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EDITORIAL

Issue 3 Volume 20 Year 2018 contains four original scientific papers, one review paper, a review of the international scientific conference, the Subject-matter Index of the papers and the List of the Authors and Titles of all of the contributions published in the *Economic Horizons* in 2018. Simultaneously, we are indicating the fact that six scientific papers by the authors from abroad (Nigeria, China, Turkey, and Croatia) have been published in Volume 20 Year 20018, which accounts for 35.3% of the total number of the scientific papers published in the Journal in 2018.

Apart from the undisputed fact that corporate innovations and the application of technologies contribute to the improvement of business operations, *Alphonse Kumaza* does research into business innovations in the context social responsibility and companies' responsibility for the imperilment of the living environment. The research results show that companies' business-innovative technologies are not sufficiently oriented towards the promotion of social and ecological responsibility, but that the exclusive orientation of their business policy is reduced to the promotion, spreading, growth and profitability. As one of the reasons for suchlike behavior of companies and their weak ecological performances, the author sees their management lacking the needed understanding for the consequences of business operations, which manifest in the form of externalities, due to which, despite the continuous growth of their profits, companies are not interested in solving the same. The absence of companies' ecological responsibility is manifested in the negligence of the consideration of the issues of social and ecological sustainability, which has implications for the pollution and degradation of the living environment.

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Starting from the attitude that organizations in many countries are faced with serious crises due to bad corporate governance, *Olubunmi Florence Osemene, Joshua Solomon Adeyele* and *Pauline Adinnu* are considering the manner in which the ownership structure and the characteristics of the boards of directors of the deposit money banks in Nigeria listed on the stock-exchange influence earnings management. By the analysis of earnings management in the five-year period from 2011-2016, a fact was established that private, foreign and government shareholdings, as well as the directors' tenures, have a negative impact on earnings management, whereas the number of the members of the Boards of Directors, the gender structure and the size of the bank do not have a significant impact. Based on the foregoing findings, the coauthors conclude that the ownership structure importantly influences earnings management, whereas the characteristics of the Boards of Directors, exempting the directors' tenures, do not significantly influence the earnings policy. Pursuant to the stated conclusions, the paper suggests that the 10-percent threshold of the government shareholding should be maintained, and a proposal is made for the regulatory and supervisory agencies to pay adequate attention to and monitor the activities performed by banks' directors in order to protect shareholders' interests.

On the basis of the perception of the position of the International Financial Reporting Standard for small and medium-sized entities, *Vladimir Obradovic* is testing the hypothesis stipulating that the option of applying the International Financial Standard for Small and Medium-sized Entities is more acceptable for the entities without public responsibility, but do prepare general purpose financial reports than the option of applying full IFRSs. The acceptability of the stated option is opted for due to the fact that it facilitates financial reporting of many enterprises which were obliged to apply the full IFRSs in an earlier period. On the basis of the empirical research study, however, which was conducted on a sample of 175 enterprises in the Republic of Serbia, a fact was established that an enterprise's management more frequently opts for the application of the full IFRSs, and not for their simpler version, which is explained by the long-lasting experience of their application. In order for accountants to opt for the International Financial Reporting Standard for Small and Middle-sized Entities as a more favorable option, it is necessary that they should be provided with education, in which professional accounting organizations play an important role.

Pursuant to the significance of the commodity market as the largest "nonfinancial" market, Şakir *Sakarya, Feyyaz Zeren* and *Hilmi Tunahan Akkuş* perceive the implications of the commodity prices for the Islamic stock-exchange indices, bearing in mind the fact that the financial system based on the profit-and-loss-sharing principle is in question, as well as that it supports the activities carried out in the real sector. In the paper, the cointegration of and the causality relationship between commodity markets (the gold and Brent oil) and the Participation-30 Indices in Turkey are researched, in compliance with the Islamic criteria. The relations between the Islamic stock-exchange indices and the commodity markets are relevant in order to determine whether the investors listed on the Islamic Stock-Exchange in Turkey, and with the aim of diversifying portfolios, should opt for investing in gold or in oil. By the demonstration of the existence of cointegration between the Participation-30 Indices and commodity markets, the fact that by investing in gold or in oil the investor will become rich and expand his or her portfolio, simultaneously minimizing risk, is highlighted.

Starting from the results generated from practice, which show that severe consequences may be caused by the application of pieces of software due to different failures that occur during their operation, *Marin Peko, Nikola Komatina, Nikola Banduka* and *Marina Crnjac* develop an integrated model based on the *Failure Mode and Effects Analysis* (FMEA) and multicriteria optimization, by the application of which it is possible to evaluate and rank a failure in an exact manner. The proposed model, which has been tested on the empirical data generated from practice, offers a possibility of detection, as well as the determination of the frequency of the occurrence of those failures, based on which the priority of the activities which need to be undertaken so as to eliminate the failures identified is defined. By the application of the stated model, the mistakes on the final product would be eliminated, or a possibility of their occurrence would be reduced, which is in the interest of both the manufacturer and the end buyer.

This Issue of the Journal contains review by *Jelena Nikolic* of the Fifth International Scientific Conference: *Contemporary Issues in Economics, Business and Management (EBM 2018)*, which was organized by and held at the Faculty of Economics of the University of Kragujevac on the days of 9th and 10th November 2018.

I would like to take this opportunity and, on behalf of the Editorial Board of the Journal and on my own behalf, thank first of all the authors of the contributions published in this Issue of the Journal. Also, our special gratitude goes to the reviewers, whose constructive and critical comments and suggestions to the authors of the submitted contributions have contributed to the raising of the level of the quality of the published papers.

Issue 3 Year 2018 contains a comprehensive Subject-matter Index of the scientific papers published in the Journal in 2018, as well as the List of the Authors and Titles of all of the contributions published in the *Economic Horizons* in 2018.

Editor-in-Chief

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Vlastimir Lekovic is a Professor at the Faculty of Economics, University of Kragujevac. He received his PhD degree at the Faculty of Economics of the University of Kragujevac in the scientific field: general economics and economic development. He teaches the teaching disciplines of Comparative Economic Systems, Public Sector Economics, Institutional Economics, Market Regulations Policies, and Scientific Research Methodology, at the bachelor, master and doctoral academic studies. The key fields of his scientific research interest are the economic system, economic policy, and institutional economics.

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EXAMINING BUSINESS INNOVATION IN THE SOCIAL RESPONSIBILITY AND ENVIRONMENTAL ACCOUNTABILITY CONTEXTS: EMPIRICAL SYNTHESES 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 multi-national 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		
1	(Constant)	9.924	.724		13.711	.000
	A disregard for the CG rules negatively affects the CSR	-3.082	.135	-.913	-22.756	.000
	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.
1	Regression	6.261	3	2.087	43.825	.000[b]
	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 x 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		
1	(Constant)	-.857	.505		-1.697	.098
	A weak corporate board disincentivizes the CSR	.429	.117	.365	3.674	.001
	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.

REFERENCES

Abuyuan, A., Hawken, I., Newkirk, M., & Williams, R. (1999). Waste Equals Food: Developing a Sustainable Agriculture Support Cluster for a Proposed Resource Recovery Park in Puerto Rico 1999. *CiteSeer[x]*.

Aguilera, R. V., Williams, C. A., Conley, J. M., & Rupp, D. E. (2006). Corporate governance and social responsibility: A comparative analysis of the UK and the US. *Corporate Governance: An International Review, 14*(3), 147-158. doi.org/10.1111/j.1467-8683.2006.00495.x

Aid, C. (2004a). *Behind the mask: The real face of corporate social responsibility*. London, UK: Christian Aid

Aid, C. (2004b). *Behind the mask: The real face of CSR*. London, UK: Christian Aid.

Akabzaa, T. (2009). Mining in Ghana: Implications for national economic development and poverty reduction. In B. Campbell (Ed.). *Mining in Africa: Regulation and development* (pp. 25-65). Pluto Press, IDRC.

Armstrong, E. (2005). *Integrity, transparency, and accountability in public administration: Recent trends, regional and international developments, and emerging issues*. United Nations, Department of Economic and Social Affairs, 1-10.

Auty, R. M. (1998). Social sustainability in mineral-driven development. *Journal of International Development, 10*(4), 487-500.

Auty, R. M., & Gelb, A. H. (2001). The political economy of resource abundant states. *Resource abundance and economic development*, 126-144, *Working Paper*, Washington, DC: World Bank.

Banerjee, S. B. (2000). Whose land is it anyway? National interest, indigenous stakeholders, and colonial discourses: The case of the Jabiluka uranium mine. *Organization & Environment, 13*(1), 3-38. doi.org/10.1177/1086026600131001

Barnett, M. L. (2007). Stakeholder influence capacity and the variability of financial returns to corporate social responsibility. *Academy of management review, 32*(3), 794-816. doi.org/10.5465/amr.2007.25275520

Bessant, J., & Tidd, J. (2007). *Innovation and entrepreneurship*. Leicester, UK: Wiley, John & Sons.

Beuachamp, T., & Bowie, N. E. (1983). *Ethical theory and business*. Englewood Cliffs: NJ: Prentice-Hall.

Blowfield, M., & Murray, A. (2008). *Corporate responsibility: A critical overview*. Oxford, Oxford University Press.

Bowen, H. R. (1953). *Social Responsibilities of the Businessman*. NewYork, NY: Harper&Row.

Bryman, A. (1999). The Disneyization of society. *The Sociological Review, 47*(1), 25-47. doi.org/10.1111/1467-954X.00161

Carroll, A. B. (1999). Corporate social responsibility: Evolution of a definitional construct. *Business & society, 38*(3), 268-295. doi.org/10.1177/000765039903800303

Carroll, A. B., & Shabana, K. M. (2010). The business case for corporate social responsibility: A review of concepts, research, and practice. *International journal of management reviews, 12*(1), 85-105. doi.org/10.1111/j.1468-2370.2009.00275.x

Chewning, R. C., Eby, J. W., & Roels, S. J. (1990). *Business through the eyes of faith*. HarperOne**.**

Crouch, C. (2004). *Post-democracy*. Polity Cambridge**.**

Danermark, B., Ekström, M., Jakobsen, L., & Karlsson, J. C. (2002). *Explaining society. Critical realism in the social sciences*. London, UK: Routledge, Taylor & Francis Group**.**

Denzin, N. (1970). Strategies of multiple triangulation. In N. Denzin (Ed.). *The research act in sociology: A theoretical introduction to the sociological method*, (pp. 297-313). New York, NY: McGraw-Hill

Denzin, N. (1992). The many faces of emotionality: Reading persona. *Investigating subjectivity: Research on lived experience*, 17-30.

Devinney, T. M. (2009). Is the socially responsible corporation a myth? The good, the bad, and the ugly of corporate social responsibility. *The Academy of Management Perspectives, 23*(2), 44-56. doi.org/10.5465/amp.2009.39985540

Elkington, J. (1997). *Cannibals with forks: The triple bottom line of twentieth-century business*. Oxford, US: John Wiley & Son Ltd

Employment Green Paper. (2001). *Promoting a European Framework for Corporate Social Responsibility: Green Paper*. Office for Official Publications of the European Commission**.**

Frezzolini, A., Teofoli, P., Cianchini, G., Barduagni, S., Ruffelli, M., Ferranti, G., Puddu, P., & De Pita, O. (2002). Increased expression of eotaxin and its specific receptor CCR3 in bullous pemphigoid. *European journal of dermatology: EJD, 12*(1), 27-31.

Frynas, J. G. (2005). The false developmental promise of corporate social responsibility: Evidence from multinational oil companies. *International affairs, 81*(3), 581-598.

Garriga, E., & Melé, D. (2004). Corporate social responsibility theories: Mapping the territory. *Journal of Business Ethics, 53*(1-2), 51-71. doi:10.1023/B:BUSI.0000039399.90587.34

Geppert, M., Matten, D., & Walgenbach, P. (2006). Transnational institution building and the multinational corporation: An emerging field of research. *Human Relations, 59*(11), 1451-1465. doi.org/10.1177/0018726706072888

Graedel, T., Allenby, B., & Linhart, P. (1993). Implementing industrial ecology. *IEEE Technology and Society Magazine, 12*(1), 18-26. **doi:**10.1109/44.192717

Harberger, A. C. (1994). *New insights into the growth process*: Indian Council for Research on International Economic Relations.

Hawkins, D. (2006). *Corporate social responsibility: Balancing tomorrow's sustainability and today's profitability*. London, UK: Palgrave Macmillan

Hertel, S. (2009). Human rights and the global economy: Bringing labor rights back in. *Md. J. Int'l L. 24*(1), 257-269.

Hon, A. H., Bloom, M., & Crant, J. M. (2014). Overcoming resistance to change and enhancing creative performance. *Journal of management, 40*(3), 919-941. doi.org/10.1177/0149206311415418

Jamal, K., & Bowie, N. E. (1995). Theoretical considerations for a meaningful code of professional ethics. *Journal of Business Ethics, 14*(9), 703-714.

Jermier, J., Forbes, L., Benn, S., & Orsato, R. J. (2006). The new corporate environmentalism & green politics. In S. R. Clegg, C. Hardy, T. B. Lawrence, **&** W. R. Nord (Eds). *The Sage handbook of organization studies.* doi:10.4135/9781848608030.n22

Kinderman, D. (2012). 'Free us up so we can be responsible!' The co-evolution of corporate social responsibility and neo-liberalism in the UK, 1977-2010. *Socio-Economic Review, 10*(1), 29-57. doi:10.1093/ser/mwr028

Lippke, R. (1996). Setting the terms of the business responsibility debate," in Ethics in the Workplace: Selected Readings in Business Ethics. Larmer, RA (Ed), West Publishing Company, Minneapolis/St. Paul, MN. *St. Paul, MN.*

Mandelbaum, D. G. (2007). Corporate sustainability strategies. *Temple Journal of Science Technology & Environmetal Law, 26*, 27-42.

Matten, D., & Moon, J. (2008). "Implicit" and "explicit" CSR: A conceptual framework for a comparative understanding of corporate social responsibility. *Academy of management review, 33*(2), 404-424. doi.org/10.5465/amr.2008.31193458

McMahon, G. (1997). The natural resource curse: Myth or reality? *Economic Development Institute,* Washington, DC: World Bank.

Miller, T. (1993). *The well-tempered self Citizenship, culture, and the postmodern subject*. The Johns Hopkins University Press.

North, D. C. (1990). *Institutions, Institutional Change and Economic Performance*. Cambridge, US: Cambridge university press.

Novak, W. J. (1996). *The People's Welfare: Law and Regulation in Nineteenth-century America*. North Carolina, US: Univrsity of North Carolina Press.

Orenstein, P. (2011). *Cinderella Ate my Daughter*: New York, NY: HarperCollins.

Orlitzky, M., & Swanson, D. (2008). *Toward Integrative Corporate Citizenship: Research Advances in Corporate Social Performance*. London, UK: Palgrave Macmillan UK.

Parkinson, J. (2003). Disclosure and corporate social and environmental performance: Sompetitiveness and enterprise in a broader social frame. *Journal of Corporate Law Studies, 3*(1), 3-39. doi.org/10.1080/14735970.2003.11419892

Ritzer, G., & Jurgenson, N. (2010). Production, consumption, prosumption the nature of capitalism in the age of the digital 'prosumer'. *Journal of consumer culture, 10*(1), 13-36. doi.org/10.1177/1469540509354673

Root, F. R. (1994). *Entry Strategy for International Markets*. New York, NY: Lexington Books.

Roy, W. G. (1999). *Socializing capital: The rise of the large industrial corporation in America*. Princeton, US: Princeton University Press.

Sayer, A. (2000). *Realism and Social Science*. London, UK: SAGE Publications.

Smith, N. C., & Quelch, J. A. (1993). *Ethics in Marketing*. JSTOR.

Spaargaren, G., & Mol, A. P. (1992). Sociology, environment, and modernity: Ecological modernization as a theory of social change. *Society & natural resources, 5*(4), 323-344. doi.org/10.1080/08941929209380797

Visser, W. (2007). Corporate sustainability and the individual. Cambridge Programme for Sustainability Leadership, *Paper Series No 1.*

Visser, W. (2010). The age of responsibility: CSR 2.0 and the new DNA of business. *Journal of Business Systems, Governance and Ethics, 5*(3), 7-22. doi:10.15209/jbsge.v5i3.185

Vogel, D. (2006). *The Market for Virtue*. Washington, US: Brookings Institute press.

Westney, D. E., & Zaheer, S. (2001). The multinational enterprise as an organization. *The Oxford handbook of international business, 1*, 101-124. doi:10.1093/oxfordhb/9780199234257.003.0013

Zagury, D., Bernard, J., Leonard, R., Cheynier, R., Feldman, M., Sarin, P., & Gallo, R. C. (1986). Long-term cultures of HTLV-III-infected T cells: A model of cytopathology of T-cell depletion in AIDS. *Science, 231*, 850-854.

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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 earning 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. Pemarathne and H. Siriyama (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. Omoye 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. Anusuem (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

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

unit increase in the private shareholding leads to a 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 (*BSIZE: 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.

REFERENCES

Alzoubi, E. S. (2016). Ownership structure and earnings management: evidence from Jordan. *International Journal of Accounting and Information Management*, *24*(2), 135-161. doi.org/10.1108/IJAIM-06-2015-0031

Beatty, A. L., Ke, B., & Petroni, K. R. (2002). Earnings management to avoid earnings declines across publicly and privately held banks. *The Accounting Review*, *77*(3), 547-570. doi:10.2308/accr.2002.77.3.547

Berle, A. J., & Means, G. (1932). *The Modern Corporation and Private Property.* New York, NY: Macmillian Company.

CAMA. (2004). *Laws of the Federal Republic of Nigeria.* Lagos: Nigeria.

CBN. (2006). *Code of Corporate Governance for Banks in Nigeria Post Consolidation.* Central Bank of Nigeria. Retrieved February 1st, 2018, from https://www.cbn.gov.ng/out/Publications/bsd/2006/corp.Govpost%20con.pdf

CBN. (2010). *Prudential Guidelines for Deposit Money Banks in Nigeria.* NDIC. Retrieved February 1, 2018, from https://www.ndic.org.ng/.../prudential%20Guidelines%205%20May%202010%20

Chen, K. P., & Chu, C. C. (2005). Internal control *versus* external manipulation: A model of corporate income tax evasion. *RAND Journal of Economics*, *36*(1), 151-164. doi.org/10.2139/ssrn.353860

Chtourou, S. M., Bedard, J., & Courteau, L. (2001). Corporate governance and earnings management. Québec Sity, Canada: University of Laval, *Working Paper.*

Chang, R-D., Shen, W-H., & Fang, C-J. (2008). Discretionary loan loss provisions and earnings management for the banking industry. *International Business and Economics Research Journal*, *7*(3), 9-20. doi:10.19030/iber.v7i3.3230}

Crumbley, D. L., Heitger, L. E., & Smith, G. S. (2015). *Forensic and Investigative Accounting.* Chicago, USA: Wolters Kluwer.

Dibia, N. O., & Onwuchekwa, J. C. (2014). An appraisal of corporate governance mechanisms and earnings management in Nigeria. *International Journal of Finance and Accounting*, *3*(2), 49-59.

Fitriya, F., & Stuart, L. (2012). Board structure, ownership structure and firm performance: A study of New Zealand listed firms. *Asian Academy of Management Journal of Accounting and Finance*, *8*(2), 43-67.

Hu, N., Hao, Q., Liu, L., & Yao, L. J. (2015). Managerial tenure and earnings management. *International Journal of Accounting and Information Management*, *23*(1), 42-59. doi.org/10.1108/IJAIM-04-2014-0025

Ijeoma, N. B. (2014). The effect of creative accounting on the Nigerian banking industry. *International Journal of Managerial Studies and Research*, *2*(10), 13-21.

Jensen, M. (2004). The agency costs of overvalued equity and the current state of corporate finance. *European Financial Management*, *10*(4), 549-565.

Kazemian, S., & Sanusi, Z. M. (2015). Earnings management and ownership structure. *Procedia Economics and Finance*, *31*, 618-624. doi.org/10.1016/S2212-5671(15)01149-1

Kim, J. B., & Yi, C. H. (2006). Ownership structure, business group affiliation, listing status and earnings management: evidence from Korea. *Contemporary Accounting Research*, *23*(2), 427-464. doi.org/10.1506/7T5B-72FV-MHJV-E697

Kole, S. R. (1995). Measuring managerial equity ownership: A comparison of sources of ownership data. *Journal of Corporate Finance*, *1*(3-4), 413-435. doi.org/10.1016/0929-1199(94)00012-J

Krishnan, G. V., & Parsons, L. M. (2008). Getting to the bottom line: An exploration of gender and earnings quality. *Journal of Business Ethics*, *78*(1-2), 65-76. doi:10.1007/s10551-006-9314-z

Kumari, J. K. P. (2017). Linking earnings management practices and corporate governance system with the firms' financial performance: A study of Indian commercial banks. *Journal of Financial Crime*, *24*(2), 223-241. doi:10.1108/jfc-03-2016-0020

Madugba, J. U. & Ogbonnaya, A. K. (2017). Corporate governance and earnings management in money deposit banks in Nigeria. *Journal of Finance and Accounting*, *8*(8), 147-153.

McKee, T. E. (2005). *Earnings Management: An Executive Perspective*. Mason, Ohio: South-Western.

Nigeria Deposit Insurance Corporation (NDIC). (2016). *Annual Report.* Abuja, Nigeria.

Omoye, A. S., & Eriki, P. O. (2014). Corporate governance determinants of earnings management: Evidence from Nigeria quoted companies. *Mediterranean Journal of Social Sciences*, *5*(23), 553-564. doi:10.5901/mjss.2014.v5n23p553

Osemene, O. F., Muritala, T. A., & Olawale, A. A. (2014). Creative accounting and bank performance: evidence from Nigerian banking sector. *Fountain Journal of Management and Social Sciences*, *3*(2), 23-33.

Osemene, O. F., Abogun, S., Olaoti, Y. I., & Ahmed, S. (2017). Directors heterogeneity and financial performance of listed deposit money banks in Nigeria. *International Journal of Accounting and Management*, *3*(1), 16-27.

Pradeep, D., Permarathane, G., & Siriyama H. (2014). Corporate governance, board characteristics and firm performance: Evidence from Sri Lanka. *Journal of South Asian Development*, *21*(1), 7-31.

Ratab, M. A., Zakaria, A. A., & Thankom, A. (2017). The effect of the CEO's characteristics on EM: Evidence from Jordan. *International Journal of Accounting and Information Management*, *25*(3), 356-375. doi.org/10.1108/IJAIM-10-2016-0099

Ratnawati, V., Hamid, M. A., & Popoola, O. M. J. (2016). The influence of agency conflict types I and II on earnings management. *International Journal of Economics and Financial Issues*, *6*(4S), 126-132.

Saidu, H., Ibrahim, O., & Muktar, J. O. (2017). The impact of earnings management on financial performance of listed deposit money banks in Nigeria. *Journal of Accounting and Financial Management*, *3*(2), 39-50.

Sarkar, J., Sarkar, S., & Sen, K. (2008). Board of directors and opportunistic earnings management: Evidence from India. *Journal of Accounting, Auditing and Finance*, *23*(4), 517-551. doi.org/10.1177/0148558X0802300405

Schrand, C. M., & Zechman, S. L. (2012). Executive overconfidence and the slippery slope to financial misreporting. *Journal of Accounting and Economics*, *53*(1-2), 311-329. doi.org/10.1016/j.jacceco.2011.09.001

Shu, P-G., Yeh, Y.-H., Chiu, S-B., & Yang, Y-W. (2015). Board external connectedness and earnings management. *Asia Pacific Management Review*, *20*(4), 265-274. doi.org/10.1016/j.apmrv.2015.03.003

Smith, R., Lipin, S., & Naj, A. K. (1994). *Managing Profits: How General Electric Damps Fluctuations in its Annual Earnings*. Dow Jones, Clearance Center.

Teshima, N., & Shuto, A. (2008). Managerial ownership and earnings management: Theory and empirical evidence from Japan. *Journal of International Financial Management and Accounting*, *19*(2), 107-132. doi.org/10.1111/j.1467-646X.2008.01018.x

Ugbede, O., Lizam, M., & Kaseri, A. (2013). Corporate governance and earning management: Empirical evidence from Malaysian and Nigerian banks. *Asian Journal of Management Sciences and Education*, *2*(4), 1-21.

Uwuigbe, O. R., & Fakile, A. S. (2012). The effects of board size on financial performance of banks: A study of listed banks in Nigeria. *International Journal of Economics and Finance*, *4*(2), 260-267. doi:10.5539/ijef.v4n2p260

Uwuigbe, O. R., Fagbemi, T. O., & Anusiem, U. F. (2012). The effects of audit committee and ownership structure on income smoothening in Nigeria: A study of listed banks. *Research Journal of Finance and Accounting*, *3*(4), 26-33.

Yorke, M. S., Amidu, M., & Boateng, C. A. (2016). The effects of earnings management and corporate tax avoidance on firm value. *International Journal of Management Practice*, *9*(2), 112-131. doi:10.1504/ijmp.2016.076741}

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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

INTRODUCTION

For a long time, the International Financial Reporting Standards (IFRS) were being developed primarily with respect to the information needs of the investors and creditors of the large companies listed on capital markets. At the beginning of the 20th century, their setter, the International Accounting Standards Board (IASB), expanded the focus of its activities by devoting greater attention to the specificities of the other profit-oriented entities that prepare general-purpose financial statements (Obradović, 2016, 165-166) and the information needs of the users of their financial statements. In this regard, after the discussion had

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begun in 2004 by drafting the preliminary document (Quagli & Paoloni, 2012, 148) the IASB published the International Financial Reporting Standard for Small and Medium-sized Entities (IFRS for SMEs) in 2009, and revised it in 2015.

The IASB dedicated the IFRS for SMEs to those entities that prepare general-purpose financial statements, but are not publicly accountable, i.e. to those whose securities (stocks and bonds) are not traded on public markets and which do not hold the assets of a broad group of outsiders while performing their primary activities (International Accounting Standards Board, 2015, 10). The attitude of the IASB regarding the purpose of the standard has only the character of a recommendation because, as an international private body, the IASB cannot impose its standards on anyone. National financial reporting regulators decide whether to accept (adopt) the IFRS for SMEs or not, and which entities have an obligation or opportunity to apply this standard.

The IFRS for SMEs is a concise version of the IFRSs in a wider sense as a set of documents labeled with IFRS, IAS (standards), IFRIC and SIC (interpretations), based on the Conceptual Framework for Financial Reporting. Unlike the full IFRSs, the IFRS for SMEs is a single document in about 240 pages, which is significantly less extensive than the documents that make up the full IFRSs taken together in about 3000 pages (Chand, Patel, & White, 2015, 139), but is also written in a more accessible style (Tan, Chatterjee, Wise, & Hossain, 2016, 57). The objective of financial reporting is differently defined in it than in the full IFRSs - while in the full IFRSs the objective is primarily related to the information needs of investors and creditors as capital providers, in the IFRS for SMEs the objective is related to the information needs of a wider range of stakeholders (Obradović, 2016, 167). In addition, the IFRS for SMEs:

- does not provide guidelines for some of the accounting problems that the full IFRSs deal with - "earnings per share, interim financial reporting, segment reporting, insurance, and assets held for sale" (Seifert & Lindberg, 2010, 34);
- provides simpler and partially modified guidelines in relation to the full IFRSs (according to the IFRS for SMEs, goodwill is written off regularly, whereas according to the full IFRSs, it is only written off if it is found to be impaired);
- requires the disclosure of a smaller amount of information than the full IFRSs do (Pacter, 2017, 27).

The aforementioned simplifications are conditioned by the fact that, as an extensive set of the documents requiring an extensive disclosure (Melville, 2017, 417), the full IFRSs are complicated and expensive for many SMEs, whereby the users of the financial statements of those entities do not need all the information required by the full IFRSs.

The IFRS for SMEs has relatively recently been incorporated into the regulatory framework for financial reporting in the Republic of Serbia (RS). The experiences in the application of this standard in the mentioned country are exactly the research subject in this paper.

The aim of the research is to examine whether the decision to include this standard in the regulatory framework for financial reporting in the RS is correct and whether it represents an attractive option for profit-oriented entities in the RS that the IASB had in mind when they developed it.

In this respect, starting from the mentioned IASB's position regarding the scope of the IFRS for SMEs, the research hypothesis is formulated as:

H When the entities which are not publicly accountable, but prepare general-purpose financial statements, the IFRS for SMEs is a more acceptable option than the full IFRSs.

The hypothesis is tested by applying a quantitative research methodology, which is based on descriptive statistical analysis and non-parametric group comparison tests. In addition, by applying the induction method, the notion of the general features of the process of the global expansion of the IFRS for SMEs is provided on the basis of the cases of individual countries. The comparative method is also used in the paper and is based on the comparison of the relevant regulations in the RS with the provisions of the IFRS for SMEs.

Hereafter, the global importance of the IFRS for SMEs is discussed first in order to make the basis for perceiving the correctness of the decision to include this standard in the regulatory framework for financial reporting in the RS. Subsequently, the position of the IFRS for SMEs in the regulatory framework for financial reporting in the RS is considered. In the last segment of the paper, the results of the empirical research related to the position of the IFRS for SMEs in the financial reporting practice in the RS are presented and discussed.

THE GLOBAL IMPORTANCE OF THE IFRS FOR SMES

Small and medium-sized enterprises are significant drivers of the modern economy (Marinkovic & Senic, 2012, 15). According to the IASB's estimate, they make up over 95% of the total number of enterprises and account for more than 65% of employment in the world (Bonito & Pais, 2018, 116). This means that there is room for the IFRS for SMEs to become globally very significant, i.e. to be substantially more disseminated in practice than the full version of the IFRSs. F. K. Jermakowicz and B. J. Epstein (2010, 72) note that the IASB adopted this standard as a reaction to the strong demands from both developed and developing countries, following a five-year development process, and with wide-ranging consultations with small and medium-sized enterprises around the world. On the basis of the foregoing, it is reasonable to expect the standard to become widely disseminated worldwide. However, the path the IFRS for SMEs has to pass in order to reach the targeted entities is not simple. In order to be available for use in one country, this standard has to be adopted, or at least it should not be forbidden, by the national institutions responsible for the financial reporting regulation.

A good basis to overview the current global importance of the IFRS for SMEs is the profiles of jurisdictions (which mainly, but not exclusively, coincide with the countries) in relation to the application of the IFRSs (in both the full and the concise versions), which is developed and updated by the IFRS Foundation (IFRS Foundation, 2018), as the body that elects the IASB's members and finances and oversees the work of the IASB. In October 2018, 166 profiles are available, wherein the application of the IFRSs in the European Union (EU) is considered through the profile of the EU and the profiles of all its member countries. In order to avoid data duplication, the EU profile is excluded from the analysis, whereas all the profiles of the member countries are considered. Table 1 shows that the IFRS for SMEs has not been officially adopted in one-half of the analyzed jurisdictions. In some jurisdictions, entities may apply this standard although it has not been officially adopted. These are the jurisdictions that do not have a clearly defined financial reporting framework for SMEs, which makes it impossible to say that the IFRS for SMEs is forbidden. In some jurisdictions, it was the basis for the development of the national standard for SMEs. Of the jurisdictions where the IFRS for SMEs has not been officially adopted (90), the adoption is being considered in 20, whereas in three additional jurisdictions the adoption has been recommended by the World Bank. In 11 jurisdictions in which it has been adopted, including the RS, the standard is more or less modified. Although the RS is not labeled as the country in which the modified IFRS for SMEs is being applied in the profile prepared by the IFRS Foundation, the analysis presented in the next section of the paper demonstrates that the standard, however, has been modified. Finally, in most jurisdictions where the IFRS for Small and Medium-sized Enterprises is being applied (over 50), SMEs are permitted to choose between it and the full IFRSs.

The previous analysis shows that, in less than one (the first) decade upon its publishing, the IFRS for SMEs has not become a single global financial reporting basis for SMEs. In many jurisdictions, this standard is not applied and there is no intention to have it adopted. The IFRS for SMEs is considerably less disseminated across the jurisdictions than the full IFRSs, which have been adopted in the 149 out of the 165 jurisdictions considered (90.3%). In a significant number of the jurisdictions, the full version of IFRSs has been adopted, but their concise version, i.e. the IFRS for SMEs, has not. In this context, the two groups of countries - the countries of the EU and the countries of West and Central Africa - are impressionable.

Table 1 The status of the IFRS for SMEs in the jurisdictions

Status of the IFRS for SMEs	Number of jurisdictions	Percentage share
Officially adopted	74	44.8
It has not been officially adopted, but at least some entities have the right to apply it	13	7.9
It has not been adopted, but it was the basis for the national standard	6	3.6
It has not been adopted and it is not used	72	43.6
Total	165	

Source: Author, based on the IFRS Foundation (2018)

As early as in 2010, namely in the year following the adoption of the first version of the IFRS for SMEs by the IASB, the evaluation of this standard was carried out in the EU, showing that it was not in compliance with the accounting directives (IV and VII), which were given a priority. The European Commission took a stance that the IFRS for SMEs was too complex and that its adoption would generate too high costs (Masca, 2012, 574). Later, i.e. in 2013, a new (single) accounting directive, which was less divergent from the IFRS for SMEs than the directives it replaced, was adopted (Obradović, 2016, 258-259). According to G. Kaufhold (2013, 1945), although the differences between the IFRS for SMEs and the EU regulations are diminishing, the problem of the complexity of this standard still remains. However, the same author believes that the growing importance of the standard worldwide will probably influence the EU institutions to (re)consider its adoption. For the EU entities that do not apply the full IFRSs (which were adopted in the EU), the national regulations (standards) based on the accounting directive are applicable. The directive does not explicitly prohibit the IFRS for SMEs, which means that the EU countries may incorporate all those parts of the IFRS for SMEs that are not contrary to the directive into their regulations (standards) (Obradović & Karapavlović, 2015, 419). There are four EU countries to have developed the national standards for SMEs by modifying (adjusting) the IFRS for SMEs, whereas the additional three countries are considering doing so (IFRS Foundation, 2018).

In 17 West and Central African countries, the members of the Organization for the Harmonization of Business Law in Africa (OHADA), SMEs apply the regional standard developed by the Organization. The Standard (labeled as SYSCOHADA) was published in French in 2017, and is significantly more extensive than the IFRS for SMEs, although it is not as extensive as the full IFRSs - 1246 pages (IFRS Foundation, 2018).

In the analyzed jurisdictions worldwide, in which the IFRS for SMEs has not been adopted, SMEs generally apply respective national (e.g. in EU countries) or regional standards (in the mentioned African countries). In three jurisdictions, only the full IFRSs are applied, which means that SMEs do not have a possibility to apply a simpler standard.

A research study conducted by H. Bohušová and V. Blašková (2012) in the first years after the publication of the IFRS for SMEs reveals that the gross domestic product (GDP) *per capita* in the countries that have adopted the standard is generally significantly lower than the same indicator in the countries that have not adopted the standard. Based on linking the data on the status of the IFRS for SMEs in the jurisdictions with the available data on the GDP *per capita* by the jurisdictions, Table 2 shows that the situation is the same nowadays. This means that there is a relationship between the level of the economic development of a country and the country's interest in the IFRS for SMEs.

H. Bohušová and V. Blašková (2012) find that the adoption of the IFRS for SMEs is related to the level of the quality of a country's financial reporting system measured by the strength of audit, whereby the countries that have adopted the IFRS for SMEs have a financial reporting system of a lower quality. The results of the research study conducted by A. Bonito and C. Pais (2018) provide an explanation for the previous findings. Namely, the research study shows that the countries that have not developed a financial reporting standard for SMEs are particularly interested in the IFRS for SMEs. Therefore, the greater the economic development of a country, the greater the likelihood that it will have its own financial reporting standard for SMEs, and the lesser is its interest in the IFRS for SMEs.

Table 2 The GDP *per capita* and the status of the IFRS for SMEs

The status of the IFRS for SMEs	Number of jurisdictions	Arithmetic mean of GDP *per capita*	Median of GDP *per capita*
Officially adopted	69	$ 12,336.36	$ 5,589.40
It has not been adopted and it is not used	69	$ 20,626.98	$ 13,294.50
Total	138		

Source: Author, based on the IFRS Foundation (2018) and the World Bank (2018)

A. Bonito and C. Pais (2018) also find that the countries with experience in the application of the full IFRSs and common-law countries are particularly interested in the IFRS for SMEs, and that there is no big likelihood that the EU countries will adopt this standard, either. The mentioned authors point out the fact that the IFRS for SMEs is mainly used in developing countries, and that its application is more often an option rather than an obligation, which is also evident from the fact that SMEs may choose between that standard and the full IFRSs in a large number of jurisdictions. P. Chand, A. Patel, and M. White (2015) also point out the fact that the application of the IFRS for SMEs is related to the non-existence or inadequacy of the national standard for SMEs. The survey conducted by Y. M. Sellami and Y. Gafsi (2018, 34) on a sample of 70 countries reveals that "SMEs' importance, a country's reliance on external funding, and the external openness degree positively affect the adoption of the IFRS for SMEs", whereas the tax system and the quality of corporate governance have a negative impact. Unlike the research study conducted by A. Bonito and C. Pais (2018), the same research study reveals the fact that the previous adoption of the full IFRSs does not significantly affect the decision on adopting the IFRS for SMEs, nor does the level of education in a country affect that decision, either.

The analysis of the profiles of the jurisdictions shows that, in addition to the previous factors, the readiness of a country to accept the IFRS for SMEs is influenced by the country's belongingness to a certain regional economic group. In addition to the cases of the member countries of the EU and the countries of West and Central Africa as the members of the groups that have not accepted the standard, the case of the member countries of the Organization of the Eastern Caribbean States, which adopted the IFRS for SMEs and offered it to SMEs as an alternative (the second alternative being the full IFRSs), is impressive.

The fact that the IFRS for SMEs is not applied in a significant part of the world suggests that there is no general agreement that the global financial reporting standard for SMEs is actually needed. J. Strouhal, M. Pasekova, and Z. Crhova (2015, 237) sublimate the factors for and against the need for a global financial reporting standard for SMEs, ascertaining that, on the one hand, SMEs do not play a significant role "in the world of globalization and international trade", whereas on the other, such entities often seek to attract foreign investors, and these investors need financial statements in a form suitable for consolidation. In addition, the application of the IFRS for SMEs facilitates possible later reporting on the basis of the full IFRSs, which the entity will be faced with if it grows from a small or medium-sized to a large one.

The partial success of the IFRS for SMEs on a global scale can also be linked with the objections asserted to it. In addition to certain technical difficulties arising from differences in the capacities of financial markets and regulatory arrangements around the world, D. Perera and P. Chand (2015) point to the difficulties of the conceptual nature that the standard brings with itself. One of them relates to the fact that it does not only differ from the full IFRSs by the extent of disclosure, but also by the recognition and measurement guidelines. In a situation where the full and the concise versions of the IFRSs differing in these guidelines coexist, the principle of a "true and fair view" is derogated since the different versions of the IFRS (the full and the concise ones) lead to different "true and fair views". This position coincides with the stance taken by M. J. Aitken and M. A. Islam (1996, 55) at the time when the IFRS for SMEs was even impossible to envisage. Namely, they noted that the information in the financial statements of SMEs might differ from the information in the statements of large entities by the volume, but that it should not differ in their nature. However, due to the application of various accounting procedures, the information generated under the IFRS for SMEs may differ in its nature from the information generated under the full IFRSs. D. Perera and P. Chand (2015) further note that, although the IFRS for SMEs is simpler than the full IFRSs, it is difficult to apply for medium-sized, small and, especially micro- entities. P. Walton (2011, 131) points to the present opinion that the standard is complex, and emphasizes the fact that the IASB ignored the information needs of the company's managers and tax authorities during its development despite the fact that some research studies show that these interested parties are the very important users of the financial statements of small and medium-sized enterprises. Starting from the fact that the IASB focused on the enterprise with about 50 employees when creating the IFRS for SMEs, H. Bohušová and V. Blašková (2012, 39) note that the standard "cannot not be suitable for all kinds of entities in the SMEs spectrum, especially not so for very small entities (micro-entities)" because "the entities of this kind prepare financial statements especially for taxation purposes".

The coexistence of the full and the concise versions of the IFRSs in one and the same country in the sense that some entities follow the full and some follow the concise IFRSs does not only affect faithful representation as a qualitative characteristic of financial statements (by raising the question of what view is really "true and fair"), but also affects comparability both amongst entities (because different entities apply different financial reporting bases) and in time (because the same entity may change the basis, i.e. it may shift from the full IFRSs to the IFRS for SMEs, or vice versa, for example because of entering into the stock exchange or due to exiting it). When changing the financial reporting basis, an entity may face the need to change its accounting policies and, therefore, recalculate comparative amounts in its financial statements and reclassify its financial statements, by which the problem of the time comparability is softened, but the entity is exposed to additional costs.

Exploring the views expressed in the process of public consultations on the adoption of the IFRS for SMEs in the EU, A. Quagli and P. Paoloni (2012) find that the opinions on this standard were divided. While the preparers of financial statements are against the standard, the users are supportive of it. In addition, it is more supported in the United Kingdom, the Netherlands and the countries of Scandinavia than it is in Germany, Austria, France, Luxembourg, Belgium, Spain, Italy, Portugal, and Greece. The attitudes of the respondents discovered by that research study coincide with the actions of the regulators. Namely, just in the United Kingdom and Sweden (as well as in Ireland and Estonia), the IFRS for SMEs served as the basis for the national standard, whereas Denmark and the Netherlands (along with Hungary, as well as Norway, Iceland, and Liechtenstein, as three countries that are not the EU members, but are closely related to the EU as a part of a single market) are considering the adoption of this standard. E. Masca (2012) considers the attitudes of institutions (public authorities, standard-setters, associations of accountants, auditors and other stakeholders) in the process of evaluating the IFRS for SMEs in the EU, and finds that the attitudes are diverse and under the influence of the accounting culture and the geographical area. The findings of those two studies indicate that the IFRS for SMEs does not fit equally well in each national environment. On the basis of the analysis of the attitudes expressed in the process of the evaluation of the IFRS for SMEs in the EU, H. Bohušová (2011) also states that the standard is mostly supported by the companies that have subsidiaries in different EU countries, the companies seeking to attract foreign capital, and the companies listed on non-regulated markets, stressing that the application of this standard facilitates consolidation. On the other hand, according to the same author, the application of the IFRS for SMEs in the EU would make financial reporting more complex and would increase the cost of preparing and auditing financial statements, especially for small companies.

A. Uyar and A. H. Güngörmüs (2013) investigate the knowledge and perceptions of Turkish accountants in relation to the IFRS for SMEs and find that there are more supporters of than the opponents of the standard, but also that the respondents are not fully informed about the standard. The research indicates the importance of the professional education of accountants which implies that such education should be organized by professional accountancy associations in order for the standard to be appropriately implemented. Considering the implementation of the IFRS for SMEs in developing countries, N. Albu and C. N. Albu (2012) also point to the importance of the continued education of accounting professionals.

The problems related to the implementation of the IFRS for SMEs are not equally important in all countries. In addition to the fact that the mentioned standard is not equally adapted to all countries, the previous regulatory arrangement, i.e. the regulatory arrangement prior to its adoption, has great significance in the given context. If, prior to its adoption, SMEs applied the national standard, the problems related to faithful representation and comparability would in fact become milder, as it is probably closer to the full IFRSs than to the national standard. On the other hand, if those entities applied the full IFRSs (which is the characteristic of the RS) prior to the adoption of the IFRS for SMEs, the mentioned problems would appear. We should also bear in mind the fact that the financial reporting of SMEs in one country after the adoption of the IFRS for SMEs would only become more complex and more expensive if these entities previously followed a simpler standard.

THE IFRS FOR SMES IN THE REGULATORY FRAMEWORK FOR FINANCIAL REPORTING IN THE REPUBLIC OF SERBIA

The IFRS for SMEs was officially adopted in the RS in 2013 by the adoption of the Accounting Law, wherein this standard became valid from the financial statements for the accounting year ending on December 31, 2014. Since the standard began to be applied in the RS five years after it had been published by the IASB, it means that in a relatively long period many entities in the RS had not had an opportunity to experience the benefits of applying the standard (Obradovic, 2014, 237).

The application of the full IFRSs in the RS had begun a decade earlier, namely in 2004. In some countries, the full IFRSs have gradually been implemented by a gradual expansion of the range of the enterprises applying them. By contrast, the RS is characterized by a comprehensive introduction of the full IFRSs with a subsequent reduction in the scope of their application. Initially, all companies applied the full IFRSs only to later, but before the introduction of the IFRS for SMEs, give small enterprises an opportunity to apply a special regulation, i.e. the Ordinance of the Minister of Finance, "which is, in effect, a national standard" (Obradovic, Cupic & Dimitrijevic, 2018, 50-51).

According to the Accounting Law (2013, Article 6), entities are classified into micro-sized, small, medium-sized and large entities on the basis of the average number of employees, their revenue, and the average value of their assets in the current accounting year, wherein the classification affects the financial reporting basis in the next year. The IFRS for SMEs is mandatory for small entities, whereas medium-sized entities are allowed to choose between that standard and the full IFRSs, whereas micro-entities (including the entrepreneurs who are treated as micro-entities in the Accounting Law) may opt between that standard and the Ordinance of the Minister of Finance, whose current version ("Ordinance on the Method of the Recognition, Valuation, and Presentation and Disclosure of the Positions in the Separate Financial Statements of Micro and Other Legal Entities") was published in 2013. The full

IFRSs have remained mandatory for large entities, as well as for listed entities (the entities whose securities are traded on the capital market), and the entities in the process of preparation for listing, financial institutions, and the entities that as parent entities prepare consolidated financial statements irrespective of their size. The medium-sized entities that choose the full IFRSs should continuously adhere to them, and the small entities that choose the IFRS for SMEs should continuously observe this standard (Accounting Law, 2013, Articles 20-22). Considering the regulatory framework for financial reporting in the RS that preceded the introduction of the IFRS for SMEs, T. Đukić and M. Pavlović (2014, 477) expressed their expectation that this standard would facilitate financial reporting for SMEs.

According to the Accounting Law (Article 3), the translation of the IFRS for SMEs (as well as the translations of the full IFRSs) is published by the Ministry of Finance. At the end of 2013, the Ministry of Finance published the translation of this standard, which created the conditions for the beginning of its implementation within the deadline provided by the Law. Shortly thereafter, i.e. in 2015, the IASB published the modified (revised) IFRS for SMEs and stated that it entered into force for the financial statements prepared for the "annual periods beginning on or after 1 January 2017" (International Accounting Standards Board, 2015, 219). However, the translation of the revised standard was only published in October 2018. In November 2016, the Ministry of Finance of the Republic of Serbia (2016, 155) issued an opinion that the entities which had "the possibility and the necessary capacities" could apply the revised IFRS for SMEs prior to the publication of its translation. Otherwise, the same is true for the full IFRSs, whose translations have not been published since 2014, although the IASB constantly changes and amends them. In practice, the opinion of the Ministry created room for the coexistence of the old and the current IFRS for SMEs, in the sense that entities might choose the version they want, and room for the coexistence of the old and the current full IFRSs is created as well. A significant difference between the old and the current IFRS for SMEs is that the current version provides an opportunity for the application of a revaluation model for the subsequent measurement of property, plant, and equipment (Obradović, 2016, 168), and the guidelines for the write-off of intangible assets with an indefinite useful life, including goodwill, are also different (Obradović, 2018, 718).

The Ordinance on the Content and Form of the Financial Statements Templates for Enterprises, Co-operatives, and Entrepreneurs of 2014 abolishes some options offered by the IFRS for SMEs. Thus, entities in the RS are not entitled to:

- present comprehensive income through a single statement (they have to present it through two statements),
- classify expenses in the income statement by function (they have to classify them by nature),
- replace the statement of comprehensive income and the statement of changes in equity with a single statement of income and retained earnings, and
- apply the indirect method for presenting the cash flows from operating activities (they have to apply the direct method).

In addition, in the original IFRS for SMEs, both the initial from the year 2009 and the revised from the year 2015, in paragraph 4.2, wherein the minimum items of the statement of the financial position (i.e. the balance sheet, according to the regulations in the RS) are specified, it is stated in brackets that deferred tax assets and liabilities are presented as non-current items. In the translations of the initial and the revised standards, there is no text in brackets, and the above-mentioned items are separately presented according to the Ordinance, between fixed (non-current) and current assets (deferred tax assets) and long-term (non-current) and short-term (current) liabilities (deferred tax liabilities), which is not in accordance with the original standard. It follows that the modified IFRS for SMEs is practically applied in the RS.

Within the ongoing process of reforming financial reporting in the RS, the position of the IFRS for SMEs is expected to be redefined. In this regard, the

Center for the Financial Reporting Reform of the World Bank states in its study on financial reporting in the RS (Center for Financial Reporting Reform, 2015, 43) that the current legal requirement for small entities to apply the IFRS for SMEs is burdensome and unrealistic. In the same study, it is emphasized that it is necessary to examine whether it is justified for all large companies to apply the full IFRSs. The mentioned attitudes, which are supported by the institution that has significant participation in the financial reporting reform project (the World Bank), suggest a change in the scope of the application of the IFRS for SMEs in the RS.

THE IFRS FOR SMES IN FINANCIAL REPORTING PRACTICE IN THE REPUBLIC OF SERBIA

In order to examine the position of the IFRS for SMEs in the financial reporting practice in the RS, an empirical research was conducted. The focus of the research is on the entities that have the right to choose between the full IFRSs and the IFRS for SMEs, i.e. the unlisted medium-sized entities other than financial institutions that do not prepare consolidated financial statements. Given the fact that the IFRS for SMEs is shorter, less demanding, and cheaper to apply than the full IFRSs are, that standard could be assumed to be readily accepted by the entities that have the right to choose between it and the full IFRSs. Accordingly, the hypothesis presented in the introductory part of the paper is formulated.

The research was conducted on a sample of 175 randomly selected enterprises classified as medium-sized entities according to the data for 2016 and fulfilling all the other foregoing conditions. The data available on the website of the Serbian Business Registers Agency (www.apr.gov.rs) were used in the analysis. The structure of the sample from the aspect of the legal form is shown in Table 3. Since, according to the Accounting Law (2013), the classification of the entities by the size is valid for the next year, it is examined for each enterprise on the basis of the notes to the financial statements for 2017, which of the financial reporting basis - either the full IFRSs or the IFRS for SMEs - was applied in the financial statements for 2017. In two cases it was impossible to discern the basis applied from the notes to the financial statements, which is unacceptable practice. In one case, the enterprise states that it complies with both the full IFRSs and the IFRS for SMEs, which is also unacceptable since, according to the Law, an entity should choose between the full and the concise IFRSs, which means that it can only follow one single basis.

Table 3 The sample structure by the legal form

Legal form	Number of companies	Percentage share
Limited liability company	135	77.1
Public utility enterprise	39	22.3
Social enterprise	1	0.6
Total	175	

Source: Author

According to the empirical data presented in Table 4, only one-fifth of the enterprises in the sample with a single and clear financial reporting basis apply the IFRS for SMEs, whereas four-fifths apply the full IFRSs. It follows that the starting hypothesis cannot be accepted. The IFRS for SMEs has not succeeded, at least not so until now, in being imposed as the dominant financial reporting basis for those medium-sized enterprises that can choose the financial reporting basis. Hence, many companies have decided to apply the full IFRSs although, under the Accounting Law, they had the right to choose their concise version.

When starting from the current regulatory framework for financial reporting in the RS, the ownership structure of an enterprise is imposed as the factor that affects the selection of the financial reporting basis (either the full or the concise IFRSs). Under the Accounting Law, the enterprises in the RS that prepare consolidated financial statements should follow the full IFRSs. An important prerequisite for preparing consolidated statements is that all the enterprises included in the scope of consolidation apply the same accounting policies.

Table 4 The application of the full and the concise versions of the IFRSs

Financial reporting basis	Number of companies	Percentage share in the sample	Percentage share in the enterprises with a single and clear basis
Full IFRS	137	78.3	79.7
IFRS for SMEs	35	20.0	20.3
Unclear	2	1.1	
Both	1	0.6	
Total	175		

Source: Author

Accounting policies may differ if companies apply different financial reporting bases, i.e. if they follow different standards. If accounting policies differ, separate financial statements have to be converted to the same basis before consolidation. Since parent companies in the RS have to apply the full IFRSs, they can be expected to influence the selection of the financial reporting basis by their subsidiaries by their use of their control power. Some companies in the sample are the subsidiaries of domestic companies, whereas some are the subsidiaries of foreign companies (which may not apply the IFRSs in any version whatsoever). In any case, medium-sized subsidiaries may generally be expected to more frequently apply the full IFRSs than the medium-sized entities that are not subsidiaries do. The empirical data confirm the aforementioned assumption. Table 5 shows that the IFRS for SMEs is more prevalent in the entities in the RS that are subsidiaries than it is in the entities that are not subsidiaries.

A chi-square test of independence is carried out so as to determine whether the influence of the characteristics of the entity in the above-mentioned sense (subsidiary/non-subsidiary) is statistically significant or not. The preconditions for running this test have been met since no cell has an expected value lesser than 5. Since both variables (the characteristics of the entity and the financial reporting basis) have two categories (the subsidiary/non-subsidiary and the full IFRSs/the IFRS for SMEs), the so-called Yates' correction is applied. The test shows that the characteristics of the entity have a statistically significant impact on the selection of the financial reporting basis, but also that their effect on the size is small ($\chi^2_{(1,\, n = 172)} = 6{,}904;\ p = 0{,}009;\ phi = 0{,}215$). In other words, the subsidiaries slightly less frequently choose the IFRS for SMEs.

Table 5 The application of the full and the concise IFRSs in subsidiaries and non-subsidiaries

Category	Apply full IFRS	Apply IFRS for SMEs	Total
Subsidiary	59 (90.8%)	6 (9.2%)	65
Non-subsidiary	78 (72.9%)	29 (27.1%)	107
Total	137	35	172

Source: Author

Table 6 shows that the frequency of the IFRS for SMEs is slightly higher for limited liability companies than for public utility enterprises (the social enterprise is excluded from this analysis). The chi-square test of independence (the condition is fulfilled again because no cell has an expected value lesser than 5) shows (with Yates' correction) that the influence of the legal form is not statistically significant, being very small ($\chi^2_{(1,\, n = 171)} = 0.047;\ p = 0.827;\ phi = -0.034$).

The fact that the vast majority of medium-sized entities in the RS have not shifted to the IFRS for SMEs regardless their legal right to do so can be explained by the influence of many factors. The ten-year application of the full IFRSs, which preceded the introduction of the IFRS for SMEs, had made enterprises in the RS get accustomed to these standards. Although the IFRS for SMEs can generate the lower costs of financial reporting, this effect is reflected in the long-term. In the short run, the situation can be quite different. With respect to this, it is noted in the study carried out by the World Bank's Centre for Financial Reporting Reform that some preparers of financial statements in the RS believe that the transition from the full IFRSs to the IFRS for SMEs can cause problems regarding the reclassification of certain items and adjustment to different reporting guidelines in general (Center for Financial Reporting Reform, 2015, 40).

Table 6 The application of the full and the concise IFRSs in the entities of a different legal form

Category	Apply full IFRS	Apply the IFRS for SMEs	Total
Limited liability company	104 (78.8%)	28 (21.2%)	132
Public utility enterprise	32 (82.1%)	7 (17.9%)	39
Total	136	35	171

Source: Author

Short-term problems and costs, therefore, could make the IFRS for SMEs repellent for companies, although long-term benefits could outweigh these costs. With regard to the provisions of the Accounting Law, we should keep in mind the fact that a non-parent unlisted entity may apply the IFRS for SMEs until it becomes listed, until it becomes large, or until it becomes a parent entity. Whenever any of the above occurs, the entity has to shift to the full IFRSs. For the medium-sized entity which has been applying the full IFRSs for years (and has got used to them), and which (for example because of its growing) might have to reapply them in the future, the continuous use of the full IFRSs could be a cheaper option as problems with changes in accounting policies and the reclassification of financial statements when shifting from the full IFRSs to the IFRS for SMEs and a subsequent return to the full IFRSs are avoided by adhering to them. Inertia, resistance to change, and the insufficient knowledge of the IFRS for SMEs and its advantages could also influence entities to continue to apply the full IFRSs.

CONCLUSION

The research study shows that, as a concise and also modified version of the International Financial Reporting Standards, the International Financial Reporting Standard for SMEs has been adopted in a number of countries around the world although there are also a number of countries whose SMEs apply a national or regional standard, where it has not been adopted yet. Economically developed countries with a developed financial reporting system have mostly developed their financial reporting standards for SMEs, which are favored over the IFRS for SMEs. For those countries that do not have an adequate standard for SMEs, the adoption of the IFRS for SMEs is a way to quickly, easily and cost-effectively obtain the necessary standard. One country's decision on the adoption of this standard is also influenced by its membership in a particular regional group. The IFRS for SMEs does not fit equally well in each national environment. Although it is simpler than the full IFRSs, many consider it to be too complex, especially when small and micro-entities are concerned. The process of spreading this standard worldwide also indicates that there is still no general consensus on the need for the same financial reporting standard for all SMEs throughout the world.

When we bear in mind the fact that prior to the introduction of the IFRS for SMEs the RS had not had an adequate financial reporting standard for the entities concerned, i.e. that it had not had an adequate national alternative to the IFRS for SMEs, and that it had had a ten-year experience in the application of the full IFRSs, which had forced preparers of financial statements to adopt the IFRS philosophy (which has significantly been transferred to the IFRS for SMEs), the decision to adopt this standard can be considered as correct and logical. On the other hand, the adoption of the IFRS for SMEs in the RS should also be considered in the context of the accession of this country to the EU, where the standard is not adopted. If the EU remained firm in its attitude regarding the IFRS for SMEs and if the discrepancies between this standard and the EU regulations were not eliminated (by changes in the EU regulations and/or changes in the IFRS for SMEs), the RS would need to adopt a different standard for SMEs before accessing the EU, whereby the IFRS for SMEs could be the basis for the development of that standard.

Some of the options offered by the IFRS for SMEs are abolished by the bylaw (ordinance), thus disabling entities in the RS to further simplify their financial reporting, especially their reporting on earnings and other changes in equity. Through the bylaw, as well as through the translation of the standard, the standard was practically modified. The publication of the translation of the revised IFRS for SMEs in the RS was notably late.

The most important result of the research conducted and presented in the paper is that the entities in the RS that have the right to choose between the full IFRSs and the IFRS for SMEs prefer the full IFRSs, which means that the starting hypothesis of the research study cannot be accepted. Without any doubt, the previous long-term experience in the application of the full IFRSs has contributed to this situation. Although the IFRS for SMEs is offered as a simpler, more affordable and cheaper version of the IFRSs when its application is concerned, these benefits may not always be sufficiently visible or significant to the entities in the RS that have the right to choose. Accustomed to the full IFRSs and familiar with them, entities are reluctant to decide to have them replaced with their simpler version, especially when taking into consideration the fact that shifting to that concise version, as well as a possible subsequent return to the full IFRSs, may bring about problems and generate costs. The research study also shows that non-subsidiaries choose the IFRS for SMEs more often than subsidiaries do. The influence of the characteristics of an entity in the described sense is statistically significant, but relatively small. The entity's legal form does not affect the choice between the full and the concise IFRSs. In the given context, and in line with the experience of other countries, the education of accountants in terms of making them familiar with the advantages (as well as the shortcomings) of the IFRS for SMEs and the essence of this standard can be very important. Professional accountancy organizations play a key role in such education.

The fundamental contribution of the paper reflects in the examination of the preference of the entities that can choose between the full IFRSs and the IFRS for SMEs, as well as the impact of the characteristics of an entity on these preferences. The contribution of the paper also manifests in examining the current position of the IFRS for SMEs in the world and, in particular, in the European Union, as well as the factors that have conditioned this position. Finally, the contribution of the paper is also evident in the comprehensive review of the position of the IFRS for SMEs in the financial reporting regulation and practice of the RS in the first years after its adoption.

The most important limitation of the empirical research study presented in the paper is that the entity's commitment to either the full or the concise IFRSs is examined on the basis of the notes to the financial statements, where pieces of information on what the entity decided, but not why it made such a decision, can be found. Further research by means of a questionnaire should investigate which factors have led the preparers of financial statements to select the one or the other basis of financial reporting, whether they have felt the benefits and if they are being faced with problems due to their decision. Taking into account the fact that the research study presented in this paper was conducted in the period of the IFRS for SMEs being still a relatively new element of the regulatory framework for financial reporting in the RS, a similar research study should be repeated in the future in order to detect possible changes.

REFERENCES

Aitken, M. J., & Islam, M. A. (1996). Dispelling arguments against International Accounting Standards. In J. Blake, & M. Hossain (Eds.). *Readings in International Accounting* (pp. 46-56). London, UK: International Thomson Business Press.

Albu, N., & Albu, C. N (2012, May). *Strategies for and Implications of the IFRS for SMEs Implementation in Emerging Economies*. Paper prepared for the 33rd Congress of the Association Francophone de Comptabilité, Grenoble, France.

Bohušová, H. (2011). The Implementation of the IFRS for SME in the EU. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, *59*(2), 43-49. doi:10.11118/actaun201159020043

Bohušová, H., & Blašková, V. (2012). In what ways are countries which have already adopted IFRS for SMEs different. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, *60*(2), 37-43. doi:10.11118/actaun201260020037

Bonito, A., & Pais, C. (2018). The macroeconomic determinants of the adoption of IFRS for SMEs. *Revista de Contabilidad - Spanish Accounting Review*, *21*(2), 116-127. doi:10.1016/j.rcsar.2018.03.001.

Centre for Financial Reporting Reform. (2015). *Republic of Serbia - Report on Observance of Standards and Codes on Accounting and Auditing: Update*. Vienna, Austria: World Bank's Global Governance Practice.

Chand, P., Patel, A., & White, M. (2015). Adopting International Financial Reporting Standards for small and medium-sized enterprises. *Australian Accounting Review*, *25*(2), 139-154. doi:10.1111/auar.12067.

Đukić, T., & Pavlović, M. (2014). The normative basis of financial reporting of the small and medium-sized entities of the Republic of Serbia. *Economic Themes*, *52*(4), 461-479. doi:10.1515/ethemes-2014-0028.

IFRS Foundation. (2018). *Who uses IFRS Standards*? Retrieved September 29, 2018, from https://www.ifrs.org/use-around-the-world/use-of-ifrs-standards-by-jurisdiction/#profiles.

International Accounting Standards Board. (2015). *International Financial Reporting Standard (IFRS) for Small and Medium-sized Entities (SMEs)*. London, UK: IFRS Foundation.

Jermakowicz, E. K., & Epstein, B. J. (2010). IFRS for SMEs - An option for U.S. private entities? *Review of Business*, *30*(2), 72-79.

Kaufhold, G. (2013). Compatibility of the IFRS for small and medium-sized entities and the new EU-accounting directive. *Acta Universitatis Agriculturae Et Silviculturae Mendelianae Brunensis*, *63*(6), 1945-1951. doi:10.11118/actaun201563061945

Marinkovic, V., & Senic, V. (2012). Analysis of service quality elements in corporate banking. *Economic Horizons*, *14*(1), 15-24. doi:10.5937/ekonhor1201013M.

Masca, E. (2012). Influence of cultural factors in adoption of the IFRS for SMEs. *Procedia Economics and Finance*, *3*, 567-575. doi:10.1016/S2212-5671(12)00197-9.

Melville, A. (2017). *International Financial Reporting: A Practical Guide*. Harlow, UK: Pearson Education Limited.

Ministarstvo finansija Republike Srbije. (2016). *Bilten: Službena objašnjenja i stručna mišljenja za primenu finansijskih propisa*, *56*(11).

Obradovic, V. (2014). Inconsistent application of International Financial Reporting Standards. *Economic Horizons*, *16*(3), 231-243. doi:10.5937/ekonhor1403239O.

Obradović, V. (2016). *Međunarodni standardi finansijskog izveštavanja: Globalni jezik računovođa*. Kragujevac, R. Srbija: Ekonomski fakultet Univerziteta u Kragujevcu.

Obradovic, V., Cupic, M., & Dimitrijevic, D. (2018). Application of International Financial Reporting Standards in the transition economy of Serbia. *Australian Accounting Review*, *28*(1), 48-60. doi:10.1111/auar.12187.

Obradović, V. (2018), Finansijsko izveštavanje o nematerijalnim ulaganjima u Republici Srbiji. U V. Ivanović, J. Nikolić, B. Jovković, D. Zlatanović, Z. Kalinić i N. Janković (Ur.). *Implikacije ekonomije znanja za razvojne procese u Republici Srbiji* (str. 713-725). Kragujevac, R. Srbija: Ekonomski fakultet Univerziteta u Kragujevcu.

Obradović, V. i Karapavlović, N. (2015). Standardi finansijskog izveštavanja u Evropskoj uniji i Srbiji - Komparativna analiza. U M. Jakšić, V. Stojanović Aleksić i P. Mimović (Ur.). *Ekonomsko-socijalni aspekti priključivanja Srbije Evropskoj uniji* (str. 415-425). Kragujevac, R. Srbija: Ekonomski fakultet Univerziteta u Kragujevcu.

Pacter, P. (2017). *Pocket Guide to IFRS Standards: The Global Financial Reporting Language*. London, UK: IFRS Foundation.

Perera, D., & Chand, P. (2015). Issues in the adoption of international financial reporting standards (IFRS) for small and medium-sized enterprises (SMES). *Advances in Accounting, incorporating Advances in International Accounting*, *31*(1), 165-178. doi:10.1016/j.adiac.2015.03.012.

Quagli, A., & Paoloni, P. (2012). How is the IFRS for SME accepted in the European context? An analysis of the homogeneity among European countries, users and preparers in the European commission questionnaire. *Advances in Accounting, incorporating Advances in International Accounting*, *28*(1), 147-156. doi:10.1016/j.rcsar.2018.03.001.

Seifert, D. L., & Lindberg, D. L. (2010). Key Provisions of IFRS for Small and Medium-sized Entities. *The CPA Journal*, *80*(5), 34-37.

Sellami, Y. M., & Gafsi, Y. (2018). What Drives Developing and Transitional Countries to Adopt the IFRS for SMEs? An Institutional Perspective. *Journal of Corporate Accounting & Finance*, *29*(2), 34-56. doi:10.1002/jcaf.22331.

Službeni glasnik Republike Srbije. (2013). *Zakon o računovodstvu*. Službeni glasnik RS, br. 62/2013 i 30/2018.

Službeni glasnik Republike Srbije. (2014). *Pravilnik o sadržini i formi obrazaca finansijskih izveštaja za privredna društva, zadruge i preduzetnike*. Službeni glasnik RS, br. 95/2014 i 144/2014.

Strouhal, J., Pasekova, M., & Crhova, Z. (2015). Are SMEs willing to report under IFRS? Czech Evidence. *International Advances in Economic Research*, *21*(2), 237-238. doi:10.1007/s11294-015-9514-3.

Tan, A., Chatterjee, B., Wise, V., & Hossain, M. (2016). An investigation into the potential adoption of International Financial Reporting Standards in the United States: Implications and implementation. *Australian Accounting Review*, *26*(1), 45-65. doi:10.1111/auar.12081.

Uyar, A., & Güngörmüs, A. H. (2013). Perceptions and knowledge of accounting professionals on IFRS for SMEs: Evidence from Turkey. *Research in Accounting Regulation*, *25*(1): 77-87, doi:10.1016/j.racreg.2012.11.001.

Walton, P. (2011). *An Executive Guide to IFRS: Content, Costs and Benefits to Business*. Chichester, UK: John Wiley & Sons, Ltd.

World Bank. (2018). *GDP per capita*. Retrieved September 29, 2018, from https://data.worldbank.org/indicator/NY.GDP.PCAP.CD.

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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

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require that some ratios related to liquidity, interest rates, indebtedness and undesirable gains should be 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

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.

trend in this field is shifting from banking to Islamic capital market instruments with higher growth rates. 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; Büyükşahin, 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-Rayan 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 *et al*, (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 *et al*, (2012b)	January 2007 - December 2011 (Monthly)	FTSE Bursa Malaysia Emas Shariah Index	Crude Oil	Johansen-Juselius cointegration test Granger causality test	=	EP → ISP
Hussin *et al*, (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 sinuses. 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:

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

where T represents the sample size, λ_1 and λ_2 are the Fourier coefficients, π is 3.11416, 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).

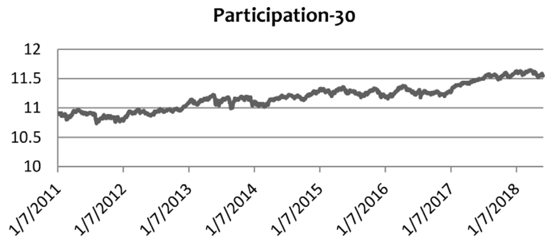

Figure 1 Participation-30 Index (Logarithmic)

Source: Authors

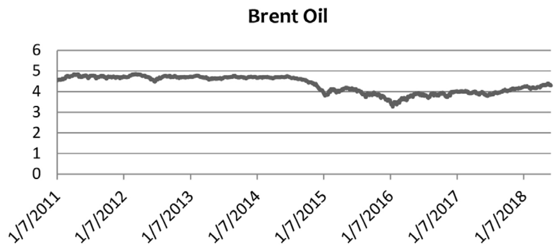

Figure 2 Brent Oil (Logarithmic)

Source: Authors

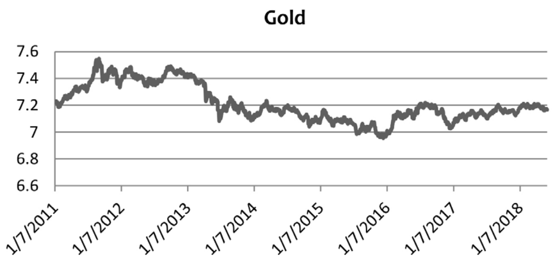

Figure 3 Gold Ounce (Logarithmic)

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	1st 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

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REFERENCES

Abdullah, A. M., Saiti, B., & Masih, M. (2016). The impact of crude oil price on islamic stock indices of South East Asian countries: Evidence from MGARCH-DCC and wavelet approaches. *Borsa Istanbul Review, 16*(4), 219-232. doi.org/10.1016/j.bir.2015.12.002

Bahloul, S., Mroua, M., & Naifar, N. (2017). The impact of macroeconomic and conventional stock market variables on islamic index returns under regime switching. *Borsa* İstanbul *Review, 17*(1), 62-74. doi.org/10.1016/j.bir.2016.09.003

Basher, A. S., & Sardorsky, P. (2006). Oil price risk and emerging stock markets. *Global Finance Journal,* 17(2), 224-251. doi.org/10.1016/j.gfj.2006.04.001

Baur, D. (2013). *Gold - Fundamental drivers and asset allocation*. Retrieved May 20, 2018, from https://www.tdr.wiwi.uni-due.de/fileadmin/fileupload/VWL-WIPO/WiWi-Kolloquium/Baur_Paper.pdf

Becker, R., Enders, W., & Lee, J. (2006). A stationarity test in the presence of an unknown number of smooth breaks. *Journal of Time Series Analysis, 27*(3), 381-409. doi.org/10.1111/j.1467-9892.2006.00478.x

Beşel, F., & Uygun, U. (2017, October). The relationship between economic growth and tourism income: The case of Turkey. Paper presented na the *3rd SCF International Conference on Economic and Social Impacts of Globalization*. Antalya, Turkey, 5-7.

Buğan, M. F. (2016). İslami hisse senedi endeksleri. In S. Erdoğan, A. Gedikli, & D. Ç. Yıldırım (Eds.). İslam *Ekonomisi ve Finansı* (pp. 249-271). Kocaeli, Turkey: Umuttepe Yayınları.

Büyükşahin, B., Haigh, M. S., & Robe, M. A. (2008). *Commodities and equities: A "market of one"*. Retrieved May 30, 2018, from https://www.cftc.gov/sites/default/files/idc/groups/public/@aboutcftc/documents/file/amarketofone_update0608.pdf.

Chebbi, T., & Derbali, A. (2015). The dynamic correlation between energy commodities and Islamic stock market: Analysis and forecasting. *International Journal of Trade and Global Markets, 8*(2), 112-126. doı:10.1504/ıjtgm.2015.069425

Çil Yavuz, N. (2015). *Finansal Ekonometri*. İstanbul, Turkey: Der Yayınları.

Derigs, U., & Marzban, S. (2008). Review and analysis of current shariah-compliant equity screening practices. *International Journal of Islamic and Middle Eastern Finance and Management, 1*(4), 285-303. doi.org/10.1108/17538390810919600

Doyle, E., Hill, J., & Jack, I. (2007). *Growth in Commodity Investment: Risk and Challenges for Commodity Market Participants*. London, UK: Financial Service Authority.

Enders, W., & Jones, P. (2015). Grain prices, oil prices, and multiple smooth breaks in a VAR. *Studies on Nonlinear Dynamics and Econometrics*, *20*(4), 399-419. doi.org/10.1515/snde-2014- 0101.

Fahami, N. A., Haris, S., & Mutalib, H. A. (2014). An econometric analysis between commodities and financial variables: The case of southeast Asia countries. *International Journal of Business and Social Science, 5*(7), 216-223.

Hussin, M. Y. M., Muhammad, F., Noordin, K., Marwan, N. F., & Razak, A. A. (2012a). The impact of oil price shocks on Islamic financial market in Malaysia. *Labuan e-Journal of Muamalat and Society, 6*, 1-13.

Hussin, M. Y. M., Muhammad, F., Abu, M. F., & Razak, A. A. (2012b). The relationship between oil price, exchange rate and Islamic stock market in Malaysia. *Research Journal of Finance and Accounting, 3*(5), 83-93.

Hussin, M. Y. M., Muhammad, F., Razak, A. A., Tha, G. P., & Marwan, N. (2013). The link between gold price, oil price and Islamic stock market: Experience from Malaysia. *Journal of Studies in Social Sciences, 4*(2), 161-182.

ICD - Thomson Reuters. (2017). *Islamic Finance Development Report 2017: Towards Sustainability*. ICD-Thomson Reuters.

Jebran, K., Chen, S., & Tauni, M. Z. (2017). Islamic and conventional equity index co-movement and volatility transmission: Evidence from Pakistan. *Future Business Journal, 3*(2), 98-106. doi.org/10.1016/j.fbj.2017.05.001

Jones, C. M., & Kaul, G. (1996). Oil and the stock markets. *The Journal of Finance, 51*(2), 463-491. doı:10.2307/2329368

Junkus, J. C. (2010). Agricultural and metallurgical derivatives: Speculation and hedging. In R. W. Kolb, & J. A. Overdahl (Eds.). *Financial Derivatives: Pricing and Risk Management* (pp. 77-87). New Jersey, USA: The Robert W. Kolb Series in Finance, JohnWiley & Sons Inc. 89-101.

Khan, A., & Masih, M. (2014). Correlation between Islamic stock and commodity markets: An investigation into the impact of financial crisis and financialization of commodity markets. *MPRA Paper No. 56979*, Munich Personal RePEc Archive.

Kisswani, K. M., & Elian, M. I. (2017). Exploring the nexus between oil prices and sectoral stock prices: Nonlinear evidence from Kuwait stock exchange. *Cogent Economics & Finance, 5*(1), 1-17. doi.org/10.1080/23322039.2017.1286061

Koy, A. (2018). *Türev Piyasalar: Emtia Türevleri, Opsiyonlar Vadeli* İşlem *Sözleşmeleri*. Ankara, Turkey: Seçkin Yayıncılık.

Narayan, P. K., & Sharma, S. S. (2011). New evidence on oil price and firm returns. *Journal of Banking & Finance, 35*(12), 3253-3262. doi.org/10.1016/j.jbankfin.2011.05.010

Nazlioglu, S., Hammoudeh, S., & Gupta, R. (2015). Volatility transmission between Islamic and conventional equity markets: Evidence from causality-in-variance test. *Applied Economics, 47*(46), 4996-5011. doı:10.1080/00036846.2015.1039 705

Nejad, M. K., Jahantigh, F., & Rahbari, H. (2016). The long run relationship between oil price risk and Tehran stock exchange returns in presence of structural breaks. *Procedia Economics and Finance, 36*, 201-209. doi.org/10.1016/S2212-5671(16)30031-4

Raza, N., Ibrahimy, A., & Ali, A. B. (2015). Gold and Islamic stocks a hedge and safe haven comparison in time and frequency domain for BRICS markets. Proceedings of the Asia Pacific Conference on Business and Social Sciences, Kuala Lumpur, Malaysia: *MPRA Paper No. 69366*.

Rithuan, S. H. M., Abdullah, A. M., & Masih, A. M. M. (2014). The impact of crude oil price on Islamic stock indices of gulf cooperation council (GCC) countries: A comparative analysis. *MPRA Paper No. 56989*.

Sadorsky, P. (1999). Oil price shocks and stock market activity. *Energy Economics, 21*(5), 449-469. doi.org/10.1016/S0140-9883(99)00020-1

Saiti, B., Bacha, O. I., & Masih, M. (2014). The diversification benefits from Islamic investment during the financial turmoil: The case for the US-based equity investors. *Borsa İstanbul Review, 14*(4), 196-211. doi.org/10.1016/j.bir.2014.08.002

Shin, Y. (1994). A residual-based test of the null of cointegration against the alternative of no cointegration. *Econometric Theory, 10*(1), 91-115. doi.org/10.1017/S0266466600008240

Tsong, C. C., Lee, C. F., Tsai, L. J., & Hu, T. C. (2015). The Fourier approximation and testing for the null of cointegration. *Empirical Economics, 51*(3), 1085-1113. doi:10.1007/s00181-015-1028-6

Yılancı, V., Aslan, M., & Özgür, Ö. (2017). Testing the validity of PPP theory for African countries. *Applied Economics Letters, 25*(18), 1273-1277. doi.org/10.1080/13504851.2017.1418 066

FOREKS. https://www.foreks.com

KATILIM ENDEKSI. http://www.katilimendeksi.org

U.S. Energy Information Administration. https://www.eia.gov

World Gold Council. https://www.gold.org

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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, Poleto, 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, Mačužić & 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 RNP 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

$\gamma = \{1,...,k,...,K\}$. 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 $G = \{1,...,g,...,G\}$. The failure index is denoted as a small g, $g=1,..,G$. 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 occuerrence 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 $A_B = [a_{b1},...a_{bk},...,a_{BK}]_{1xK}$. The preference of the worst risk factor over all the other risk factors is similarly defined and presented by the matrix $A_W = [a_{1W},...a_{kW},...,a_{KW}]_{1xK}$. 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

$$\min_k \max \left\{ \left| \frac{w_B}{w_k} - a_{Bk} \right|, \left| \frac{w_k}{w_W} - a_{kW} \right| \right\} \tag{1}$$

s.t.

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

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

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

$$\min \{\varsigma\} \tag{2}$$

s.t.

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

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

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

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

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

$$[W_1^*,...,w_k^*,...,w_K^*]_{1xK},\quad k = 1,...,K \tag{3}$$

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, $g = 1,..,G$ are determined according to the proposed scales.

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

$$S_g = \frac{1}{2} \cdot \left(S_{g1} + S_{g2} \right) \tag{4}$$

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

$$v_k^+ = \max_{g=1,..,G} r_{gk},\ v_k^- = \max_{g=1,..,G} r_{gk} \tag{5}$$

where $r_{gk} = S_g, O_g, D_g, g = 1,...,G$

Step 9. Calculate separation measures.

$$d_g^+ = \sum_{k=1}^{K} w_k \cdot \left| v_k^+ - r_{gk} \right|, d_g^- = \sum_{k=1}^{K} w_k \cdot \left| v_k^- - r_{gk} \right| \tag{6}$$

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

$$c_g = \frac{d_g^-}{d_g^- + d_g^+} \tag{7}$$

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.

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

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

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

$$w_1 + w_2 + w_3 = 1$$

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.

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REFERENCES

Abdelgawad, M., & Fayek, A. R. (2010). Risk management in the construction industry using combined fuzzy FMEA and fuzzy AHP. *Journal of Construction Engineering and Management*, *136*(9), 1028-1036. doi.org/10.1061/(ASCE) CO.1943-7862.0000210

Aslani, R., Feili, H., & Javanshir, H. (2014). A hybrid of fuzzy FMEA-AHP to determine factors affecting alternator failure causes. *Management Science Letters*, *4*(9), 1981-1984. doi:10.5267/j.msl.2014.8.024

Banduka, N., Tadić, D., Mačužić, I., Crnjac, M. (2018). Extened Process Failure Mode and Effect Analysis (PFMEA) for automotive industry: The FSQC-PFMEA, acceptged for publishing for tom *Advances in Production Engineering & Management*.

Belohlavek, R., & Klir, G. J. (2011). *Concepts and Fuzzy Logic*. MIT Press.

Carmignani, G. (2009). An integrated structural framework to cost-based FMECA: The priority-cost FMECA. *Reliability Engineering & System Safety*, *94*(4), 861-871.

Chang, D. Y. (1996). Applications of the extent analysis method on fuzzy AHP. *European journal of operational research*, *95*(3), 649-655.

Dedrick, J., Kraemer, K. L., & Shih, E. (2013). Information technology and productivity in developed and developing countries. *Journal of Management Information Systems*, *30*(1), 97-122.

Gabus, A., & Fontela, E. (1972). *World Problems, an Invitation to Further Thought Within the Framework of DEMATEL*. Geneva, Switzerland: Battelle Geneva Research Center.

Guimarães, A. C. F., Lapa, C. M. F., & de Lourdes Moreira, M. (2011). Fuzzy methodology applied to probabilistic safety assessment for digital system in nuclear power plants. *Nuclear Engineering and Design*, *241*(9), 3967-3976.

Hwang, C. L., & Yoon, K. (1981). Methods for multiple attribute decision making. In *Multiple attribute decision making* (pp. 58-191). Springer, Berlin, Heidelberg.

Kutlu, A. C., & Ekmekçioğlu, M. (2012). Fuzzy failure modes and effects analysis by using fuzzy TOPSIS-based fuzzy AHP. *Expert Systems with Applications*, *39*(1), 61-67.

Liu, H. C., Qin, J. T., Mao, L. X., & Zhang, Z. Y. (2015). Personnel Selection Using Interval 2-Tuple Linguistic VIKOR Method. *Human Factors and Ergonomics in Manufacturing & Service Industries*, *25*(3), 370-384.

Liu, H. C., You, J. X., Li, P., & Su, Q. (2016). Failure mode and effect analysis under uncertainty: An integrated multiple criteria decision making approach. *IEEE Transactions on Reliability*, *65*(3), 1380-1392.

Opricovic, S., & Tzeng, G. H. (2004). Compromise solution by MCDM methods: A comparative analysis of VIKOR and TOPSIS. *European journal of operational research*, *156*(2), 445-455.

Papaioannou, S. K., & Dimelis, S. P. (2007). Information technology as a factor of economic development: Evidence from developed and developing countries. *Economics of Innovation and New Technology*, *16*(3), 179-194.

Pawlak, Z. (1982). Rough sets. *International journal of computer & information sciences*, *11*(5), 341-356.

Rezaei, J. (2015). Best-worst multi-criteria decision-making method. *Omega*, *53*, 49-57.

Saaty, T. L. (1990). An exposition of the AHP in reply to the paper "remarks on the analytic hierarchy process". *Management science*, *36*(3), 259-268.

Signor, M. C. (2002). The failure-analysis matrix: A Kinder, gentler alternative to FMEA for information systems. In *Reliability and Maintainability Symposium, 2002. Proceedings. Annual* (pp. 173-177). IEEE.

Silva, M. M., de Gusmão, A. P. H., Poleto, T., e Silva, L. C., & Costa, A. P. C. S. (2014). A multidimensional approach to information security risk management using FMEA and fuzzy theory. *International Journal of Information Management*, *34*(6), 733-740.

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CONTEMPORARY ISSUES IN ECONOMICS, BUSINESS AND MANAGEMENT - EBM 2018

November 9-10, 2018, Faculty of Economics, University of Kragujevac,
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Jelena Nikolić*

Numerous challenges and problems in the field of economics and management require various theoretical and methodological responses implying the development of new concepts, methodologies, methods, models and techniques. Given the complexity of contemporary economic and managerial problems, the papers submitted to the International Scientific Conference entitled *Contemporary Issues in Economics, Business and Management* (EBM 2018), which was held at the Faculty of Economics of the University of Kragujevac on 9th and 10th November 2018, encompassed diverse topics in the following fields: management, marketing, globalization, regionalization, accounting, business finance, information systems and the application of quantitative methods and models in economics and management. So far, this EBM 2018 fifth biennial international conference brought together the largest number of participants, i.e. 127 participants in total, 88 authors being from higher education institutions (HEIs) in the Republic of Serbia, and 39 authors coming from abroad (Poland, Russia, Germany, Slovenia, Japan, Spain, Croatia, Hungary, Bosnia and Herzegovina).

According to the above-mentioned, and starting from the theory of social identity, the keynote lecture given by D. Tipurić (Faculty of Economics, University of Zagreb, Croatia) was focused on the organizational identification as the process of the cognitive linking of individuals and the organization, special attention being paid to the process of the organizational identification in higher education institutions (HEIs) in Southeast Europe. The importance of understanding the degree of employees' identification with the organization was particularly pointed out since it contributes to their commitment to the job they do in the organization, job satisfaction, as well as their performance. Apart from the organizational

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identification, the importance of researching the professional identification was also emphasized. The empirical results show that academics in the field of management are more identified with their HEIs than with the profession.

The keynote lectures given by B. Begović (Faculty of Law, University of Belgrade) and V. Kufenko (Institute of Economics, University of Hohenheim, Germany) were dedicated to relevant problems in developing efficient institutions and their importance for economic growth and development. Based on the comparative research into the connections between institutions and culture, on the one hand, and economic growth, on the other, B. Begović indicates the need for answering the question whether and to what extent institutions and culture are alternative or complementary explanations. It is concluded that institutions and culture, as complementary mechanisms, significantly influence economic growth. The mutual action of institutions and culture as the factors of economic growth is a good base for conducting theoretical and empirical research. Also, in dealing with the analysis of institutions, V. Kufenko paid particular attention to the problem of causality amongst institutions, and inequality, as well as to answering the question whether institutions contribute to an increase or decrease in inequality. Therefore, from the viewpoints of formal and informal institutions, the knowledge of the institutional framework is particularly relevant for the understanding of the problem of inequality and the mitigation of its negative consequences.

For the purpose of presentation at the Conference, of the submitted papers 64 were accepted and 54 were presented. The papers presented at the Conference are concerned with the following thematic areas: *Key Issues in Management and Marketing, Globalization and Regionalization, Accounting and Business Finance, and Applied Informatics and Quantitative Methods in Economics and Management.*

Within the framework of the first session dedicated to the *Key issues in management and marketing*, the papers highlighting knowledge management, organizational design and learning, corporate governance, innovation management and entrepreneurship were presented. The largest number of the papers were dedicated to the relevant aspects of knowledge management and its application to diverse organizations, as well as to organizational design and learning, and their implications for knowledge management. Respecting the importance of innovations and entrepreneurship in modern circumstances, relevant innovation factors and drivers, as well as the appropriate forms of financing an entrepreneurial venture, were identified. The role of HEIs and the need for the transformation of traditional into entrepreneurial universities were particularly emphasized. In addition, the internal and external mechanisms of corporate governance in transition economies were analyzed and it was concluded that a high ownership concentration negatively affected financial performance, and also that those cross-border acquisitions in Serbia performed better than the domestic acquisition.

The second parallel session dealing with the *Key issues in management and marketing* involves the papers in which various aspects of human resource management, corporate social responsibility and digital marketing were considered. The participants discussed the contemporary research models and results of empirical studies. The concept of the employer brand was presented, as well as its development in enterprises of a different size and ownership structure. In addition to that, it explained Industry 4.0, and also how digitalization affects business in the contemporary turbulent environment and which competencies employees should possess for the new generation of digital factories. Special attention was paid to the safety and protection of data in the area of mobile commerce. The specifics of electronic positive word-of-mouth communication in the function of improving the image of a tourist destination were also discusses, as well as the role of customers' financial literacy in using banking services.

The participants in the session entitled *Globalization and Regionalization* considered the key economic challenges in the Republic of Serbia and the Western Balkan region, such as: economic development, the stability of the financial system, the state and perspectives on the development of the financial market, the innovativeness and efficiency of the economic policy. Taking into account the fact that the consequences of the global economic crisis can still be observed in the countries within the Western Balkan region, the mitigation of these consequences is one of the key challenges of economic growth and development. Therefore, in the presented papers, particular attention was paid to the reexamination of the actual macroeconomic paradigms, as well as to the efficiency of the monetary and fiscal policy in the circumstances of a large budget deficit and low interest rates. By analyzing the state of the financial system, the authors concluded that the consolidation of the banking sector and the growth of credit activities had occurred in recent years, but also that the consequences of the financial crisis could still be observed in the rest of financial system, above all in the financial stock exchanges of the Western Balkan region. Finally, the participants agreed that dynamic economic growth and development would be conditioned by the ability of the economic policy creators to activate the innovation potential and support the improvement of innovativeness, which would enable an increase in the competitiveness of the economy and sustainable economic development in the long run.

The papers presented in the *Accounting and Business Finance* session may thematically be divided into two groups. The first group encompasses the papers in which the actual problems of the financial management of the modern corporation were researched. These papers were concerned with the rules of the initial public offer of ordinary shares and the impact of their relaxation on companies' innovativeness, the performance of alternative models for predicting the volatility of exchange rates, as well as the conditionality of profitability and the company's market value by the company income tax management activities. In the second group of the papers, the importance of applying managerial accounting instrumentarium in the modern business environment was emphasized. Alternative approaches to the creation of the budget and the relation amongst corporate social responsibility reporting and its financial performance were particularly elaborated. Significant attention was paid to the consideration of the domain and the limitations of the State Audit Institution in the Republic of Serbia, and the comparative analysis of the causes for a change in the auditor's opinion as well.

In the session dedicated to *Applied Informatics and Quantitative Methods in Economics and Management*, the papers considered the application of modern informatics and quantitative methods, models and techniques, such as text clustering methods, evolutionary algorithms for complex optimization problems, artificial neural networks for the determination of technology acceptance model parameters, the DEA method, contemporary approaches to digitalization in managing cadastral data based on the blockchain methodology, as well as the application of modern information systems. The need for the deepening of the research studies of the technology acceptance model that is traditionally based on the structure modelling by applying artificial neural networks (ANN) was pointed out. With the aim of conducting a research study of the key indicators of the national innovation system, the participants discussed the possibilities of applying the DEA non-parametric approach based on linear programming. In addition, the key advantages, problems and challenges of the implementation of the CRM system were subjected to consideration. In order to improve the efficiency of higher education institutions (HEIs), particular attention was paid to analyzing the information systems applied to the universities of Poland.

The conclusions derived from the papers presented at the Conference are a good basis for adequate responses to various challenges in the field of economics and management. The Conference presents a great opportunity for exchanging ideas and the presentation of research results, as well as the intensification of international cooperation and the development of the diverse forms of academic cooperation.

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THE LIST OF AUTHORS AND TITLES

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Lekovic, V. (2018). Editorial. *Economic Horizons 20*(3), 191-192 Published online 28th December 2018. doi:10.5937/ekonhor1803195L

Manic, S., Joksimovic, Lj., & Zaric, S. (2018). Vertical Segregation in Higher Education - The Case Study of the Republic of Serbia. *Economic Horizons*, *20*(1), 3-14. Published online 26th April 2018. doi:10.5937/ekonhor1801003M

Milosevic, S., Trifunovic, D., & Popovic Markopoulos, J. (2018). The Impact of the Competition Policy on Economic Development in the Case of Developing Countries. *Economic Horizons*, *20*(2), 153-167. Published online 27th August 2018. doi:10.5937/ekonhor1802157M

Nikolic, J. (2018). Biases in the Decision-Making Process and Possibilities of Overcoming Them. *Economic Horizons*, *20*(1), 43-57. Published online 26th April 2018. doi:10.5937/ekonhor1801045N

Nikolic, J. (2018). Confrence review**:** International Scientific Conference: Contemporary iIssues in Economics, Business and Management - EBM 2018. November 9-10, 2018, Faculty of Economics, University of Kragujevac, Kragujevac, the Republic of Serbia. *Economic Horizons 20*(3), 261-264 Published online 28th December 2018. doi:10.5937/ekonhor1803269N

Obradovic, V. (2018). The International Financial Reporting Standard for Small and Medium-Sized Entities in the Republic of Serbia. *Economic Horizons 20*(3), 221-234. Published online 28th December 2018. doi:10.5937/ekonhor1803229O

Osemene, O. F., Adeyele, J. S., & Adinnu, P. (2018). The Impact of the Ownership Structure and Board Characteristics on Earnings Management in Nigeria's Listed Deposit Money Banks. *Economic Horizons 20*(3), 209-220. Published online 28th December 2018. doi:10.5937/ekonhor1803215O

Peko, M., Komatina, N., Banduka, N. i Crnjac, M. (2018). The Assessment and Ranking of Failures in the Information Technology Industry Based on FMEA and MCDM. *Economic Horizons 20*(3), 249-259. Published online 28th December 2018. doi:10.5937/ekonhor1803257P

Sakarya, Ş., Zeren, F., & Akkuş, H. T. (2018). The Relationship Between Islamic Indices and Commodity Markets in Turkey: Evidence Fourier-Based Approaches. *Economic Horizons 20*(3), 235-247. Published online 28th December 2018. doi:10.5937/ekonhor1803243S

Slavkovic, M., Pavlovic, G., & Simic, M. (2018). Employee Recruitment and its Relationship With Employee Satisfaction: Verifying the Mediating Gole of the Employer Brand. *Economic Horizons*, *20*(2), 125-137. Published online 27th August 2018. doi:10.5937/ekonhor1802127S

Stanisic, N. (2018). The Subject Index. *Economic Horizons 20*(3), 265-269. Published online 29th December 2018. doi:10.5937/ekonhor1803273S

Stankic, R., Jovanovic Gavrilovic, B., & Soldic, Aleksic, J. (2018). Information and Communication Technologies in Education as a Stimulus to Economic Development. *Economic Horizons*, *20*(1), 59-71. Published online 26th April 2018. doi:10.5937/ekonhor1801061S

Zlatanovic, D. (2018). Conference Announcement: International Scientific Conference: Contemporary Issues in Economics, Business and Management - EBM 2018. November 9-10, 2018, Kragujevac, the Republic of Serbia. *Economic Horizons*, *20*(1), 89-90. Published online 26th April 2018. doi:10.5937/ekonhor1801091Z

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