	5	7
Total software blockade	7	4	1	9

Source: Authors

By applying the proposed algorithm (Step 1 to Step 5), the weights of severity, occurrence and detection are determined.

$$A_B = [1, 7, 4]$$

$$A_W = [1, 7, 4]$$

The weights determination problem can be expressed by the LP task.

$$\min \{0.145\}$$

s.t.

$$\left| \frac{w_1}{w_2} - 7 \right| \leq 0.145$$

$$\left| \frac{w_1}{w_3} - 4 \right| \leq 0.145$$

$$\left| \frac{w_2}{w_3} - 2 \right| \leq 0.145$$

$$w_1 + w_2 + w_3 = 1$$

So, the obtained optimal weight vector is

$$(0.7209, 0.1052, 0.1739)$$

According to the proposed algorithm (Step 6 to Step 8), the decision matrix is constructed and PIS and NIS are presented (Table 6).

Table 6 The decision matrix, PIS and NIS

Failure	S	O	D
Software inflexibility to different operative systems	4.5	3	6
Upgrade inability	5.5	2	7
Inability to meet customer demands and dysfunctionality	6	4	8
Inadequate graphical user interface design	3.5	2	2
Low operative performance and bagging problems during execution	5	5	7
Total software blockade	5.5	1	9
PIS	6	5	9
NIS	3.5	1	2

Source: Authors

The separation measurements are calculated by applying Eq. (6), and the coefficient of relative closeness to the ideal solution for each identified failure is calculated by applying Eq. (7). This

procedure is illustrated by the following example:

$$d_1^+ = 0.7209 \cdot |6 - 4.5| + 0.1052 \cdot |5 - 3| + 0.1739 \cdot |9 - 6| = 6.5094$$

$$d_1^- = 0.7209 \cdot |3.5 - 4.5| + 0.1052 \cdot |1 - 3| + 0.1739 \cdot |2 - 6| = 1.6269$$

$$c_1 = \frac{1.6269}{1.6269 + 6.5094} = 0.1999$$

The coefficient of relative closeness to the ideal solution is calculated in the same manner and presented in Table 7. According to the calculated values, the rank of the failures is determined.

Table 7 The values of the relative closeness coefficient and the failures rank

Failure	d_i^+	d_i^-	c_i	Rank
Software inflexibility to different operative systems	6.5094	1.6269	0.1999	5
Upgrade inability	1.0238	1.7209	0.6269	4
Inability to meet customer demands and dysfunctionality	0.2791	3.1613	0.9189	1
Inadequate graphical user interface design	3.3352	0.1052	0.0306	6
Low operative performance and bagging problems during execution	1.0687	2.3716	0.6893	3
Total software blockade	0.7811	2.6593	0.7729	2

Source: Authors

The first-ranked failure in the given ranking is the inability to meet customer demands and dysfunctionality, and it has the biggest impact on software usability. The second-ranked failure in the

given ranking is the total software blockade. It is clear that software engineers primarily need to undertake activities for the elimination of these two failures. Some of the activities are implicative of finding oversights in the software development process that lead to the occurrence of these failures. Sometimes, these oversights can be eliminated if they are minor. It is not a rare case that a program must be written from the very beginning, i.e. it must be subjected to the execution of software re-engineering. It is necessary that an updated software version should be tested so as to determine the (no)existence of such failures. The third- and fourth-ranked failures in the giving ranking are the low operative performance and bagging problems during execution failure, and the upgrade inability failure, respectively. According to the obtained relative closeness coefficient values, these failures can be said to have an almost similar impact on software usability, which further means that the activities for the elimination of these failures should simultaneously be carried out. The failure ranked the last is the inadequate graphic user interface design, with a significantly low impact on the software quality.

CONCLUSION

It is clear that the assessment and determination of the priority of failures, as well as the existence of a number of issues, take an important place. In this paper, a novel approach to the assessment and ranking of failures in the IT sector is presented. Based on the obtained results, the decision-maker may define the appropriate activities that should lead to a decrease in the risk of delivering a product with a failure to the customer, which further propagates long term sustainability. The proposed model was tested against real-life data.

- The key results of this research study are as follows:
- The new tables (related to severity and detection) for the IT sector are created.
- The new cost severity index is generated.

- The relative importance of the defined severity, occurrence and detection is determined by applying the BWM method.
- All the changes, inclusive of the changes in the number of failures, can easily be incorporated into the model.

The considered problem may be described by using the formal language as an MCDM problem enabling the determination of the failure rank in an exact manner, for which reason the first hypothesis has been proven.

Activity undertaking in the shown order may bring about a reduction in the time spent and the cost incurred in the software updating process. In this manner, the second hypothesis has been proven.

Beside the aforementioned various advantages of the proposed model for the selection of failures, there are certain limitations pertaining to it, namely:

- The new approach is complex and time-consuming, just like the other models combining the MDCM and the FMEA methods. Therefore, a certain automatized solution is needed in order to overcome this problem.
- The rating of the relative importance of severity, occurrence and detection, as well as their values, depends on decision-makers' knowledge and experiences.
- Although, sometimes, the effect of a failure does not lead to a safety consequence, this factor is still taken into consideration in the course of risk evaluation.

At the same time, the proposed model can be applied to the assessment and ranking of failures in IT companies operating in a real environment.

A further research study should include new aspects in the severity index.

ACKNOWLEDGEMENTS

This paper was supported by the Croatian Science Foundation under the project entitled "Innovative Smart Enterprise - INSENT" (1353) and by the European Commission under the "Green-Tech-WB: Smart and Green Technologies for Innovative and Sustainable Societies in Western Balkans" Erasmus Mundus Project (551984-EM-1-2014-1-ES-ERA MUNDUS-EMA2).

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Received on 12th October 2018,
after revision,
accepted for publication on 12th December 2018
Published online on 28th December 2018

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OCENA I RANGIRANJE GREŠAKA U INDUSTRIJI INFORMACIONIH TEHNOLOGIJA ZASNOVANI NA FMEA I VIŠEKRITERIJUMSKOJ OPTIMIZACIJI

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Globalizacija i savremeni trendovi usloveli su ubrzan razvoj i primenu informacionih tehnologija, koje danas postaju jedna od najznačajnijih grana privrede svake razvijene države. Prema rezultatima iz prakse može se uvideti da primena *software*-a koji tokom rada prave različite greške, mogu dovesti do ozbiljnih posledica. Analiza i eliminacija potencijalnih grešaka u komercijalnim *software*-ima predstavlja problem koji se može označiti kao jedan od osnovnih zadataka inženjera. U ovom radu predložen je novi integrisani model za ocenu i rangiranje potencijalnih grešaka kod *software*-a, zasnovan na *Failure Mode and Effects Analysis* (FMEA) i višekriterijumskoj optimizaciji. FMEA analiza primenjena je tako da je troškovni aspekt uvršten u standardni indeks ozbiljnosti posledice, a uz to, pri analizi grešaka, razmatrana su i ostala dva indeksa (faktora) FMEA analize, odnosno mogućnost detekcije i učestalost pojave grešaka. Vrednosti težinskih koeficijenata indeksa ozbiljnosti posledice, mogućnosti detekcije i učestalosti pojave grešaka određene su primenom Best-Worst metode. Određivanje ranga razmatranih grešaka izvršeno je pomoću konvencionalne metode *Technique for Order of Preference by Similarity to Ideal Solution* (TOPSIS). U skladu sa dobijenim rangom, određen je prioritet aktivnosti koje se preduzimaju kako bi se eliminisale identifikovane greške. Predloženi model testiran je na podacima iz prakse.

Ključne reči: razvoj *software*-a, Failure Mode and Effects Analysis, Best-Worst, Technique for Order of Preference by Similarity to Ideal Solution

JEL Classification: C6, I2

Prikaz naučne konferencije

UDK: 33:005.745(497.11)"2018"(049.32)

doi:10.5937/ekonhor1803269N

V-TA MEĐUNARODNA NAUČNA KONFERENCIJA: CONTEMPORARY ISSUES IN ECONOMICS, BUSINESS AND MANAGEMENT - EBM 2018

9-10. novembar 2018, Ekonomski fakultet Univerziteta u Kragujevcu,
Kragujevac, Republika Srbija

Jelena Nikolić*

Brojni izazovi i problemi u oblasti ekonomije i menadžmenta uslovljavaju različite teorijsko-metodološke odgovore koji podrazumevaju razvoj novih koncepata, metodologija, metoda, modela i tehnika. Polazeći od kompleksnosti, aktuelnosti i relevantnosti savremenih problema ekonomije i menadžmenta, Ekonomski fakultet Univerziteta u Kragujevcu organizovao je V-tu međunarodnu naučnu konferenciju *Contemporary Issues in Economics, Business and Management* (EBM 2018), koja je održana 9. i 10. novembra 2018. Predmet razmatranja, u radovima koje su dostavili i prezentirali učesnici EBM 2018, bile su različite teme iz oblasti menadžmenta, marketinga, globalizacije, regionalizacije, računovodstva, poslovnih finansija, informacionih sistema i kvantitativnih metoda

i modela u ekonomiji i menadžmentu. Bijenalna međunarodna naučna konferencija EBM 2018 okupila je, do sada, najveći broj učesnika, ukupno 127 autora - 88 autora sa visokoobrazovnih institucija u Srbiji i 39 autora iz inostranstva (Poljska, Rusija, Nemačka, Slovenija, Japan, Španija, Hrvatska, Mađarska, Bosna i Hercegovina), koji su podneli 64 rada.

Na naučnoj konferenciji EBM 2018, podneta su tri uvodna referata.

Oslanjajući se na teoriju društvenog identiteta, D. Tipurić (Ekonomski fakultet Univerziteta u Zagrebu, Republika Hrvatska), u svom uvodnom izlaganju se bavio pitanjem organizacione identifikacije, kao procesom kognitivnog povezivanja pojedinca i organizacije, sa posebnim osvrtom na proces organizacione identifikacije u visokoobrazovnim institucijama na području Jugoistočne Evrope. Posebno je istaknut značaj razumevanja stepena u

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kojem se zaposleni identifikuju sa organizacijom, jer doprinosi njihovoj posvećenosti poslu koji obavljaju u toj organizaciji, zadovoljstvu poslom, kao i ostvarenim performansama. Pored organizacione identifikacije, ukazano je na značaj istraživanja profesionalne identifikacije. Dobijeni rezultati pokazuju da se nastavnici i saradnici iz oblasti menadžmenta u većoj meri identifikuju sa visokoobrazovnom institucijom u kojoj su zaposleni nego sa profesijom.

Uvodna izlaganja B. Begovića (Pravni fakultet Univerziteta u Beogradu, Republika Srbija) i V. Kufenka (Institut za ekonomiju Univerziteta u Hohenhajmu, Nemačka), bila su posvećena relevantnim problemima izgradnje efikasnih institucija i njihovog značaja za ekonomski rast i razvoj. U izlaganju B. Begovića, zasnovanom na komparativnom istraživanju povezanosti institucija i kulture, s jedne strane, i ekonomskog rasta, s druge strane, ukazano je na potrebu za traženjem odgovora na pitanje: da li su i u kojoj meri institucije i kultura alternativna ili komplementarna objašnjenja? Zaključeno je da institucije i kultura kao komplementarni mehanizmi imaju značajan uticaj na ekonomski rast. Zajedničko delovanje institucija i kulture, kao faktora ekonomskog rasta, pruža dobru osnovu za sprovođenje teorijskih i empirijskih istraživanja. Baveći se, takođe, analizom institucija, V. Kufenko je posebnu pažnju posvetio problemu kauzalnosti institucija i nejednakosti i, shodno tome, traženju odgovora na pitanje: da li institucije doprinose povećanju ili smanjivanju nejednakosti? Shodno navedenom, znanja o institucionalnom okviru, sa stanovišta formalnih i neformalnih institucija, od posebnog su značaja za razumevanje problema nejednakosti i ublažavanje negativnih posledica analiziranog problema.

Nakon uvodnih izlaganja, učesnici Konferencije su prezentirali radove u okviru sledeće četiri tematske oblasti: *Ključni izazovi menadžmenta i marketinga, Globalizacija i regionalizacija, Računovodstvo i poslovne*

finansije i Primenjena informatika i kvantitativni metodi u ekonomiji i menadžmentu.

U okviru prve sesije *Ključni izazovi menadžmenta i marketinga*, prezentirani su radovi koji se bave upravljanjem znanjem, organizacionim dizajnom i učenjem, korporativnim upravljanjem, upravljanjem inovacija i preduzetništvom. Najveći broj radova bio je posvećen odgovarajućim aspektima upravljanja znanjem i njegovoj primeni u različitim organizacijama, kao i implikacijama organizacionog učenja i dizajna za upravljanje znanjem. Respektujući značaj inovacija i preduzetništva u savremenim okolnostima, identifikovani su relevantni faktori i podsticaji inovativnosti, kao i odgovarajući načini finansiranja preduzetničkih poduhvata. Posebno je istaknuta uloga visokoobrazovnih institucija i potreba za transformacijom tradicionalnih u preduzetničke univerzitete. Analizirani su interni i eksterni mehanizmi korporativnog upravljanja u tranzicionim ekonomijama i zaključeno je da visoka koncentracija vlasništva negativno utiče na finansijske performanse, kao i da se bolje performanse postižu međunarodnim akvizicijama u odnosu na domaće.

Na drugoj paralelnoj sesiji, *Ključni izazovi menadžmenta i marketinga*, prezentirani su radovi koji tangiraju probleme upravljanja ljudskim resursima, korporativne društvene odgovornosti i digitalnog marketinga. Učesnici sesije su diskutovali o savremenim istraživačkim modelima, kao i o rezultatima sprovedenih empirijskih studija. Predstavljen je koncept brenda poslodavaca i nivo njegove razvijenosti u preduzećima različite veličine i vlasničke strukture. Objasnjen je fenomen Industrije 4.0, ukazano na načine na koje proces digitalizacije utiče na poslovanje u savremenom turbulentnom okruženju, kao i na neophodne kompetencije zaposlenih u novoj generaciji digitalizovanih fabrika. Posebna pažnja je posvećena bezbednosnim aspektima i zaštiti podataka u domenu mobilne trgovine. Autori su razmatrali i specifičnosti elektronske pozitivne

usmene komunikacije u funkciji poboljšanja imidža turističkih destinacija. Istaknuta je uloga finansijske pismenosti klijenata prilikom korišćenja bankarskih usluga.

Sesija *Globalizacija i regionalizacija* bila je posvećena razmatranju ključnih ekonomskih izazova u Republici Srbiji i regionu, kao što su: ekonomski razvoj, makroekonomska stabilnost, stabilnost finansijskog sistema, stanje i perspektive razvoja finansijskog tržišta, konkurentnost, inovativnost i efikasnost ekonomske politike. Imajući u vidu da se u zemljama regiona i dalje osećaju posledice globalne ekonomske krize, njihovo prevazilaženje i dalje predstavlja jedan od ključnih izazova ekonomskog rasta i razvoja. Shodno tome, u prezentiranim radovima, posebna pažnja je posvećena preispitivanju važećih makroekonomskih paradigmi, kao i pitanju efikasnosti monetarne i fiskalne politike u uslovima visokog javnog duga, budžetskog deficita i niskih kamatnih stopa. Analizirajući stanje finansijskog sistema, autori su zaključili da je poslednjih godina došlo do konsolidacije bankarskog sektora i porasta kreditne aktivnosti, ali da su posledice finansijske krize i dalje jako uočljive u ostatku finansijskog sistema, pre svega, na finansijskim berzama u regionu. Na kraju, učesnici sesije su se saglasili da će dinamiziranje ekonomskog rasta i razvoja regiona zavisiti, pre svega, od sposobnosti kreatora ekonomske politike da aktiviraju inovacioni potencijal i podrže razvoj inovativnosti, čime bi se obezbedilo dugoročno povećanje konkurentnosti privrede i održiv ekonomski razvoj.

Prezentirani radovi u okviru sesije *Računovodstvo i poslovne finansijske* se tematski mogu podeliti u dve grupe. Prva grupa obuhvata radove u kojima su istraživani aktuelni problemi finansijskog upravljanja savremenim korporacijama. Predmet istraživanja u radovima se odnosio na pravila za odobrenje inicijalne javne ponude običnih akcija i uticaj njihovog relaksiranja na inovativnost kompanija, performanse alternativnih modela za predviđanje volatilnosti

deviznih kurseva, kao i uslovljenost profitabilnosti i tržišne vrednosti preduzeća aktivnostima upravljanja porezom na dobitak preduzeća.

U drugoj grupi radova, istaknut je značaj primene upravljačko-računovodstvenog instrumentarija u savremenom poslovnom okruženju. Posebno su elaborirani alternativni pristupi pripremi budžeta i odnos između izveštavanja o društvenoj odgovornosti korporacije i njenih finansijskih postignuća. Značajna pažnja je posvećena razmatranju domena i ograničenja delovanja Državne revizorske institucije, kao i komparativnoj analizi uzroka promene revizorskog mišljenja.

U radovima koji pripadaju sesiji *Primenjena informatika i kvantitativni metodi u ekonomiji i menadžmentu* razmatrana je primena modernih informatičkih i kvantitativnih metoda, modela i tehnika u ekonomiji i menadžmentu, kao što su evolutivni algoritmi za kompleksne optimizacione probleme, klasterizacija tekstualnih podataka za podršku tržišnim istraživanjima, veštačke neuronske mreže za utvrđivanje parametara modela prihvatanja tehnoloških dostignuća, DEA metoda, savremeni pristupi digitalizaciji u upravljanju katastarskim podacima, kao i primena savremenih informacionih sistema. Ukazano je na potrebu da se istraživanja modela prihvatanja tehnoloških dostignuća, koji se tradicionalno bazira na strukturnom modeliranju, prodube primenom veštačkih neuronskih mreža (ANN). U cilju istraživanja ključnih indikatora nacionalnog inovacionog sistema, učesnici su razmatrali mogućnosti primene DEA neparametarskog pristupa baziranog na linearnom programiranju. Takođe, razmatrane su glavne prednosti, problemi i izazovi koji se odnose na implementaciju CRM sistema. U cilju unapređenja efikasnosti institucija visokog obrazovanja kroz proces digitalizacije, posebna pažnja je posvećena analizi informacionih sistema koje primenjuju univerziteti u Poljskoj.

Zaključci do kojih su istraživači došli, a koji su prezentirani na plenumu, u uvodnim referatima, i u okviru analiziranih sesija, predstavljaju polaznu osnovu za pružanje adekvatnih odgovora na različite izazove u oblasti ekonomije i menadžmenta.

Konferencija predstavlja dobru priliku istraživačima za razmenu ideja i prezentiranje rezultata istraživanja, kao i za jačanje međunarodne saradnje i razvoj različitih oblika akademske saradnje.

*Primljeno 5. decembra 2018,
nakon revizije,
prihvaćeno za publikovanje 12. decembra 2018.
Elektronska verzija objavljena 28. decembra 2018.*

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Indeks sastavio Nenad Stanišić

UDK: 050:33ЕКОНОМСКИ ХОРИЗОНТИ(083.86)"2018"
doi:10.5937/ekonhor1803277L

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CIP - Каталогизacija y publikaciji
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EKONOMSKI horizonti / glavni i odgovorni urednik
Vlastimir Leković. - God. 1, br. 1/2 (1999)- . - Kragujevac:
Ekonomski fakultet Univerziteta u Kragujevcu, 1999 -
(Čačak: Univerzal). - 26 cm

Tri puta godišnje. - Tekst na srp. i engl. jeziku. - Drugo
izdanje na drugom medijumu : Ekonomski horizonti
(Online) = ISSN 2217-9232
ISSN 1450-863X = Ekonomski horizonti (Štampano izd.)
COBISS.SR-ID 158022663

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