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SERIES ECONOMICS AND ORGANIZATION

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Original Scientific Paper

UPDATE OF THE CRAWL, WALK, RUN METHODOLOGY FRAMEWORK

UDC 658.8:004

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Abstract. *This study updated the Crawl, Walk, Run methodology framework (CWRM) for the current digital marketing circumstances, observed in the context of the artistic community in virtual space. Four main premises of CRWM have been considered in order to address the effectiveness of online campaigns based on the laddering support through tiers of engagement (personal, social, advocating); empowering super users; providing source materials for user-generated content; and using tools people are familiar with. The analysis was performed on the data collected from the online community which operated for 43 days. Data on the number of registered users, their interactions with web site content and showcased artworks were gathered. The specific online platform was created for the purpose of this research and the campaign for its promotion was conducted both in Serbia and globally. The materials for direct communications (email, instant messaging), social media promotion (social networks, blogs) and public relations (articles in online and traditional media) were created. CRWM was proved to be efficient framework for the establishment of online presence of the artistic community. However, we propose that social networks should be introduced in the stage three instead of in the stage four, due to the increase of their applications compared to the time when the CRWM was formulated. All activities once they start should be maintained and performed throughout the campaign lifetime. This study represents one of the first efforts aimed at updating the CRWM theoretical framework and provides business community with hands-on solutions in modern digital marketing.*

Key words: *online community; crawl, walk, run methodology; arts; digital marketing*

JEL Classification: M15, M31

1. INTRODUCTION

Online advertising has been constantly on the growth and its revenues have exceeded the level of $20 billion yearly (Shaouf, Lü & Li, 2016). In China in 2011 web advertising surpassed the newspaper advertising revenue for the first time ever (Zha, Li & Yan, 2015), while it is predicted that in 2019 digital ad spending will exceed traditional in the USA (eMarketer, 2019). In Serbia the value of the digital advertising market amounted to €18.16 million in 2014 (Filipovic, 2017, p. 80). In the last decade we have testified to the strong surge in social media marketing usage and relevance (Shareef et al., 2019). Nevertheless, the term social media marketing covers a broad range of strategies and techniques which can significantly vary in their effectiveness in communication with target groups (Willis, 2019). The main aims of all of them are to incite and reinforce consumers' engagement (Tuten & Mintu-Wimsatt, 2018).

Despite its relevance and numerous scientific and professional studies that have been conducted in the field of digital business, there is still a paucity of research which propose methodologies and analyze effectiveness of the online campaigns, especially in the field of social media, given the novelty of this concept. In order to reflect the changes of the media landscape and promotional opportunities arisen from the technological development, the methodology framework „Crawl, Walk, Run" (CWRM) was developed by the Lutz and Edelman team in 2009 and tested in subsequent studies (e.g. Aaker & Chang., 2009). The aim of this study is to update the current understanding of CRWM and explore its applicability in the modern social media circumstances.

2. LITERATURE REVIEW

In general, there is still a debate among scholars of modern theory of advertising on the extent of influence of advertising on consumer behaviour (Ognjanov, 2013, p. 180). Furthermore, there is also an issue of the effects of advertising on consumers' attitudes, knowledge and shopping patterns. According to their nature, all models can be divided into two groups: i) advertising impacts individuals in predetermined order of stages; ii) effects may occur simultaneously and not in the specific sequence (Ognjanov, 2013, p. 182). Both types of models need to be revised, as Wijaya (2012, p. 73) pointed out "the development of information technology has radically changed the way of how people communicate and socialize; as well as a paradigm shift from product-oriented marketing to consumer-oriented marketing or people-oriented marketing. Therefore, the variables in the hierarchy of effects model needs to be updated..."

The „Crawl, Walk, Run model" (CWRM) proposes appropriate social media tools for public engagement in different stages of the campaign. According to the Lutz & Edelman team (2009) there are ten characteristics of a successful online campaign: "laddering support through tiers of engagement (personal, social, advocating); empowering super users; providing source materials for user-generated content; going where the people are, using tools people are familiar with, ensuring that people can find your content, mobilizing supporters through mobile devices, harnessing analytics to constantly improve engagement activities, building the online operation to scale and choosing the right team". Notwithstanding importance of all of them and of their interrelations, we particularly explored the ones which are significant for the short term campaigns and virtual social community. More specifically, these are: laddering support through tiers of engagement;

empowering super users; providing source materials for user-generated content; and using tools people are familiar with. These four premises have been investigated in our study and the results are demonstrated in the following sections.

CWRM has been efficiently utilized in the investigation in numerous sectors: non-profit (Berkman, 2013), industry (Debes et al., 2007; Vitas, 2013), army (Meliza & Barnett, 2006; Florio et al., 2010), finances (Raisinghani, 2006), branding (Neitzel, 2015), interactive television (Jensen, 2005) and many others and proved its relevance over time. Despite the emergence of other frameworks in digital marketing over time, such as: RACE (reach, act, convert, engage), CDJ (consumer decision journey), PESO (paid, earned, shared, owned media), etc., some of the leading companies utilize CWRM in their current digital marketing approach (Kerr & Moloney, 2018), while scholars (e.g. Berman & Thelen, 2018) argue its theoretical credibility. However, it should be noted that some updates of CWRM are needed, due to the arrival of some of the new digital marketing tools (compared to 2009 when this concept was established), the acceleration of changes in business environment and burst of global competition in the web space. In these terms, this paper strives to update CWRM and to help its better application in the modern state of affairs of digital marketing.

In nowadays media landscape there are hundreds of social media sites that target smaller groups of users with specific interests. One of the groups of users which has drawn considerable attention in the previous period is the community of artists and artisans. The crafting market is estimated to be worth $100 billion annually on the global scale (PYMNTS, 2017). The relevance of the online community for this sizeable market can be understood from the fact that LoveCrafts, the UK-headquartered marketplace for craft products, has raised $33 million in 2017 in new funding from Scottish Equity Partners, as well as previous investors Balderton Capital and Highland Europe (Cook, 2017). LoveCrafts runs two online communities: knitting and crochet. Users can follow each other and purchase designs for knitting and crochet projects, while the platform takes a cut of the cost of designs, as well as any of the crafting supplies sold through the site.

The other case of the global significance of the artists' and crafters' global community is the social network DeviantArt, which has gathered more than 40 million registered members and showcased over 325 million pieces of original art. Israel-based Wix.com acquired DeviantArt in 2017 for $36 million in cash (Reuters, 2017). The importance of socializing tools on such online platforms are best reflected by the example of the results of Dribbble, where in 2017, designers showed off over 640 thousand of shots of their work, and the community responded with over 27 million likes and 925 thousand comments (Dribbble, 2017).

Artistic and „do it yourself" (DIY) virtual communities have attracted considerable attention of researchers in various fields. Some of the research areas in which online groups related to arts and DIY are represented are: culture (Spero & Stone, 2004, Kuznetsov & Paulos, 2010; Hall & Jayne, 2016), gender studies (Bratich & Brush, 2011), ecology (Cervellon & Wernerfelt, 2012), politics (Harris, 2008), media (Lingel & Naaman, 2012) and marketing (Liss-Marino, 2014; Chen & Chandler, 2010; Wu & Fang, 2010).

The aim of this research is to re-examine the potency of CWRM in the introduction of a new artistic community to the global virtual space. In the following section of the paper the adopted methods are explained thoroughly, while the subsequent chapters detail on the results that have been obtained and relevance of the study both for scholars and for managers.

3. METHODS

For the purpose of this research, a specific web site was registered and developed. In order to reach wider audience, the web site was created in English and indexed under the global domain name www.TalentsFair.com. The aim of the platform was to attract artists and artisans to exhibit their works and establish their online portfolios. Moreover, the web site also addressed general public who was interested in arts and who wanted to take part in browsing, commenting and voting for various content.

The landing page of the website included large picture of logo (artistically designed star), name of the website (Talents Fair), its credo („You got it, show it!“) and categories of artistic works that could be submitted. The picture of the first page and the typical page of the web site is depicted in Figure 1. The prevailing colour of the whole web site (including the landing page) was yellow.

Fig. 1 Pages of the experimental website Talents Fair

There were five different categories of artistic works whose pictures could be presented – these are: photos, paintings, pottery, clothes designs and accessories designs. Accessories mainly pertain to jewellery, but also included: hats, bags, boxes, glasses and other fashion pieces. In order to mimic real (i.e. non-experimental) web sites to the highest extent, the subject platform also included sections on Terms of Use and Privacy Policy, as well as the banner spaces as a part of promotional opportunities for advertisers.

Only registered users were able to display their work, therefore, the first step was to open their account and create a profile, by providing their name, user name and email address. After that, they were granted the right to log in. The users accessed the area for the showcase of their work (virtual gallery) through the „User panel“. In this section they could upload their pieces and provide necessary details, e.g. the name of the creation or its description (for instance, if it is for sale, contact details, etc.).

The web site construction encompassed some widgets too. These interaction tools included: browsing content in the gallery („Previous“ and „Next“ arrows), commenting and scoring (scale 1-5) of each of the exhibits. Furthermore, all users could observe Top rated, Most viewed, Last commented and Last added content. The links for the listed categories were presented in the top left part of the page, allowing shortcuts and efficient paths for users.

The experiment lasted 43 days, while the relevant results of its usage are presented in the following chapter. In accordance to ethic rules, the relevant parties were notified of the experimental nature of the web site and its limited lifetime. Given the aim of the research, only online media were used for the promotion, while offline media were not involved. The experiment acted on the null budget principle, allocating no budget for promotional activities. Hence, only free promotional tools were used, mainly relying on social networks. It should be noted that even though the banner space was presented on the web site, its rental was not foreseen within the experiment. In any manner, no request for advertising was received throughout the project's lifetime.

4. RESULTS AND DISCUSSION

In the analysis we will examine the effectiveness of the Crawl, Walk, Run Methodology (CWRM) for the social media and investigate whether proposed online tools in each stage result in the expected outcomes.

Table 1 Crawl, Walk, Run Methodology framework

CRAWL	WALK	RUN	FLY
Establish an online presence	Enrich content	Engage online influencers	Embrace community
▪ Web site ▪ Conversation audit	▪ Podcasting ▪ Video ▪ Games ▪ Widgets	▪ Blogger Outreach ▪ Blogger conference calls ▪ Advertising ▪ Ally development ▪ Sponsorships	▪ Blogger tours ▪ Thought leadership blog ▪ Social networks ▪ Advocacy ▪ Contests ▪ Mobile

Source: Lutz & Edelman team (2009), The Social Pulpit, Edelman, p. 11,
https://cyber.harvard.edu/sites/cyber.harvard.edu/files/Social%20Pulpit%20-
%20Barack%20Obamas%20Social%20Media%20Toolkit%201.09.pdf

In the first phase of the span of the social media campaign, the model foresees the introduction of the media content in the virtual space. Therefore, the website www.TalentsFair.com was launched, under the global domain. Previous inspection of the online sources (e.g. DeviantArt, Styleportfolios, Artlog, etc.), which was a sort of a conversation audit, concluded that terms such as „talent" and „fair" were associated with arts, artistic portfolios, purchase and other aspects embedded in the main vision and orientation of the subject web site.

The stage demarcated as „Walk" means populating the website with content. Taking into account the peculiar type of the web site (user generated content), this is comprehended in twofold manner: users should be attracted to open their profiles and they need to be incited to showcase their work, by adding their content to the platform. Overall, 348 users registered (created their profiles) and submitted 767 different works (Artistic photos: 227; Paintings: 130; Pottery: 80; Clothes: 72; Accessories: 258).

Moreover, widgets for voting were utilized, resulting in 512 comments on the website, while the top rated content was the picture of a forest, which scored 4.88 (scale 1-5) based on 1561 votes. Many other content raised significant interest by the target groups, e.g.: the painting of a dancer (score: 4.99; 401 votes); the sculpture by Magdalena Pavlovic (score: 4.96; 316 votes), ballet costumes (score: 4.97; 145 votes), a graphic by a professor (score: 4.98; 142 votes), etc.

The third and fourth stages were performed simultaneously, given that both of them aim to reach the target group. Therefore, in this phase, the users were attracted mainly by social networks, namely by the posts on Facebook, Twitter, Instagram, YouTube, Skyrock and direct contacts through Viber and Whatsapp. Even though the CWRM proposed by the Lutz and Edelman team (2009) did not list social networks as the tool within the third stage, we assumed that it was due to the date the CWRM was established, while social network ecosystem and its significance have grown greatly from that time up to nowadays.

The engagement of online influencers mostly occurred by direct communication – either personal (face to face and telephone) or by direct online media, such as email, Skype and instant messaging on social networks. CWRM suggests that the emphasis should be put on stimulating bloggers, regarded as the dominant influencers in the virtual sphere, to take part in the web site activity. Table 2 depicts some of the influencers in each category whose reputation and exhibition of the works on the platform were estimated to have positively affected the web site performance.

Table 2 Influencers who engaged in the web site performance

Accessory design	Clothes design	Paintings	Photos	Pottery
Maruska nakit	Kostimi - kreator Rada	Jovica Poguberov	Milica Djeric	Magdalena Pavlovic
UNA nakit	Diline Haljine	Dragan Petkovic	Istok Pavlovic	Stefan Stankovic-Peric
Chicamote	Gingerita T-shirt	Milos Kostic	Ivan Josifovic	Ljubica design
Torbice za frajlice	D-fashion by Danijela Zujic	Tijana Stojanovic		Etnopark Terzic Avlija
Wa Wa Woom design	Svetlana Blagojevic i Georgeone Essi	Branka Cvorovic		Aleksandar Mitrovic

However, in the modern media landscape, we considered that social networks influencers should be regarded at the same level of importance. Testing that assumption, online communities were reached in the specialized groups on social networks (Table 3). Results demonstrated that „ally development" and „social networks involvement" may encompass the same set of activities, especially in terms of advocacy. This outcome also reinforces the hypothesis that the last two stages of the model need to be conducted parallelly rather than consecutively.

Table 3 Ally programmes – posts on the established social media groups

Facebook	Number of members (likes)	Twitter	Number of followers
Novecento Cipele Beograd	160,000	Smajli	2,332
DressCode	60,752	Lauro Pedraza	1,056
Kreativnost	40,046	UNA nakit	274
Elm Jewelry	31,903	Kreativnost	105
Diotima	14,297		

Since public relations activities have not been specifically stipulated in the CWRM, it might be supposed that they were blended with advocacy, sponsorship and advertising. Thus, articles and posts regarding TalentsFair are published in: a) online journals: WANNABE magazine and Prave novine; and b) print magazines: Style magazine and MonopolList. Many other media were contacted, both traditional and interactive, as well as many associations which gather professionals from target groups (e.g., painters, photographers, sculptors, etc.), but they showed no interest in participating in the work or promotion of this online community.

Finally, as it has already been explained in the previous section, the web site was created in English, in order to be able to reach global audience. During the project lifetime, the promotional information on TalentsFair was published in several languages by diverse web authors: Lauro Pedraza Visual Artist, Partito Artisti del Mondo, Alex Art Works, Portrety na zamówienie - Monika Malinowska, Phanères bijoux, International Art Contest, Nina's fashion show and blog.dnevnik.hr.

5. CONCLUSIONS

It should be noted that the first two phases last significantly less than the last two phases. Dominantly it is due to the fact that they include many preparatory activities, usually performed before the official start of the campaign. However, this does not affect the relevance of the former stages compared to the latter ones, given that the level of their quality will highly determine the overall success or failure of the campaign.

It is significant to observe that the first two stages are web site directed, while the second two are user oriented. In fact, the establishment of the online presence and upgrade of its content can be considered as the work on the organization's offer and online product, whereas the involvement of the opinion leaders (influencers and allies) and community is targeted to obtain consumers. Provided that these two spheres cannot exist independently, it may be concluded that the CWRM should be updated to be organized as a simultaneous rather than a sequential model.

All activities once they start should be maintained and performed throughout the campaign lifetime. For instance, website maintenance and continuous enriching the content are of substantial importance for the success of the whole campaign. In line with recent changes and trends in the online communications, the authors propose the obligatory introduction of the social media presence in the list of tools listed in the stage of „Walk". Mainly, it should be addressed by enabling the sharing of the content on the website on social media platforms, primarily by including appropriate widgets for that purpose in the online platform. Similarly to our observation related to social networks, the proposition based on the results of our study is also to include "thought leadership blog" in the third instead of the fourth phase. In the Serbian market, opinion leaders in virtual space usually coincide with professionals in the subject domain in real life.

In addition, in the context of the subject web site, the use of the visually specialized social media, such as Instagram and Pinterest, potentially could improve the effects. This assumption should be addressed by some further studies, exploring the different channels for enriching the content and enhancing the performances based on the nature (verbal vs. visual vs. multimedia) of the online platform. Given that the authors of the CWRM (Lutz

& Edelman team, 2009) recommended only multimedia tools, which contain audio, video and user-performed content, we suggest that this list should be extended to incorporate tools that demand lower level of users' involvement, compared to theirs. More specifically, provided the shrinking of users' available time and concentration span, they should be enabled to participate less extensively, through tools, such as: voting (like, dislike, scoring, etc.), commenting, browsing the content, etc.

The lack of interest by established traditional media to promote new initiatives may suggest that there is still a gap between traditional and digital media. However, it may also occur due to the great number of news that compete for limited media space. This notion might also explain why digital media were more prone to participate in the promotion of TalentsFair, given that digital space has been inexhaustive and they understood to a higher extent, than their traditional counterparts, the importance of provision of PR to new online businesses.

The scarcity of support by professional associations probably was grounded in the understanding of the determined project lifetime and not yet established reputation, due to its novelty, of the web site. Further studies should investigate willingness of professional associations to help the growth of confirmed web sites which contain artistic portfolios. Its potential for wider international reach can be examined both from the perspective of the brand reputation, as well as from the point of view of (limited vs. unlimited) duration of web site.

Some limitations of this study should also be considered. Firstly, the duration of the experiment was quite short and all phases of the CWRM were executed in condensed form. Future research should review the possibility of undertaking longer experiments. Secondly, mobile communications, even though they are proposed in the model, were not addressed by this study due to the lack of resources. Taking into account the substantial growth of this kind of communications, further studies should consider testing of the mobile versions of online platforms too. Finally, rather limited international grasp and impact were made, despite the international character of both the media (i.e. the Internet) and the tool (i.e. the web site in English).

However, given that this study represents one of the first efforts aimed at updating the CWRM theoretical framework, as well as its orientation toward exploration of the globally soaring handicrafts and artistic online communities, it is supposed to serve as a relevant point of reference for future research in the subject field.

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AŽURIRANJE METODOLOŠKOG OKVIRA "PUZI, HODAJ, TRČI"

Predmet istraživanja ove studije je ažuriranje metodologije "Puzi, hodaj, trči" (PHTM) u savremenim okolnostima digitalnog marketinga, posmatrano u kontekstu umetničke zajednice u virtuelnom prostoru. Razmotrene su četiri glavne premise PHTM-a kako bi se testiralo da li bi onlajn kampanje mogle postići uspešne rezultate kroz: faznu podršku kroz različite nivoe angažovanja (lične, društvene, zastupničke); osnaživanje super korisnika; obezbeđivanje materijala za sadržaj koji generišu korisnici; i korišćenje alata sa kojima su korisnici upoznati. Analiza je izvršena na podacima prikupljenim iz onlajn zajednice koja je bila aktivna 43 dana. Prikupljeni su podaci o broju registrovanih korisnika, njihovim interakcijama sa sadržajem veb stranica i materijalima (umetničkim radovima) koji su bili izloženi na sajtu. Za potrebe ovog istraživanja napravljena je posebna onlajn platforma, a kampanja za njenu promociju sprovedena je kako u Srbiji, tako i globalno. Kreirani su materijali za: direktne komunikacije (imejl, instant mesindžer), promociju na društvenim medijima (društvene mreže, blogovi) i odnose s javnošću (članci u onlajn i tradicionalnim medijima). PHTM se pokazao kao efikasan okvir za uspostavljanje onlajn prisutnosti umetničke zajednice. Međutim, predlažemo da se društvene mreže uvedu u trećoj umesto u četvrtoj fazi, s obzirom na povećanje opsega njihovih funkcija u odnosu na vreme kada je PHTM formulisan. Sve započete aktivnosti treba održavati i izvoditi tokom čitavog trajanja kampanje. Ova studija predstavlja jedan od prvih napora u cilju ažuriranja PHTM teorijskog okvira i pruža poslovnoj zajednici praktična rešenja u modernom digitalnom marketingu.

Ključne reči: onlajn zajednica; puzi, hodaj, trči metodologija; umetnost; digitalni marketing

Original Scientific Paper

IMPROVING PERFORMANCE OF VAT SYSTEM IN DEVELOPING EU COUNTRIES: ESTIMATING THE DETERMINANTS OF THE RATIO C-EFFICIENCY IN THE PERIOD 1997-2017

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Abstract. *Indirect taxes have a significant place in developing EU countries' tax systems. The article sums up works by different scientists, dealing with the impact of VAT efficiency determinants. The purpose of this study is to investigate the determinants of VAT collection efficiency in the EU developing countries. The study relies on relevant data in transparent international statistical databases, covering the period from 1997 to 2017. The main research question in this paper is: does rise in value added tax rate negatively affect VAT collection efficiency in the EU developing countries. Accordingly, one of the independent variables included in the survey is standard annual VAT rate. In addition to standard VAT rate, as a determinant of VAT collection efficiency, we analyze: economic growth rate, export of goods, export of services, wages and salaries, household consumption. The hypotheses set are analyzed using correlation and regression analyses. Empirical results show a positive effect of economic growth rate, export of goods, and the negative effect of two variables: standard VAT rate and household consumption. The two observed variables, export of services and wages and salaries, do not show a statistically significant effect. The results obtained using appropriate statistical tools serve as guidelines to macroeconomic policy makers to generate higher tax revenues from VAT. By analyzing the C-efficiency determinant, we design a relevant development strategy approach for economically underdeveloped EU countries.*

Key words: *value-added tax (VAT), performance of VAT, C-efficiency ratio, developing countries*

JEL Classification: H2, H21, O52

INTRODUCTION

Value added tax is, according to many theorists, the most important tax revenue in developing countries (Bird, 1987; Cnossen, 1988; Gilbert, 1995; Alan, 1999; Ebrill et al., 2002; Minh Le, 2003; Emran & Stiglitz, 2004; Grandcolas, 2005; Hillman, 2009; Keen, 2013; Đurović Todorović, Đorđević & Ristić, 2019; Bikas & Anduskaite, 2013; Izedonmi & Okunbor, 2014; Hajdúchová, Sedliačiková & Viszlai 2015; Andrejovská & Mihoková, 2015). A well-known British economist, Owens (2011), states that value added tax (VAT) today "accounts for one-fifth of the total tax revenue". Apodictically, VAT is a tax whose lucrative character has led to its application in more than 150 countries around the world.

Research shows that VAT is the most profitable tax form in developing countries (Đurović Todorović, Đorđević & Ristić, 2019, p. 234), and, for this reason, the importance of VAT is highlighted in these countries' tax systems. Developing countries can collect significantly higher tax revenues by indirect taxes, compared to direct taxes. Restrictions on the financing of public spending by direct taxes correspond to the level of their development. However, it often happens that developing countries do not collect sufficient funds by indirect taxes either. This is mainly the result of global economic and financial crises, which in most cases end with fiscal implications. In order to cover their fiscal deficits, developing countries either turn to borrowing or increase tax rates. The lack of tax revenues can also be noticed in situations where "the government does not redistribute tax revenue and when it has to increase revenues to finance public goods" (Stiglitz, 2002, p. 484). As VAT has the largest share in indirect taxes, developing countries provide for their goods by increasing standard VAT rate.

"Increasing standard VAT rate was one of the basic ways to tackle the problem of insufficient public revenues recorded before the 2008 crisis" (Keen, 2013, p. 423). Therefore, both developed and developing countries increased their standard VAT rate. Most of the countries did not see alternative ways to increase VAT revenues. The captious question that arose in academic circles was: is rise in standard VAT rate the most effective solution to generate higher tax revenues? The polygon for these surveys was mainly found in developing countries, and the responses, which resulted from empirical research, were generally negative. Increasing standard rate is the simplest solution, but it is not feasible in all circumstances. Increased standard rates in developing countries, which already have the highest rates, trigger the problem of tax avoidance and rising tax evasion. This list of negative effects resulting from high VAT rates does not end here in countries where this is the main source of revenue. Rise in tax evasion creates an unfavorable business environment, as well as a field for gray economy. A more efficient option to increase VAT revenue is to improve VAT performance. "Improving performance involves expansion of the tax base, limited use of reduced rates and exemptions, more productive tax administration, better compliance of legislation and practice" (Owens, 2011a, p. 8).

In order to ensure optimum tax revenues, VAT performance, i.e. VAT collection efficiency, is the subject of numerous theoretical, empirical, and experimental studies today. Given that economic development of underdeveloped countries is determined by a well-designed VAT system, it is very important that VAT collection efficiency is at a satisfactory level. "The development of tools that explain the differences in VAT performance has over the past few years received considerable practical attention. The need for conceptual development of these tools is the result of a tendency to increase VAT revenues without compromising other policy objectives" (Keen, 2013a). The aim of this paper is to

investigate factors that influence VAT collection efficiency, which will be one of the options for increasing tax revenues. The starting point is the fact that studies dealing with VAT collection efficiency factors are scarce. We focus on the underdeveloped countries of the European Union, because these countries "experienced significant government changes during economic transformation" (Bayar, 2016, p. 6). The main objective of this study is to investigate factors that influenced VAT collection efficiency during the period 1997-2017. We focus on Greece and Hungary, which were among the first countries to introduce the VAT system in the 1980s, then Estonia, Slovakia, the Czech Republic, Poland, Romania, and Bulgaria, countries that introduced the VAT to join the EU in the 1990s, as well as Latvia, Lithuania, and Slovenia, which have recently incorporated VAT. In particular, we want to answer the following questions. First, which empirical link exists between analyzed independent variables, GDP growth rate, standard VAT rate, export of goods, export of services, wages and salaries, household consumption, and VAT collection efficiency in underdeveloped EU countries? What factors determine VAT collection efficiency and the way to generate higher tax revenues? We also want to show negative effects of higher standard rates on VAT collection efficiency. Section II provides an overview of existing literature on determinants of VAT collection efficiency. Section three presents empirical methodology and model evaluation. Finally, section IV gives conclusion.

1. Factors Affecting VAT Collection Efficiency: Literature Review

Consumption taxes, especially value added tax, first gained academic attention in 1980s. Numerous studies speak of the role of value added tax and its obvious administrative advantages in national development (Bird, 1987). However, despite the importance of increasing the revenue coming from this form of taxation, studies on the factors that determine VAT collection efficiency are scarce. "The importance of value added tax in the economy is recognized, but this tax form is mainly analyzed only in terms of tax rate, tax relief, and tax threshold" (Bikas & Andruskiate, 2013, p. 41). Some authors emphasize the great impact of VAT collection efficiency on revenue collection (Keen & Lockwood, 2010), but, at the same time, there is a relatively small number of empirical studies that examine determinants of VAT collection efficiency.

The first theorists who investigated VAT collection efficiency were Agha and Haughton (1996). The purpose of their study was to, through a cross-country analysis, investigate determinants that affect VAT compliance. They pay special attention to multiple tax rates, as well as to high tax rates. Observing the example of the OECD countries, using the 1987 data, the authors note that VAT collection efficiency is determined by standard rate level, number of rates, administration, and the period of VAT application in a country. VAT collection efficiency would be enhanced by a lower standard VAT rate, smaller number of tax rates, longer application period, and better tax administration.

Bogetić and Hassan (1993) investigate the basic determinants of VAT revenue, analyzing the statistics of 34 countries. Their research involves 20 countries with a single rate and 14 countries using multiple rates. Theorists, among other things, give an answer to the question whether there is a statistically significant difference in VAT performance between countries with a single VAT rate and countries with a multiple VAT rate. The results of their regression model show that key variables that affect the performance of VAT revenue are: rate, tax base, and rate dispersion. The determinant, whose character

the authors emphasize, is VAT rate. According to their estimator model, countries with tax systems involving a single VAT rate may have higher VAT revenues. They point out that their results are crucial in creating a tax policy in developing countries planning to introduce a single tax rate in their tax systems.

Agha and Haughton (1996a) analyze VAT collection efficiency determinants, using the 1987 statistics of 17 OECD countries. The authors conceive the index of compliance, regressed against determinants. They pay particular attention to what happens if the country introduces multiple rates, as well as to the effects of high VAT rates. The results of the regression analysis show that efficiency can be improved with a lower VAT rate, fewer rates, smaller population, more learning time, and greater spending on administration.

Ebrill et al. (2002) investigate the basic factors behind the relatively high level of C-efficiency and conclude that a high level of trade share, high literacy rates, and the time period of VAT application are crucial for VAT revenues.

Aizenman and Jinjarak (2005) investigate the connection between several factors and VAT collection efficiency. They base their research on statistical data in the 1970-1999 period. The survey covers the statistics of 44 countries and uses panel regression. The analysis includes Estonia, Greece, Hungary, and Poland. The authors examine the following explanatory variables: real GDP per capita, share of agriculture, trade development and level of urbanization, measures of political instability and the degree of political regulation. The estimator models their research uses are the Fixed Effects model and the OLS model. They find a strong link between trade development, political regime sustainability, and VAT collection efficiency.

Hybka (2009) analyzes the relationship between VAT collection efficiency and estimated factors in the European Union countries, with focus on Poland. The author points out that Polish VAT collection efficiency is influenced by changes in terms of VAT system harmonization with the EU, economic growth rate trends, and changes in domestic demand. In Poland, Hybka concludes, VAT collection efficiency is also influenced by standard rate level.

Based on the VAT structure in Lithuania, Bikas and Rashkauskas (2011) investigate factors that affect VAT collection efficiency. Their analysis, based on quarterly statistical data, encompasses the period 1995-2009 and contains the appropriate regression model. Independent variables included in the model are: standard VAT rate, difference between standard VAT rate and reduced VAT rate (excluding zero rate), and unemployment. The results of regression analysis show a positive and statistically significant effect of standard rate as well as the difference between standard rate and reduced VAT rate on VAT collection efficiency. Also, the results show a negative and statistically significant effect of unemployment on VAT collection efficiency.

Đurović Todorovic and Đorđević (2013), based on the 2009 C-efficiency analysis in 14 countries, conclude that the average value of the C-efficiency ratio depends on the reduced rates, exemptions, level of tax evasion, and inefficient tax administration.

Tagkalakis (2014) analyzes factors that influence VAT collection efficiency in Greece. He focuses on VAT collection efficiency determinants using quarterly data on VAT revenue, private consumption, and GDP (2000: Q1-2012: Q3). In addition, the regression model includes the following dummy variables: elections in Greece and situation after implementing measures to improve administration revenues and combat tax evasion, which Greece had to implement during the EU-IMF monitoring (since May 2010). The main goal is to investigate VAT collection efficiency in good and bad economic conditions. The dependent variable, C-efficiency ratio, is expressed by the following equation: VAT Consumption C efficiency =

(VAT revenue / private consumption) / standard tax rate * 100. The results of the regression analysis carried out using OLS technique show a positive and statistically significant relationship between the analyzed variables. The author finds that the growth of real GDP growth rate by 1% increases VAT collection efficiency on average by 0.63 percentage points. The author concludes that when there are poor economic conditions in the country, VAT collection efficiency is at a much lower level. Additionally, research points to another factor that can reduce VAT collection efficiency, namely the ability to combat tax evasion. Deterioration in these abilities in one country implicitly reduces VAT collection efficiency.

Sancak et al. (2010) carry out a panel data analysis of VAT C-efficiency determinants, using data from the EU countries in the period 1995-2008. They divide their analysis into three data sets, including, among others, the countries whose estimator model we are exploring. The first data set contains annual data on 32 EU countries during the period 1995-2008; the second data set consists of the annual data of 84 developed and developing countries and encompasses the same time period; the third data set includes quarterly data on 37 developed and developing countries during the period 1999-2009. Using correlation and regression analysis, they find a strong positive correlation between revenue and output gap. The results of their regression analysis show that "shifts in consumption patterns towards goods and services with lower VAT rates and higher tax evasion during economic expansions are key channels through which the output gap affects VAT C-efficiency". During the period of expansion, households tend to get the goods they need, and these goods are in most economies taxed at minimum rates or are not taxed. A good example is the Baltic countries, Estonia, Latvia, and Lithuania, which faced the biggest impact of the global economic crisis. They also find that VAT C-efficiency is positively correlated with institutionally regulated administration and is in a negative correlation with the overall tax burden in one economy.

Sokolovska and Sokolovskyi (2015) study VAT collection efficiency, analyzing tax collection efficiency around the world. They investigate the dependence between C-efficiency and the level of gray economy and corruption in countries.

Numerous studies point to basic factors that affect VAT collection efficiency, excluding the group of countries studied in this paper. Antić (2014) investigates VAT efficiency in Bosnia and Herzegovina. Bosnia and Herzegovina is also a developing country that faced a sharp decline in VAT collection efficiency at the onset of the global economic crisis. Since this developing country had high C-efficiency, the decline in this ratio during periods of crisis has raised many questions in academic circles. The author decomposes C-efficiency in Bosnia and Herzegovina to prove that the VAT design cannot provide a high level of VAT collection efficiency. The research results show that deviations from the VAT law, debt growth, and tax evasion have the biggest impact on gap growth. Analogously, the author concludes that high VAT rates deepen the crisis and cannot improve VAT collection. Hodzic and Celebi (2017) investigate VAT collection efficiency in 28 EU countries, with a particular focus on Turkey during the 2009-2013 period, giving a comparative picture of C-efficiency in Turkey and other EU countries. Based on the VAT revenues in various countries and different levels of C-efficiency, they conclude that Turkey needs greater stability and efficiency of the VAT collection system. Grandcolas (2005) analyzes C-efficiency in 15 Pacific countries (Papua New Guinea, Jamaica, Trinidad, Mauritius, Fiji, Cyprus, Malta, Iceland, Barbados, Vanuatu, Samoa, Tonga, Cook Islands, Niue). The author presents C-efficiency ratio as a share of VAT revenues in GDP to standard rate. The author includes a C-efficiency ratio in his study to explore the experience of countries that

abandoned the VAT system. A special research focus is on Malta, Grenada, and Ghana. He concludes that the VAT system works if there is a strong obligation of political authorities and a detailed plan and resources for VAT implementation. Bird and Gendron (2006) investigate VAT collection efficiency in 24 countries (Argentina, Barbados, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Suriname, Trinidad and Tobago, Uruguay, Venezuela), assessing C-efficiency as the most reliable indicator of VAT collection efficiency. The most important explanatory variables that influence VAT collection efficiency are, according to these authors, urbanization and real GDP per capita.

Finally, we also pay attention to the latest research in this field. Sarmento (2016) investigates the crucial factors that affect VAT revenue. In this way, the author highlights the importance of VAT collection efficiency. His research relies on panel data analysis of 27 countries, in the timeframe 1998-2011. Sermento explores the countries of the European Union and finds that EU governments in most cases rely on increasing tax rates in order to raise a higher amount of tax revenues. The author divides all independent variables into several groups: 1) VAT rates, 2) economic variables, 3) efficiency of administration, using the C-efficiency ratio, 4) legal and institutional environment. The research results show that the efficiency of tax administration (the C-efficiency ratio) is a key determinant in collecting VAT revenues. Ueda (2017) analyzes Japan in addition to EU countries. Ueda explores the impact of compliance and policy gaps following the example of the EU and Japan over the period 2000-2014, and finds strong causality of both gaps, compliance gap and policy gap. The focus of this study is on the fluctuations of C-efficiency, resulting from changes in final consumption and standard rate.

2. C-EFFICIENCY RATIO AS AN INDICATOR OF VAT EFFICIENCY

There are several indicators of VAT collection efficiency. A retrospective presentation of VAT collection efficiency formula is found in a survey conducted by Sokolovska and Sokolovskyi (2015a). The authors sum up all previous studies of the relevant VAT collection efficiency indicator. Đurović Todorović and Đorđević (2013a) also point to some of the measures of VAT collection efficiency. One of the ways in which VAT collection efficiency can be considered is based on the share of VAT revenue in the GDP of a country. However, this indicator does not show if VAT collection efficiency is unsatisfactory. The more subtle indicator is the traditional efficiency measure.

The traditional measure of VAT collection efficiency, efficiency ratio, is presented in the following formula.

$$efficiency\ ratio = \frac{VAT\ Revenue/GDP}{SR} \tag{1}$$

Where VAT revenue is tax revenue generated from VAT; GDP – Gross domestic product; SR – standard VAT rate.

Ebrill et al. (2002a) point to the shortcomings of this indicator. In their opinion, traditional efficiency measure tends to increase VAT collection efficiency in one country. The main disadvantage of the "traditional" indicator is in the numerator. VAT collection efficiency can be increased, because numerator includes production, while VAT is a tax form that explicitly applies to consumption.

A significant diagnostic tool, which will include only consumption in the numerator, instead of production, is a C-efficiency ratio. The basic formula to calculate C-efficiency, according to Keen (2013b), can be presented as follows:

$$C - efficiency\ ratio = \frac{V}{PV^T} \tag{2}$$

Numerator V represents realized VAT revenues; while PV^T can be calculated as follows:

$$PV^T \equiv \tau^S(FC - V). \tag{3}$$

PV^T represents theoretical VAT revenue; τ^S is a standard VAT rate[2]; FC represents final consumption (Keen 2013c, p. 427).[3]

"This ratio measures the difference between the actually collected revenue and the amount of VAT revenues that could theoretically be collected if the standard rate was applied to the entire tax base" (Đurović Todorović & Đorđević, 2013b, p. 92). If VAT gap is higher, this indicates that the potential of this tax form is unused. However, in spite of the authors' consent that this ratio is a relevant indicator of efficiency, the ratio analysis must contain a certain level of reserve. Sancak et al. (2010a) find that deterioration (improvement) of ratio is often conditioned by changes in consumption patterns or changes in tax evasion during expansion. Consequently, it is necessary, in the course of the crisis, to include effects of capital consequences in the analyses. Sokolovska and Sokolovsky (2015b) also speak about the negative link between tax evasion and this ratio, suggesting that a large part of the evaded revenues is used for consumption, which ultimately reflects on this ratio. With a certain level of reserve, and taking into consideration C-efficiency defects that are difficult to measure, we will explore factors that determine VAT collection efficiency based on C-efficiency.

2.1. Measurement of C-efficiency ratio in EU developing countries

The European idea of greater economic integration got a new concept on May 1, 2004, when 8 former centrally planned economies from Central and Eastern Europe – the Czech Republic, Poland, Hungary, Slovakia, Slovenia, Lithuania, Latvia, and Estonia – become members of the European Union (Njegić et al., 2017). The VAT implementation in the EU's developing countries is related to their simplified tax systems" (Andrejovska & Mihokova, 2015, p. 488). Such reforms have made it possible for developing countries to open their economies. In previous years, VAT has become the basic source of revenue in all EU member states (European Commission, 2019). "According to various analyses, VAT is the best form of consumption tax" (Bird & Gendron, 2006a, p. 2). As such, VAT has, over the past twenty years, reached "share in total tax revenues of almost 65%" (Owens, 2011b, p. 8). However, one captious question that arises here is whether the VAT system is well designed in all countries where the VAT is implemented, i.e. whether the VAT collection efficiency is at a satisfactory level.

The following graph shows the trend of C-efficiency in the period 1997-2017 in the observed developing countries of the EU.

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[2] In our study, the annual VAT standard rate of each country is used in the calculation of VAT.
[3] According to Keen (2013), final consumption involves: consumption by households, the government, and nonprofit serving households (NPISH).
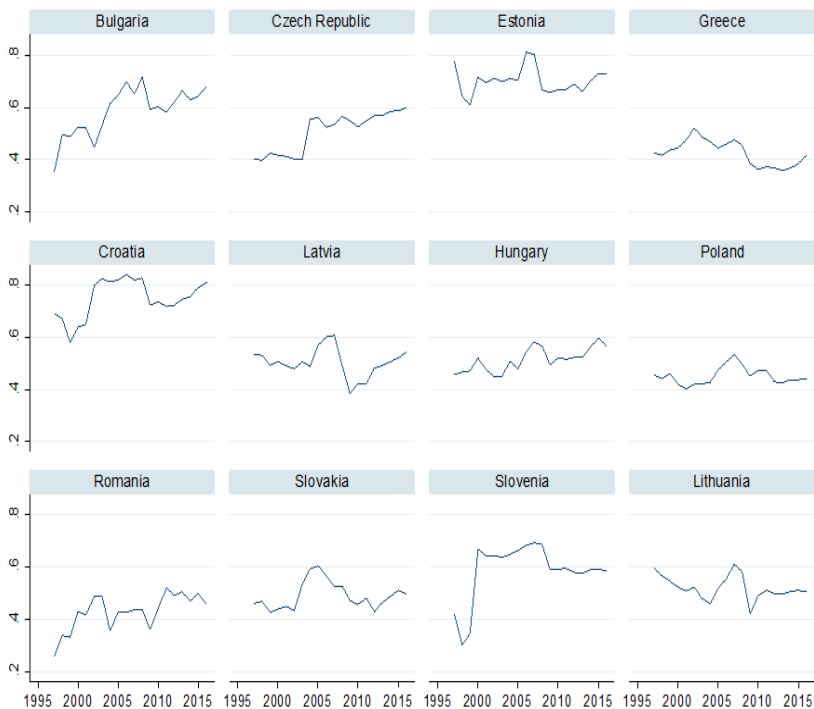
Fig. 1. The C-efficiency trend in the observed countries in the period 1997-2017
Source: Eurostat; European Commission; Own calculations.

"Empirical studies show the connection between VAT collection efficiency in one country and the level of its development" (Minh Le, 2003, p. 2). Based on the trends of the relevant indicator, VAT collection efficiency in developing countries is different. The highest VAT collection efficiency in the last analyzed year is in Croatia (0.80) and the lowest in Greece (0.41). Croatia has recorded growth in C-efficiency over the past few years, which is in line with the country's GDP growth rate in the same period. At the same time, a country that is famous for the negative GDP growth rates and the growing public debt is undoubtedly Greece. Judging by such circumstances in the country, a logical conclusion is the low value of C-efficiency ratio.

In Bulgaria, one can notice a very cyclical trend of C-efficiency ratio. If we look at Bulgaria's tax policy, tax rate changes can be one of the important factors of these cyclical trends (European Commission, 2019). The growth trend of the efficiency indicator in the Czech Republic can also be observed in line with the standard VAT rate trend. In the years that followed the reduction in the rate, the C-efficiency ratio showed positive discrepancy.

Large cyclical changes can be seen in Romania and Hungary, which may be associated with frequent changes in the standard and reduced VAT rates in these countries. In addition, the global economic crisis of 2008 left the consequences on fiscal and financial stability in Romania (Oprea, 2013, pp. 176-177; Popa, 2014). A sharp fall in C-efficiency can, therefore, be related to the consequences described in Oprea et al. (2013a).

When it comes to Lithuania, VAT revenue has been falling since 2001. The reason for the reduction of VAT revenues in the national budget of Lithuania can be explained by the situation at that time, and is related to the harmonization of taxes, in accordance with EU legal acts. Harmonization implied changes in VAT rates (tariff), and "VAT revenues largely depend on the number of taxes applied, the amount, and the tax base to which the reduced rates are applied" (Bikas, 2011). Period from 2004-2008 is considered to be a period of economic growth in Lithuania, when consumption grew, and so did the value of C-efficiency (Bikas, 2011a). "Estonia, Latvia, and Lithuania are the countries that experienced the greatest impact of the global economic crisis during 2008-09" (Sancak et al., 2010b, p.4), and what explicitly followed in these countries was the fall in VAT collection efficiency. VAT collection efficiency in Poland was the highest in 2007, which is in line with the growth of Poland's GDP. When it comes to Slovenia, we note that the C-efficiency ratio in 2009 was significantly lower than in the previously analyzed years. This drop can be associated with the negative GDP growth rate in the country, which was very low in 2009 (-7.8%). Effects of changes in tax policy are also evident in Slovakia. The reduction of the VAT rate (2003, 2004) was accompanied by an increase in the ratio value, while increase in the VAT rate (2011) came with the fall in the ratio value.

2.2. Implications of standard VAT rate on the ratio

"Increasing the standard VAT rate is one of the easiest ways to increase tax revenue, especially when governments in developing countries are trying to find ways to finance large fiscal deficits" (Owens, 2011c, p. 8). The graph shows the standard VAT rate trend in the analyzed EU countries in the 1997-2017 timeframe.

Graph 2 and Graph 1 show that, in most countries, rise in the standard VAT rate is followed by the falling trend of C-efficiency. Greece has had the most changes in tax policy,
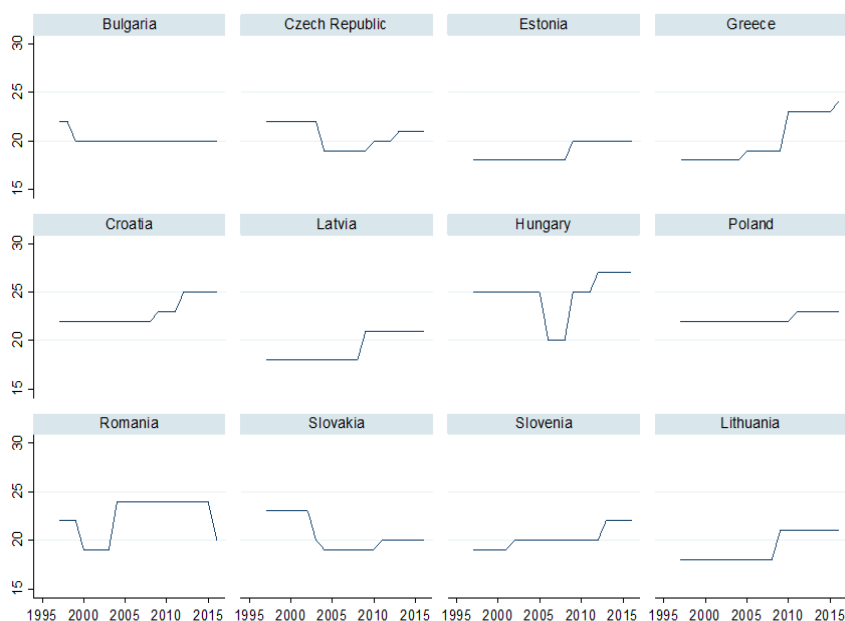
Fig. 2 Standard VAT rate trends in the observed countries (in %), 1997-2017.
Source: Eurostat; European Commission; Authors' calculations.

with explicitly the lowest ratio value in the analyzed period (1997-2016). The highest standard VAT rate, not only in the analyzed countries, but also in the EU, is in Hungary (27%).

Table 1 The introduction of the VAT system in the developing EU countries and current standard rate (in %)

Country	Year of VAT introduction	Standard rate (in %)
Bulgaria	1994	20
Czech Republic	1993	21
Estonia	1991	20
Greece	1987	24
Croatia	1998	25
Latvia	1995	21
Hungary	1988	27
Poland	1993	23
Romania	1993	19
Slovakia	1993	20
Slovenia	1999	22
Lithuania	1994	21

Source: European Commission, 2019.

Table 1 shows the years of VAT introduction into the tax system of the countries analyzed, as well as the VAT rate in 2017. The lowest VAT rate is applied in Romania. "Only two EU countries have changed the tax rate in 2017: Greece (from 23% to 24%) and Romania (from 20% to 19%)" (European Commission, 2019). The answer to the question of whether the standard rate is an important determinant of VAT collection efficiency is analyzed in the following section.

3. DATA, ECONOMETRIC METHODOLOGY AND EMPIRICAL ANALYSIS

The research sample of our statistical data includes 12 developing countries, members of the European Union: Bulgaria, Czech Republic, Estonia, Greece, Croatia, Latvia, Hungary, Poland, Romania, Slovakia, Slovenia, Lithuania. Statistical data consists of annual data for the period from 1997 to 2017. We investigate the impact of 6 indicators on VAT collection efficiency in EU transition economies. Dependent variables whose impact will be assessed are: GDP growth rate, standard VAT rate, export of goods, export of services, wages and salaries, and household consumption. The dependent variable, VAT collection efficiency, will be expressed using formulas for calculating C-efficiency, (2) and (3).

3.1. Data

The aim of this paper is to evaluate the basic determinants of VAT collection efficiency. To calculate dependent variables, we collect data on realized annual VAT revenues, final consumption expressed in millions of euros, and data on the annual standard VAT rate trend in each country. Explanatory variables used in the econometric analysis are given in the following table.

Table 2 Review of explanatory variables

Independent variables	Symbol/Abbereviation	Calculation	Source
Gross domestic product	GDPgrowth	Annual growth rate	Eurostat
Standard VAT rate	VATrate	Annual rate of each country	European Commission - Taxation and Customs Union
Export of goods	EG	Percentage share of GDP	Eurostat
Export of services	ES	Percentage share of GDP	Eurostat
Wages and salaries	WS	Percentage share of GDP	Eurostat
Household consumption	C	Percentage share of GDP	Eurostat

Source: Author's illustration.

Combining time series and comparative data decreases the possibility of multicollinearity (Jovičić & Dragutinović Mitrović, 2011, p. 217). This creates the basis to conduct panel data analysis of 12 EU countries for the period 1997-2017, using StataSE (release 13). Before selecting the model to be evaluated, a correlation analysis is conducted, to point to the possibility of a multicollinearity problem. The correlation analysis ranges from -1 to +1, and the value of the coefficient determines the strength of the correlation (Bhattacherjee, 2012, p. 123). The correlation matrix is presented in Table 3.

Table 3 Correlation matrix of the used variables

	C-efficiency ratio	GDP growth	VATrate	EG	ES	WS	C
C-efficiency ratio	1.0000						
GDP growth	0.1504	1.0000					
	(0.0197)						
VATrate	-0.1457	-0.2804	1.0000				
	(0.0240)	(0.0000)					
EG	0.2054	0.0173	0.0437	1.0000			
	(0.0014)	(0.7899)	(0.5502)				
ES	0.4446	0.0096	-0.0514	-0.0451	1.0000		
	(0.0000)	(0.8825)	(0.4280)	(0.4866)			
WS	0.3477	-0.0559	0.0733	0.1472	0.3454	1.0000	
	(0.0000)	(0.3945)	(0.2642)	(0.0243)	(0.0000)		
C	-0.2880	-0.0085	-0.1261	-0.6129	-0.2374	-0.3446	1.0000
	(0.0000)	(0.8954)	(0.0510)	(0.0000)	(0.0002)	(0.0000)	

Note: p-value in ().
Source: Authors' calculations.

Based on Table 3, we conclude that there is a significant degree of agreement between individual indicators and C-efficiency. The results show direction and strength of linear correlation between the analyzed variables. The results of the correlation analysis point to an agreement between the C-efficiency ratio and the GDP growth rate (GDPgrowth). The Pearson's coefficient points to a positive correlation (0.1504) at a significance level of 5% ($p < 0.05$). There is a positive correlation between C-efficiency and the export of goods (EG) (Pearson's correlation coefficient is 0.2054, at a significance level of 5% ($p < 0.05$). Also, there is a positive correlation between C-efficiency and export of services (ES) (Pearson's correlation coefficient is 0.4446, at a significance level of 1% ($p < 0.001$).

Analogously, the positive correlation exists between C-efficiency and the wages and salaries (WS) ratio (p <0.001). A negative correlation exists between C-efficiency and consumption based on the Pearson's coefficient (-0.2880), at the level of statistical significance of 1% (p <0.001), as well as between C-efficiency and the standard VAT rate (Pearson's coefficient of correlation is 0.1457, at the significance level of 5% (p <0.05).

3.2. Econometric methodology and empirical analysis

Since the correlation analysis indicates that there are significant interdependencies between the analyzed variables, we select the appropriate model. Before we interpret the results of regression analysis, we show which model best suits the analyzed data. There are several types of appropriate panel models: The Pooled Regression Model (Pooled), the Fixed Effect Model (FEM), and the Random Effect Model (REM). These model types are determined by their parameters. The Pooled model is a model with constant regression parameters. The Fixed model is a model with regression constant variability. Third, but not in order of significance, is the Random model, which does not indicate the variability of a constant in any dimension.

In order to obtain the relevant results of the panel analysis, we carry out research using strongly balanced data. The first step in the panel analysis of time series involves testing individual and time effects using the F-test (Jovičić & Dragutinović Mitrović, 2011a, p. 243). The F test is a tool by which we choose between two models: the Pooled or the FEM model. In the event that the zero hypothesis cannot be rejected, we use the Pooled model. However, the Pooled model will not explain the differences between the observed units, in particular, the differences that exist between the countries. In the event that the zero hypothesis is rejected, the constant is not the same for all observation units, but varies. In such a situation, we apply a fixed-effects model (FEM), to determine differences between countries. A Breusch-Pagan LM test is used to decide between the Pooled or REM models. In order to determine whether the variability relates only to a constant or also to a regression parameter with an independent variable, we apply the Breusch-Pagan LM test (Jovičić & Dragutinović Mitrović, 2011, p. 247). In the event that the zero hypothesis cannot be rejected, the Pooled, or a model with constant regression parameters, should be applied. If the zero hypothesis is rejected, we apply the REM model. It is possible that the results of the conducted tests indicate that both the FEM and REM models can be relevant for the interpretation of the regression analysis. In that case, it is necessary to continue the testing using the Hausman test. The Hausman test will examine which alternative is the best, i.e. what differences exist in the assessment of the fixed and random effect models. If the zero hypothesis is rejected, it is inevitable that the fixed effect model should be applied. On the other hand, we apply the random effect model (REM).

The research results are shown in Table 4. The model results are the FEM model results, showing that the average value of the coefficient varies between countries.

Table 4 Results of the test for choosing the suitable model

	F-test H_0: Pooled, H_1: FEM	Breusch-Pagan LM H_0: Pooled, H_1: REM	Hausman H_0: REM, H_1: FEM
Model	5.01 (0.0000)	4.29 0.0191	29.01 (0.0001)

Note: p values in ().
Source: Authors' calculations.

The results obtained by the regression analysis are presented in Table 5. The model explains 46.17% of changes in the C-efficiency ratio and is statistically significant at a significance level of 1%.

Table 5 Results of regression analysis

Independent variable Ratio c efficiency	Dependent variable
Constant	1.325429
	[4.80]
	(0.000)
GDPgrowth	0.0040728
	[2.29]
	(0,023)
VATrate	-0.008913
	[-1.69]
	(0.093)
EG	0.0016631
	[2.51]
	(0.013)
C	-0.0126943
	[-3.95]
	(0.000)

Note: t statistic in [], p values in ().
Source: Authors' calculations.

The results of the estimated fixed effect regression model (FEM) show that the coefficients of the observed independent variables, which can be seen in Table 5, are statistically significant in explaining the C-efficiency ratio. If the gross domestic product growth rate increases by 1%, the C-efficiency ratio will increase by an average of 0.40728%, ceteris paribus ($p < 0.05$). If the exports of goods as a percentage of GDP increases by 1%, the C-efficiency ratio will increase by an average of 0.16631%, ceteris paribus ($p < 0.05$). The other two explanatory variables have a statistically significant negative effect on the C-efficiency ratio. If the standard VAT rate increases by 1%, the C-efficiency ratio will decrease by an average of 0.8913%, ceteris paribus ($p < 0.10$). If household consumption as a percentage of GDP increases by 1%, the C-efficiency ratio will decrease by an average of 1.26943%, ceteris paribus ($p < 0.001$). Independent variables, wages and salaries and export of services, expressed as a percentage of GDP, do not show a statistically significant impact.

CONCLUSION

The regression analysis has highlighted the following statistically significant factors for increasing the VAT collection efficiency in developing countries: GDP growth rate, standard VAT rate, export of goods as a percentage of GDP, and household consumption as a percentage of GDP. Given that authors do not fully agree on the importance of different VAT collection efficiency determinants, this paper has investigated the impact of explanatory variables on VAT revenues in economically underdeveloped countries over the period 1997-2017. The subject of our analysis has been explanatory variables, which are in correlation with the analyzed indicator of VAT collection efficiency.

"The limitations that accompany this research are tax evasion and various tax exemptions, which differ between countries" (Aizenman & Jinjarak, 2005, p. 14).

As an indicator of VAT collection efficiency, we have determined the C-efficiency ratio. This ratio, using the appropriate variables, best illustrates whether VAT collection in one country is at a satisfactory level. Since C-efficiency is obtained using the standard VAT rate, the same variable has been one of our explanatory variables. By incorporating the standard VAT rate in the analysis, we answered one of the research questions set: is the increase in the standard VAT rate an efficient way to achieve optimal tax revenues? The aim of our research was to point out the negative effects of a high standard rate and to explore relevant factors for increasing VAT revenue through C-efficiency analysis. The results of the regression model explicitly show the negative impact of the standard VAT rate on C-efficiency. The standard VAT rate and C-efficiency are in a negative correlation. In this sense, the paper highlights consequences of inadequately conceived tax policy for the economic growth of the underdeveloped countries of the European Union. If authorities increase tax rates, this explicitly leads to reduction in VAT collection efficiency, and, ultimately, reduced tax revenues in the budget.

The correlation analysis has established an empirical link between the analyzed independent variables and VAT collection efficiency. The VAT collection efficiency in developing countries is affected by GDP growth rates. Accordingly, in line with GDP growth, C-efficiency will be at a higher level, i.e. VAT collection efficiency will be higher. There is a negative and statistically significant effect of household consumption on C-efficiency. Specifically, an increase in household consumption decreases C-efficiency. Excessive increase in consumption can create indications of the existence of tax evasion. Sokolovska and Sokolovskyi (2015) indicate that a large part of evaded revenues are used for consumption, and this in the end has reflections on C-efficiency. Furthermore, this can be explained by the negative correlation between household consumption and economic growth rate. Export of goods positively affects VAT collection efficiency. Increase in export increases VAT collection efficiency. The two variables we observed did not show a statistically significant effect on VAT collection efficiency: export of services and wages and salaries.

We hope that answers to the questions set will be guidelines for governments in shaping tax policies. The study of VAT collection efficiency factors has added up to empirical research in the field of the most profitable consumption tax in developing countries, and gave an overview of the existing literature on the observed problem.

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POBOLJŠANJE PERFORMANSI POREZA NA DODATU VREDNOST U ZEMLJAMA U RAZVOJU EVROPSKE UNIJE: PROCENA DETERMINANTI RACIA C-EFIKASNOSTI U PERIODU 1997-2017

Indirektni porezi zauzimaju značajno mesto u poreskim sistemima zemalja u razvoju EU. Članak subsumira radove različitih naučnika, koji se bave uticajem determinant na efikasnost PDV-a. Svrha ovog istraživanja je da istraži determinante efikasnosti PDV-a u zemljama u razvoju koje su članice Evropske Unije. Glavno istraživačko pitanje u ovom radu je: da li povećanje stope poreza na dodatu vrednost negativno utiče na efikasnost PDV-a u zemljama u razvoju EU. U skladu sa tim, jednu od nezavisnih varijabli, koju smo uključili u istraživanje, predstavlja standardna godišnja stopa PDV-a. Pored standardne stope PDV-a, kao determinante efikasnosti PDV-a, analizirali smo: stopu privrednog rasta, izvoz dobara, izvoz usluga, plate i nadnice, potrošnju domaćinstva. Postavljene hipoteze analizirane su korelacionom i regresionom analizom. Istraživanje je sprovedeno korišćenjem relevantnih podataka iz transparentnih internacionalnih statističkih baza, u periodu od 1997-2017. Empirijski rezultati su pokazali pozitivan efekat stope privrednog rasta, izvoza dobara i negativan efekat dve varijable: standardne stope PDV-a i potrošnje domaćinstva. Dve posmatrane varijable, izvoz usluga i plate i naknade, nisu pokazale statistički značajan efekat. Na osnovu rezultata regresionog modela, date su smernice kreatorima makroekonomske politike u cilju ostvarivanja većih poreskih prihoda od PDV-a i ekonomskog razvoja analiziranih zemalja.

Ključne reči: *porez na dodatu vrednost (PDV), performance PDV-a, racio c-efikasnosti, zemlje u razvoju*

Review Paper

THE IMPACT OF AUTOMATED TRADING SYSTEMS ON FINANCIAL MARKET STABILITY

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Abstract. *The way in which financial markets operate has substantially been changed by the development of information technology. Automation of trading systems in financial markets represents the last phase of depersonalizing activities previously done by traders. Automated trading development enabled computers to determine the moment and the way of executing sales orders. Computers still do not make autonomous decisions regarding the choice of instruments to be traded or trading criteria. They implement the strategy a trader has decided on, choosing a favorable moment. This reduces the impact of human emotions on decision making and enables overcoming possible problems which arise due to neglect or lack of concentration. High-frequency trading enables the execution of algorithmic operations at a high speed. The main goal of the paper is to determine advantages and dangers produced by automated stock trading.*

Key words: *automated trading system, financial markets, high-frequency trading*

JEL Classification: G10, O33

INTRODUCTION

The rapid development of computer technology and the importance of its application in contemporary business operations have positioned financial sector as one of the leading in applying modern technology. In order to increase efficiency and ensure continuity in conducting financial transactions, financial markets have succeeded in making the best use of technological development. Unlike previous ways of performing stock trading and visible trade that used to happen on conventional stock exchange markets with the

physical presence of traders, a series of consecutive purchasing or sale operations on stock exchanges is carried out today via electronic systems. Further development of these systems has contributed to the creation of electronic networks, thus providing continuity in the work at the global level through the improvement of information flows. Human activity is replaced by automated trading systems which use predetermined parameters to make autonomous decisions on the execution of trading.

In the past decade, the participation of automated trading systems in the total trading volume tripled. Over time, these systems have become an indispensable part of the markets where sophisticated technology is used to manage all levels of the value chain. Given the increasing importance of automated trading systems for financial markets, the paper seeks to provide updated basic information about these systems by precisely defining terms, strategies and trading software, as well as by presenting empirical researches. The subject of the paper is the influence of automated trading systems use on trading process. The main goal of the paper is to determine advantages and risks caused by automated stock trading.

The first part of the paper analyses the long-term trend of reducing the share of manual work in financial markets which resulted in the development of systems that autonomously enter and execute orders. The second part presents the basic characteristics of automated trading systems. The focus of the third part of the paper will be on trading strategies and software methods. The last part will include the analysis of empirical data and earlier research on the effects of automated stock trading.

1. TRADE DEPERSONALIZATION IN FINANCIAL MARKETS

The beginning of stock exchanges was marked by highly intense manual work of traders. Trade was carried out at trading venues through direct communication of traders, and demanded direct handling of financial instruments. For many years, regulations were the only improved aspect, while trading mechanisms remained unchanged. The main shortcomings of the conventional form of *trading on the floor* are low level of transparency, need for the participation of numerous staff, paperwork overload and slow supply-demand matching (Stoll, 2006, pp. 167). Therefore, as a rule, the innovation of trading was aimed at increasing the speed and quality of the information flow and abuse prevention.

Communication between traders used to be done directly at a trading venue. Requiring permanent physical presence of traders, direct communication was considered to be inadequate. Traders often neither had the opportunity to check the information they arrived at, nor could they do the analysis and/or calculation of the current situation. Instead, they had to make decision as soon as possible so as not to miss the opportunity. The absence of a timely reaction could cause huge losses or lead to a loss of potential earnings. Such circumstances created good opportunities for fraud caused by communicating incomplete or false information. The introduction of the phone as a channel of communication provided traders with the opportunity to retreat into their own offices. The collection and verification of information was facilitated, which created the ability to perform an analytical forecast during the process of trade. However, an obvious limitation of the telephone use was a bilateral communication with other participants. If a

trader wanted to be the first to contact another trader by telephone, he/she would have to find the right order among the offered ones. The first computers in financial markets provided traders with the ability to instantly obtain information on the movement of financial instrument prices and order matching. In this way, investors were given the convenience of quickly selecting the most favorable financial transaction both at the national and international financial markets (Jakšić, 2016, pp. 51). Communication became multilateral, since it enabled a trader to communicate simultaneously with all participants.

Informing is one of the key functions for ensuring efficient stock trading. Brokerage houses must have a quick and easy access to all relevant information concerning the quality of financial instruments, price movements and trading volume. Since stock exchange is not primarily concerned with information flow but rather presents a system of organized and safe trading, the aforementioned can be taken as a progress in stock exchange operations, as far as its function is communicating information (Dugalić & Štimac, 2011, pp. 122). In some earlier times, all information had to be retrieved, sorted and processed manually by employees. Computer systems have enabled the automation of this process, through accelerated information gathering, separating relevant from irrelevant information and its processing. By developing FIX protocol in 1992, a standardized basis for pre-trade communication and trade execution was created.

Due to the processes of immobilization and decentralization, shares have ceased to be physically transferred in a trading process. Immobilization of shares refers to their keeping in one place trusted by all participants - a central depository. Shares are no longer transferred physically from a seller to a buyer during the trade; instead, the bookkeeping transfer of ownership is made. In this way, trading costs are reduced, the possibility of creating liquidity and credit risks is diminished, and the time required for the completion of the entire process is shortened. In addition, immobilization prevented the risk of losing or stealing financial instruments (Kanzaki, 1981, pp. 115). The following step in handling stock is dematerialization during which immobilized instruments completely lose their physical form. Shares lose their physical form and become electronic records on the owner's account at the central depository. Stock trading started to take the form of mechanisms of cashless transactions, where, instead of regulating debtor-creditor relations, ownership relations are regulated (Vuksanović, 2009, p. 225).

The final outcome was the reduction of the needed number of employees in stock companies, faster distribution of information and easier order matching. A number of computer softwares were developed for the purpose of analyzing the performed transactions and predicting future trends. However, regardless of the logistic support provided by the use of ICT, the decisions on trading were still made by traders. Innovation of the activities that have played a logistic role in the trading process has created the conditions for changing the approach to the process of trading. The possibility of a very fast distribution of information and its incorporation into predictions put once again the speed of reaction into the focus of the problem. Traders realized that, if properly programmed, computer systems, being deprived of deconcentration and hesitation, were able to eliminate the problem of slow reaction.

2. AUTOMATED TRADING SYSTEMS

Managing trading orders without direct human intervention has become a daily routine in global financial markets. The roles of traders have been taken over by computer algorithms, which automatically make decisions about offers, send orders and manage them (Kaya, 2016). Having noted a favorable opportunity at the market, automated trading systems supported by appropriate software packages independently carry out transactions of buying and selling a certain currency pair, shares or commodities. Despite the positive effects attributed to them, Venkataraman (2001) maintains that it is impossible to completely replace some of the benefits of human intervention in trade market. He emphasizes that the choice of a trading mechanism should involve the creation of a compromise solution between higher operating costs and potentially better order execution in the presence of a floor broker.

The process of trading in the financial market has been altered forever by the use of computer technology. Computers can now independently carry out all the activities or give signals for buying or selling, while the decisions are made by the trader. There are differences between electronic, algorithmic and high-frequency trading. Within electronic trading, a person makes decisions about the purchase, but he/she does not send the orders personally or by telephone, but via the electronic system. Algorithmic trading involves computer execution of sales transactions, in which computers use the parameters of a predefined algorithm to make a decision on a trading instrument, moment and quantity (Sajter, 2013, pp. 322). In algorithmic trading, computer algorithms not only distribute orders, but also make decisions about the moment and amount of their execution (Aldridge, 2013, pp. 10-11).

One of the first attempts to define high-frequency trading in Europe was done by the European Securities Markets Authority. This organization points out that high-frequency trading involves trading in a very short period of time with low price differences where the dominant focus is on highly liquid instruments, and the ultimate goal is to close all open positions at the end of a business day (Gregoriou, 2015, pp. 159). The main advantage of high-frequency trading is that they can spot price discrepancy and execute a trade much faster than traders with limited cognitive abilities (Das & Kadapakkam, 2018, pp. 4). The term high-frequency trading does not have a generally accepted or legal definition. However, an optional definition of high-frequency trading was offered at the 2012 meeting of the Technical Advisory Committee for Automated and High Frequency Trading (CFTC) (Miller & Shorter, 2016, pp. 1):

- decision-making algorithm (initiating, generating, directing or executing orders) for each individual transaction, with no human intervention;
- low latency technology, designed to minimize response times and make trading closer;
- technology that establishes a fast connection, i.e. communication with the market in order to enter orders and transfer a large number of messages about orders, quotes or cancellation of order execution.

Algorithmic trading can comprise trading in shares, bonds, currencies, and goods (Kissell, 2014, pp. 1). With the help of advanced and complex mathematical models for making decisions in automated systems, strict rules determine the optimal time for an order execution, which can be changed or cancelled during realization, causing the least

possible impact on the price of shares (Dubey, Chauhan, & Syamala, 2017, pp. 2). Apart from being more efficient and capable of performing complex calculations and processing a large amount of information and data, computers are also extremely suitable for rapid reaction to changes in market conditions. This is a necessary feature for real-time trading in a turbulent environment which characterizes today's financial markets. High investments in the construction of computer networks and appropriate data transfer technologies have made it possible to measure the duration of order execution in milliseconds (Zook & Grote, 2016, pp. 4).

The last 20 years recorded a remarkable growth achieved by automated trading systems, which is evidenced by the fact that a half of the overall trading in global stock markets is done through these systems (Zook & Grote, 2016, pp. 1). Kirilenko and Lo (2013) point to three key changes in financial market operations that opened the door to the rapid development of automated trading systems. The first change relates to financial system structure, which has become increasingly complex over time. Globalization and economic growth have led to an increase in the number of market participants, different forms of financial transactions, changes in the level and distribution of risks, etc. With an ever increasing complexity of the financial system, the development of computer technologies in this field was considered necessary. Quantitative modeling of financial markets has created a strong theoretical basis underlying automated trading. The third change relates to the already mentioned integration of computer technology into financial system operations and its impact on the collection and organization of data and communication.

3. AUTOMATIC TRADING STRATEGIES AND SOFTWARES

Financial market traders have different goals and priorities, different amounts of available assets, and different risk tolerance. Due to all this, their trading strategies also vary. A trading strategy is a predefined set of rules that are strictly applied during trading. The basic set of rules should precisely describe the conditions to be met in order to open the position of buying or selling, the way of determining the amount traded and the conditions under which positions are closed (Ilić, 2010 a). Based on the observed parameters, an automatic trading system checks whether the conditions for opening or closing the position are fulfilled and, if so, sends orders for trading. The three key components of each trading strategy are: entering and leaving trading, risk management and positioning (Ilić & Brtka, 2011).

Trading strategies depend on the ability to recognize the opportunity for trading and the speed of responding to an order (Lakić, 2014, pp. 8). The formation of a trading strategy consists of the following steps: formulation, trading rules specification and software package development, preliminary testing (simulation with historical data), parameter optimization (selection of optimal trading strategy, maximum profit, lowest risk, etc.), performance appraisal, implementation of a strategy in realistic conditions, monitoring trading performance (comparison of real results with simulation results), evaluation of strategies and recommendations for further improvements (Ilić & Brtka, 2011).

A key part of each trading strategy is to determine favorable moments for the start and end of trading. If trading is activated too early or too late, losses could be made, or in a

better case, less profit could be achieved than in a situation where trading would be activated at the optimal moment (Ilić, 2010 b). The strategy for opening a trading consists of a *trend-following strategy*, which helps to open a trading in the direction of market price movements and *counter-trend strategy*, which opens a trading when direction changes are expected, i.e. trading opens in the opposite direction from the current trend of market prices. Trend-following strategy is based on making decisions about buying or selling solely by observing market trend (Fong, Si, & Tai, 2012, pp. 11378). The trend is determined at the very beginning of a workday, where further trade during the day automatically proceeds according to a predetermined strategy, regardless of whether there are changes in market trends.

Unlike the input strategy, the output strategy determines the moment when the positions should be closed. A position closing could be aimed at making a profit, or at protecting traders from excessive losses when a price moves in an opposite direction from the expected one. The reasons for closing positions can be situations when prices reach a certain level, if the desired result of a combination of selected technical indicators is reached, or if the level of profit is not reached after a certain period of time (Ilić, 2010 b). In addition, algorithms can also be used for speculative purposes, i.e. in situations of taking over the market risk in order to achieve greater profit. These algorithms are mainly based on *momentum strategy*, *relative value strategy* and *microstructure strategy* (Lakić, 2014, pp. 11). In their papers, the authors (MacKenzie, Beunza, Millo, & Pardo-Guerra, 2012; Zook & Grote, 2016) name numerous high-frequency trading strategies, including market maker strategies, as well as different arbitrage strategies - statistical arbitrage, cross-market arbitrage, etc.

The optimization of parameters implemented in a trading strategy is undertaken in order to increase profit and reduce risk. When optimizing an input automated trading strategy, it is necessary to determine favorable parameters of technical indicators for increasing profitable trading percentage, while the optimization of an output strategy regulates the level of profit or loss in individual trading and attempts to find the ratio of parameters for achieving the best results (Ilić & Brtka, 2011). Different trading strategies also have different risk levels, so even the most efficient trading strategies have a certain percentage of loss. Risk management means maintaining the risk within the expected limits which are acceptable in relation to the balance on the account. The main objective of risk management is to limit losses, in a way that there is always a sufficient amount of funds to continue trading, even after a series of trades that ended with a loss (Ilić, 2010a).

High-frequency traders can be classified depending on the trading strategy they implement. The use of aggressive trading strategies is associated with traders who primarily trade by placing market orders, while, on the other hand, the implementation of trade through the limit order indicates traders who opt for passive trading strategies (Lakić, 2014, pp. 15). Traders use aggressive strategies to retain their position, while their trading is focused on tracking the latest price trend (they buy when prices rise and sell when prices fall). Passive strategies are applied by traders who often change their positions in a short period of time (sales are followed by purchases, and vice versa).

The relationship between human participants who designed trading strategies and computers which executed trading orders deepened and evolved into software trading systems (Zook & Grote, 2016, pp. 5). The handling of trading orders is automated with the help of a software with implemented trading strategies. The development of

automated trading software begins with a trading plan, i.e. it is necessary to formulate how the trading strategy should function and what is expected from such a strategy. Parameters having been optimized and satisfactory results confirmed by detailed testing, the systems for automatic trading, i.e. softwares and their strategies can be used in practical trading. This procedure is shown in Figure 1.
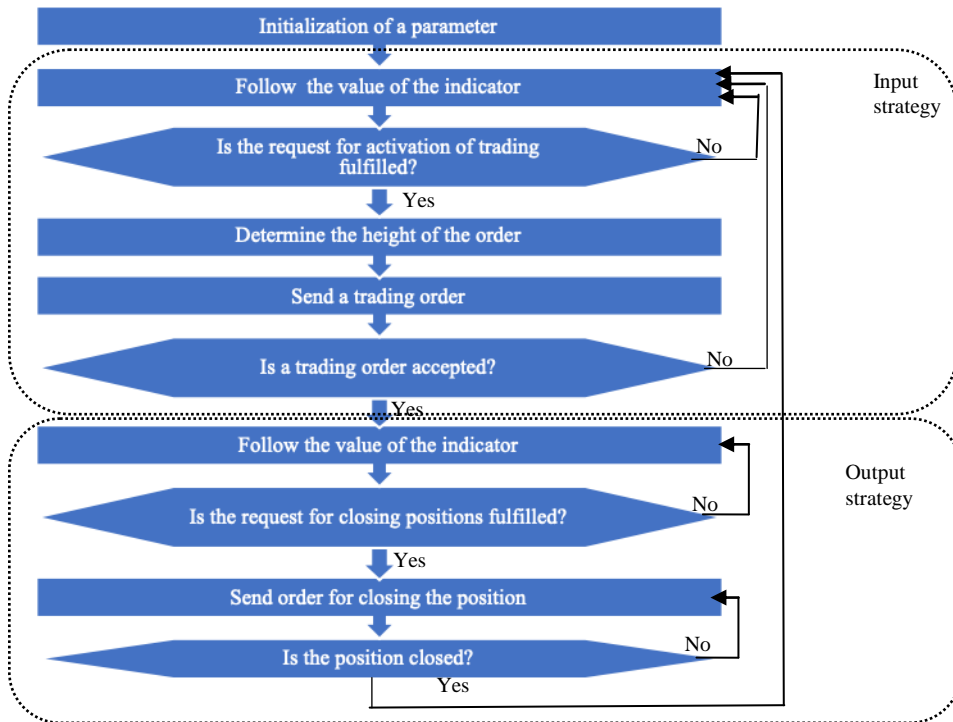
Fig. 1 The structure of the real-time automated trading software
Source: Ilić, V. (2010 b). The structure of software
for automated trading on foreign exchange market.

Automated trading softwares allow one to track a large number of parameters and at the same time make it easy to decide in real time. They can fully take control of trading activities (opening and closing positions and determining the amount of deposits). At the stage of using software strategies, the user should not interfere with the decisions made by the algorithmic strategy, but his task is to monitor the fulfillment of the planned results and the movement of the level of risk. In the case when software does not achieve desired results, it is necessary to correct the trading model and to return the strategy to the stage of optimization and efficiency testing. Automated trading software strictly adheres to the given strategies. In this way, the influence of human emotions on decision making is reduced and it is possible to overcome problems that may arise from neglect or lack of concentration (Ilić, 2010 a).

4. EMPIRICAL EVIDENCE RELATED TO AUTOMATED TRADING SYSTEMS

Automated trading systems have created a number of new challenges and opportunities for both investors and their regulators. Since traders have been given the opportunity to better adapt their bids to new market information over the past few years, the share of high-frequency trading in the overall stock trading turnover has grown sharply, while market liquidity has been constantly improving (Jones, 2013, pp. 2). Diagram 1 shows the changing trend of high-frequency trading share in the overall volume of stock trading in the USA financial market.
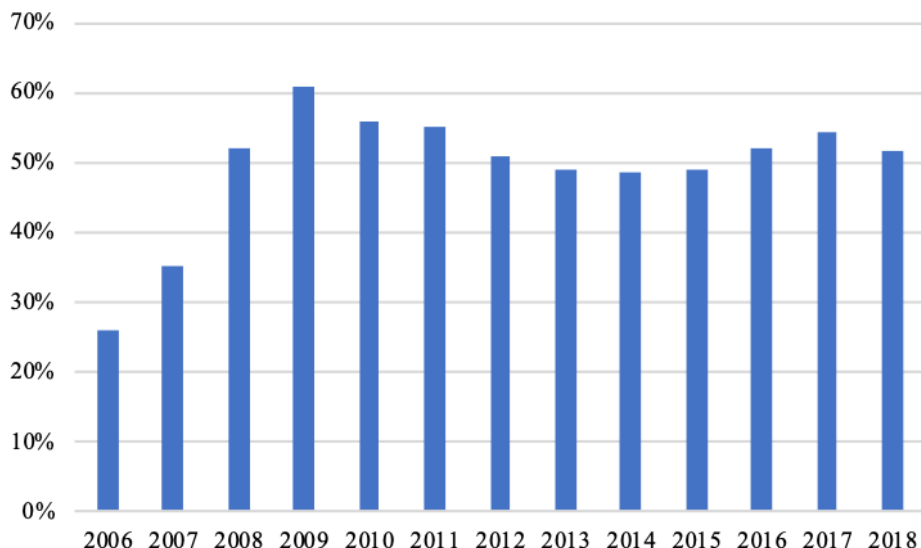
Diagram 1 Share of high-frequency trading in the overall stock trading turnover
Source: https://www.theatlas.com/charts/HJ3PraH_7

During the observed period of time, a significant increase in the volume of automated trading was recorded. The share of high-frequency trading in the overall stock trading in the USA financial market increased from around 25% in 2006 to over 60% in 2009. With the onset of the global economic crisis, a further trend of increasing the share of high-frequency trade stopped. From 2010 onwards, a steady decline and stagnation was noted in high-frequency trading. The share of these systems in post-crisis years was around 50%. These data gain on significance when compared with the total annual number of trades presented in Table 1. It can be seen that in the period 2004-2008, where the relative participation of high-frequency trading increased, a significant increase in the overall volume of trade was marked. In post-crisis years, the stagnation is followed by a fall in the total annual trade volume. The reasons for reducing high-frequency trading can be found in: a) a smaller amount of revenue and profit that was appropriated as the cost of technological infrastructure increased; b) the existence of intense competition within the industry and c) the growth of alternative trading platforms (Kaya, 2016).

Table 1 Total annual trading volume in the USA financial market (in millions)

| Year	Trading	Year	Trading	Year	Trading	Year	Trading
2002	24,678	2007	48,957	2011	48,820	2015	40,866
2003	20,405	2008	53,889	2012	45,390	2016	34,795
2004	20,629	2009	51,001	2013	42,371	2017	34,844
2005	38,372	2010	44,794	2014	40,944	2018	34,691

Source: https://www.itg.com/trading-volume/year/

The application of automated trading systems to an increasing number of markets is owed to some of their key features. The speed of order execution as one of main features has been increasing significantly from year to year (Jones, 2013; Carrion, 2013; Dubey, Chauhan, & Syamala, 2017). In addition to this, the key advantage is considered to be real-time decision making, along with the observation of a large number of parameters. Companies using high-frequency systems trade hundreds or thousands of times a day for their own account, where holding periods are measured in minutes or seconds. A recent research conducted by Indian authors (Dubey, Chauhan, & Syamala, 2017) confirms that in the first five years of the automated trading system implementation in 2009, due to the high speed of transfer, the volume of trading in financial markets increased by 60%.

The motive for high-frequency trading implementation is to generate revenue. However, traders who do not possess the technological infrastructure necessary to implement these systems face the high costs of introducing new equipment (Kearns, Kulesz and Nevmyvak, 2010, pp. 14). Riordan & Storkenmaier (2011) observed technological changes on the German stock market in 2007, trying to find out whether this type of change has affected two important aspects of market quality - liquidity and price. The results confirmed that the time between order entering and verification was shortened by technological upgrade from about 50 to 10 milliseconds, whereby the reduced time provided greater liquidity on the market.

Most researches in the field of automated trading systems examine and confirm the existence of a positive impact of these systems on the quality of the market. Most often, they point to effects that contribute to increasing market efficiency - faster processing of information, timely decision-making, higher profits (Frino, Prodromou, Wang, Westerholm, & Zheng, 2017) greater information efficiency in stock markets around the world (Das & Kadapakkam, 2018), etc. However, the benefits of high-frequency systems should not be taken for granted. Though considered to be a positive aspect, speed might be unfavorable for other investors, which can lead to the emergence of adverse selection that reduces market quality (Jones, 2013, p. 1). On the other hand, Jovanovic & Menkveld (2016) dispute these claims, stating that the implementation of high-frequency systems into financial markets reduces adverse selection by 23%, with a 17% increase recorded in trade volume. Also, many regulatory barriers (each country has its own regulatory regime), as well as difficulties in identifying participants' identities, since most global stock exchanges function on the principle of voluntary disclosure of participants' identity, provide the possibility of placing anonymous orders (Comerton-Forde, Putniņš, & Tang, 2011, pp. 3). The regulatory policy of the automated trading system of the Australian Stock Exchange (SEATS) stands out from others in that it enables direct participants to identify the traders' identity at all times (Berkman & Koch, 2008, pp. 234). In this way, automated systems adopt one of the characteristics of the conventional trading method, i.e. significantly facilitated identification of a trader, which can reduce the risk of unfavorable selection when trading.

In conditions of market disturbance and instability, there is an increase in the speed at which high-frequency systems exhaust the best prices for buying and selling leading to a change in trading volume, which may lead to a phase corresponding to some form of *flash crash*. This term refers to dramatic changes in prices on stock exchanges in a short period of time. One such event from the recent past was Flash Crash in 2010, in which Dow Jones dropped by almost 1,000 points within 10 minutes, which was followed by the recovery of most of the losses in just 30 seconds (Lakić, 2014, pp. 9). This event led to a fall in the price of a large number of shares in the market, some of which lost their entire value, while the value of others rose more than a factor of 1000 (Braun, Fiegen, Wagner, Krause, & Guhr, 2018, pp. 2).

Flash Crash has raised a number of important issues related to the structure and stability of the USA financial markets. Many experts (Kirilenko, Kyle, Samadi, & Tuzun, T., 2011; Akansu, 2017; Braun, Fiegen, Wagner, Krause, & Guhr, 2018) attributed instability to excessive use of computers and high-frequency trading systems. However, the key question is whether these systems really made the market fragile and unstable. In fact, on Flash Crash day, the high-frequency trading system stabilized the prices at the very beginning, but the inflow of a large number of orders that overflowed the system disabled the liquidation of positions, which, due to the withdrawal of the high-frequency algorithms liquidity, further led to the acceleration of the subsequent crash. This is supported by the fact that almost two-thirds of the total trading volume on that day was submitted via high-frequency trading systems (Figure 2), and that in almost two minutes the critical fall of the Dow Jones index millions of shares were traded in each second (Lakic, 2014 , page 9). The largest number of canceled orders at these moments was recorded at high frequency traders (Figure 3).
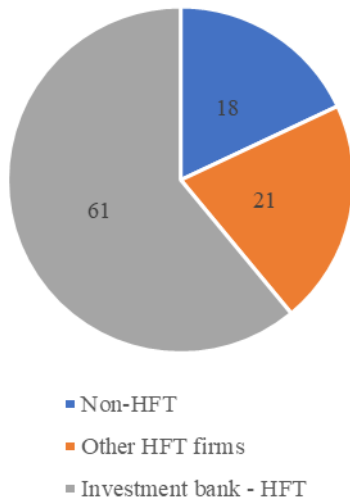
Fig. 2 Trading activity   **Fig. 3** Cancellation ratio
Source: Bellia, M., Christensen, K., Kolokolov, A., Pelizzon, L., & Renò, R. (2018). High-Frequency Trading During Flash Crashes: Walk of Fame or Hall of Shame?

The initiation of Facebook's initial public offering in May 2012 makes another example of market vulnerability caused by the use of high-frequency trading systems. The opening of Facebook on the stock market attracted a large number of investors, which was not supposed to be a problem for NASDAQ, because this over-the-counter market is characterized by the ability to process large amounts of orders. However, the huge demand for Facebook shares, which was placed using the orders of high-frequency system, made NASDAQ computers slow down. Instead of the usual 0.04 milliseconds to calculate the price, computers took almost a hundred times more, i.e. 5 milliseconds to carry out the same operation (Zook & Grote, 2016, pp. 12). An unanticipated problem with NASDAQ's initial public offering system led to a 30-minute delay in opening Facebook positions, which is a serious lag in today's market environment characterized by hyperactivity (Kirilenko & Lo, 2013, pp. 63). Despite the fact that after the initial delay, the trading of Facebook shares continued at a usual rate, short-term software problems on NASDAQ led to losses that cost investors and their brokerage houses tens of millions of dollars (Jones, 2013, pp. 41).

The rise of automated trading was followed by instabilities that made the financial markets more vulnerable than before. Technological concerns in the years following 2012 have led to the emergence of less dramatic market crashes, localized within the change of the value of one share. Most commonly, these market crashes are called ultrafast extreme events, since a significant increase or decrease in stock prices happens within milliseconds (Braun, Fiegen, Wagner, Krause, & Guhr, 2018, pp. 1). There is a controversy in the attitudes held by experts on the reasons of mini flash crash emergence. Most often, the focus of their attention is still on high-frequency trading systems. However, market manipulation and unbalanced liquidity, on the one hand, and large orders, on the other, are also marked as possible triggers. Consequently, the regulators seek to gather all necessary information from the market in order to create adequate provisions in the field of automated trading systems, which will reduce the risk of endangering the integrity of the capital market.

CONCLUSION

The prospects for further development of financial markets and financial institutions rely heavily on future investments in information technology. One of the results of the previous investments in the development of technology is automated trading systems. At the very beginning of this paper, the theoretical analysis pointed out the superiority of these systems over conventional stock trading. Some of the benefits of these systems would be making decisions based on algorithms and executing orders in a virtual space between computers, with no need for immediate human intervention. The new era of trading enabled more efficient order execution, which ultimately resulted in improved characteristics of stock portfolio. Speed, real-time software decision making, automatic order execution and reduced transaction costs for traders have made global financial markets open to these systems. On the other hand, such a rapid expansion of automatic trading has seriously affected the stability of financial markets on several occasions. The evidence is provided by empirical research on the events such as Flash Crash, as well as the delay of the initial public offering of Facebook shares. In both cases, the risks

associated with high-frequency trading such as inaccurate computer interpretation, lack of capacity, programming error or targeted manipulation seem to be the main instigators of market instability. The analysis shows that these events were one of the triggers for reducing high-frequency trading volume in the last few years. Altogether, although golden age is far behind, the conclusion is that risks can be avoided by introducing new appropriate measures of regulation and international standards, so that in the years to come, society can take advantage of the positive sides of these systems.

It should be noted that technological innovations are essential for the development and improvement of the market. In this regard, the positive influence that automated trading systems have on the quality of the market is indisputable and it is proven by earlier empirical researches. The contribution of these systems should not be called into question even if the circumstances when these systems can destabilize the market in the short term are taken into account. The market crashes pointed to the weaknesses of automated trading systems. Studying detected weaknesses should serve regulators, since further progress and evolution of automated trading systems necessarily require to be accompanied by appropriate regulatory measures.

Theoretical and empirical considerations presented in the paper contribute to the creation of new knowledge in the field of contemporary stock trading in global financial markets. By pointing out the key characteristics of automated trading systems, with an overview of the challenges of their implementation in practice, the paper has filled the existing gap in the research literature in Serbia. Having in mind the fact that the practical application of these systems was most often observed for the USA capital market, the recommendation for further research would be to include the financial markets of Europe and Asia into analysis.

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UTICAJ AUTOMATIZOVANIH TRGOVINSKIH SISTEMA NA STABILNOST FINANSIJSKIH TRŽIŠTA

Razvoj informacionih tehnologija je suštinski promenio način funkcionisanja finansijskih tržišta. Automatizacija trgovinskih sistema na finansijskim tržištima predstavlja poslednji čin depersonalizacije aktivnosti koje su ranije obavljali trgovci. Razvojem algoritamskog trgovanja, računarima je potpuno prepušteno određivanje trenutka i načina izvršenja kupoprodajnih naloga. Računari i dalje ne donose autonomno odluke u pogledu izbora instrumenata koji će biti predmet trgovine, ili kriterijuma po kojima će se trgovati. Oni implementiraju strategiju za koju se trgovac odlučio, birajući povoljan trenutak. Na ovaj način se smanjuje uticaj ljudskih emocija na donošenje odluka i omogućavaju prevazilaženje problema koji mogu nastati usled nepažnje ili nedostatka koncentracije. Visoko-frekventna trgovina omogućava izvođenje algoritamskih operacija velikom brzinom. Osnovni cilj rada je utvrđivanje prednosti i opasnosti koje produkuje algoritamsko trgovanje hartijama od vrednosti.

Ključne reči: *automatizovani trgovinski sistemi, finansijska tržišta, visoko-frekventna trgovina*

Original Scientific Paper

RELATIONSHIP BETWEEN EASE OF DOING BUSINESS INDICATORS AND THE FOREIGN DIRECT INVESTMENT INFLOWS IN THE REPUBLIC OF SERBIA

UDC 339.727.22(497.11)

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Abstract. *The importance of Ease of Doing Business indicators as determinants of FDI inflows has attracted attention in establishing their connections. The aim of the research is to examine the relationship between the Ease of Doing Business indicators and foreign direct investment (FDI) inflows. Dynamic and correlation analysis are applied in the consideration of the interdependence of Doing Business indicators, Starting Business, Construction Permits, Getting Electricity, Registering Property, Getting credit, Paying taxes, Trading across borders, Enforcing contracts, and Resolving insolvency, with FDI inflows. The obtained results show that Resolving insolvency and Construction Permits have the highest degree of agreement with FDI, while the negative agreement with FDI trends is shown by Getting Electricity, Registering Property, Getting Credit, and Enforcing contracts. The main results of this research are useful for economic policy makers because they provide a good basis for formulating the strategy of improving the business environment in the Republic of Serbia.*

Key words: *FDI inflows, Doing Business indicators, Republic of Serbia*

1. INTRODUCTION

Foreign Direct Investment (FDI) is widely considered in numerous surveys from different perspectives. In general, if countries are at a similar level of economic development, those who attract more FDI are considered more competitive. Considering the growing importance of FDI for the economies of countries, the importance of analyzing the costs and benefits of such investment is emphasized. In this way, multinational companies not only maximize benefits, but can also minimize their costs. Higher economic growth based on FDI is achieved through numerous benefits at different levels. FDI benefits are associated with technology transfer, better use of available resources, and the introduction of new processes, international trade integration, and plant development. Given that FDI is identified as positive for the country's development, it is important to explore the characteristics and policies of countries to attract FDI. With policies attracting FDI inflows, the host country can improve the business environment. Leaders require trade promotion, and creation of a long-term relationship that will distinguish FDI from one-time import-export contracts. In order to promote confidence in the market, it is proposed that governments define business rules, ensure presence and demonstrate loyalty to the private sector. Governments strive to improve policies, conditions and legislation, and introduce laws to create a simple and secure environment for business and attract FDI. These improvements are measured by the Doing Business indicators of the World Bank. Doing business is an annual survey, including a large number of "Ease of Doing Business" indicators, to assess and rank countries based on their quality to attract FDI. Therefore, ease of doing business represents an economic ranking based on the assessment of the ease of doing business in a particular economy. The higher ranking indicates that the regulatory environment is more suitable for the start-up and the functioning of a local company. Better economic governance (banking and finance, fiscal burden, monetary policy), less government participation in the economy, less government intervention, higher levels of political freedom, and the absence of wage and price controls contribute to higher FDI inflows.

The first part of the paper provides a literature overview of the World Bank's Doing Business indicators. The second part is devoted to the connections of Doing Business indicators with FDI inflows, while the third part presents methodology of the research and hypotheses. The fourth part gives the results of the research.

2. EASE OF DOING BUSINESS

Since 2006, the World Bank has adopted an approach to rank nearly 200 countries based on their business environment and "ease of doing business" in these economies. The essence of the approach is reflected in the importance of the prosperity of the private sector in the promotion of growth and development. In general, the main idea is that simpler business start-up encourages an increase in the number of investors, which affects the increase in the number of jobs. The World Bank's analysis points to the link between a good business environment and promotion of competitiveness, innovation and expansion (World Bank, 2013). The business environment is also linked to the institutional environment in the country. If the country has strong institutions, it becomes more attractive for foreign direct investment, bearing in mind that the cost of transactions is reduced by increasing the efficiency of the host country market.

The World Bank's Doing Business report is based on certain criteria for evaluation and ranking of business simplicity. Doing Business indexes analyse areas, which are made up of several indicators (variables) representing qualitative measures. Indices are divided into following areas: starting a business, working with building permits, registering ownership, obtaining a loan, investor protection level, paying taxes, cross-border trade, respecting contracts, closing a business (or resolving insolvency), hiring workers, and obtaining electricity. They do not include certain business norms such as: macroeconomic stability, corruption, working skills of the population, security level, specific legislation for foreign investment, or infrastructure quality. In the further text it is shown how Doing Business in general, and above-mentioned criteria individually, are related to growth and development indicators.

Starting a business. The decision of an investor regarding whether to start a particular business is determined significantly by the simplicity of starting a business. A large number of empirical research studies highlight and confirm that entry barriers prevent development, while empowering forms that would lose part of the market share if someone applies more efficient technology (North & Thomas, 1973). Higher initial costs are a barrier to creating an enterprise, and higher costs of starting up operations affect an entrepreneur's withdrawal from creating a company. In this case, they become employees, not employers, which affects the reduced number of potential jobs. The entry barriers discourage companies from entering, which is primarily the case with small businesses (Klapper et al., 2006). Numerous procedures for starting a business, as well as higher start-up capital, reduce the scope of business activities. Higher capital affects the reduction in the level of entrepreneurship, and shorter time to register a company affects the increase in the number of enterprises in those industries with rising demands on the world markets. Reduced costs, shorter time and simplification of procedures in starting up operations affect the increase in the number of registered companies.

In a number of studies, the connection of entry barriers for businesses and determinants of growth is emphasized. A link between lower entry barriers and precise regulation and improvement of productivity factors was established. It was concluded that several entry barriers affect the lower overall productivity factor (Moscoso, Boedo & Mukoyama, 2012). A negative link between input costs and productivity factors is identified, and that easy entry allows adaptation and faster spread of the best technology, leading to a faster growth of productivity factors.

Getting a loan. The influence of finance is significant for growth and development (Schumpeter, 1912). On the other hand, certain authors point out that financial development is not significant for growth (Lucas, 1988). Based on a survey conducted by King & Levine (1993), it is concluded that there is a positive link between financial development and GDP growth per capita and capital accumulation. In addition, it is emphasized that there is a need to have programs that will allow better access to loans for enterprises, that is, the availability of loans not necessarily follows the increase in economic activity. Financial development positively influences growth by providing businesses with easier access to credit. In addition, credit-worthy companies grow faster in financially more developed countries. Financial development positively influences growth by reducing credit constraints, while it is noticed that financial development manages credit constraints to a significantly greater extent for smaller companies.

Implementation of contracts and good institutions. In order to simplify business, growth and development, it is necessary to establish efficient mechanisms for implementation of

contracts and good institutions. This facilitates access to credit, improves trade and reduces the informal sector (World Bank, 2013). Particular attention is paid to the importance of institutions and management to growth and development, in terms of the importance of good institutions for promoting economic growth (Djankov et al., 2003). Three foundations of efficient market created by good institutions are: protection of property rights, implementation of contracts and collective action (Dixit, 2009). Through the protection of property rights, investments are made by individuals, who will later collect the fruits of their investments. Implementation of contracts is aimed at individuals participating in mutual benefit transactions. Institutions with better enforcement mechanisms prevent one party from doing fraud transactions causing losses to the other party.

Certain research indicates how implementation or compliance with the contract affects the development and simplicity of business (Dixit, 2009). The model suggests that in countries that have problems in implementing contracts, investors and contracting parties are in the "prisoner's dilemma" situation. High costs of implementing a contract may affect one party's failure to fulfil its obligations, which adds additional caution to investors when defining projects. In addition to this, an additional model emphasizing that problems of contract realizations cause higher macroeconomic volatility is created.

Developed legal institutions simplify the growth of enterprises by allowing them to gain simpler access to long-term financing. The countries with effective implementation of contracts have developed banks, and weak implementation of the law relates to a smaller financial market. The quality of institutions is the most important determinant of access to loans at the country level.

Effective compliance with contracts and good institutions also improves a trade. Effective compliance with contracts promotes comparative advantages in terms of goods for which production contractual relationships with third parties are necessary. Limited compliance with contracts and weak institutions are associated with the size of "grey" economies and foreign direct investment. The survey was conducted on the basis of data from 4000 companies from 40 countries, showing that a higher level of legal system reduces the size of the informal sector (Dabla-Norris et al., 2008). Quintin (2008) defines the model describing how to reduce the size of the informal economy by improving compliance with contractual obligations on formal funding. In addition, the rule of law significantly increases the level of foreign direct investment, i.e. countries where the ways of registering assets are simpler are more attractive to FDI.

Investor protection. The issue of investor protection is significant for minority owners of a company. If an investor protection is weak, investors will not invest in a corporation unless they are the majority owners. In this way, the market is prevented from financing the growth of enterprises (World Bank, 2013). In general, investor protection promotes economic growth and risk taking with regard to large investments. Better investor protection positively impacts companies in terms of risk taking and positively affects growth. Investor protection can also affect growth through financial markets, where poor investor protection is associated with the smaller financial market. Poor investor protection can lead to higher costs of external financing. Like investor protection, ownership protection, also encourages investments. When ownership protection is secured, investors are convinced to benefit from their investments. A positive link exists between the quality of institutions, such as the ownership protection (property rights) and investment, and growth. The existence of a positive link between the quality of property rights and the reinvestment of a company's profit initiates a positive link between property rights and growth.

Property rights promote economic growth through better allocation of resources. The impact of property rights on growth is generally viewed as providing an initiative for investors to invest. Besley & Ghatak (2009) identified four channels in which the property rights affect economic activity and growth, which include: 1) minimizing the risk of expropriation, 2) reducing the costs of protection, 3) property rights in the realization of trade gains, and 4) support of property rights to other transactions, and in particular regarding the loan claiming the guarantee.

The link between property rights and growth is complex, which points out the analysis of data panels from 91 countries in the period from 1980 to 2005 (Bose et al., 2012). There is a positive link between property rights and growth in the countries in which financial institutions are developed, while in the developing countries there is an optimal level of property rights. Below and above this basic level lower growth will be achieved. On the other hand, the bidirectional causality between property rights and growth is identified, in the sense that ownership of land is the basis for the development of large enterprises, while the growth of companies improves property rights. Strong property rights have a positive effect on wealth and capital formation, that is, property rights positively affect investment and growth.

Paying taxes. Based on the analysis of the World Bank, it was found that the tax administration is one of the first 11 business constraints, while taxes are among the top 5 basic business constraints (World Bank, 2013). Research focuses on the relationship between tax rates and development indicators. The conclusion was made that high tax rates adversely affect total investments, reduce FDI, reduce entrepreneurial activity and increase the informal sector. Higher tax rates may be associated with lower growth, and there is a negative link between tax rates and tax evasion. The Tax Administration is also an important aspect of taxation for ease of doing business and its impact on growth and development. Bird (1989) points out that tax administration should have the same or even greater significance than the tax structure of the tax system reform. The tax system of a particular country should be such that it works effectively and efficiently surrounded by the institutional weaknesses of a country.

Cross-border trade. The trade aims to allow manufacturers to expand their product market and to purchase inputs at the best prices. This is impossible to achieve if business is done exclusively on the domestic market. Certain studies have shown that in some African countries, due to inefficient trading procedures, revenue losses are almost 5% of GDP (World Bank, 2013). Trading costs are higher in developing countries. Inefficiency in trade, especially in developing countries, imposes reforms in certain areas. Developed countries and developing countries differ in terms of the necessary reforms. The richer countries have to implement information and communication technology reforms, while developing countries need infrastructure and regulatory reforms. Simpler movement of goods through better infrastructure and institutions will have the greatest effects on improving trade for developing countries. Trade performance is most affected by the availability of information regarding trade, simplification and harmonization of documents, simplification of procedures and automation of processes.

Other indicators. In addition to the specific components, Ease of Doing Business is analysed also, in general, and its relationship with growth and development indicators (Mendoza et al., 2014). For example, Bayraktar (2013) considers the link between FDI and business simplicity indicators as one potential source of FDI change in the period from 2004 to 2010. The results show that countries with better business outcomes attract more FDIs.

When considering developing countries, improvements in the „ease of doing business" indicators can have a partial impact on determining higher FDI flows in these countries. This study also shows that there is a steady increase in the share of FDI flows in developing countries while falling in developed countries. In addition, the difference in the growth rate of developed and developing countries is a factor that can explain the change in FDI flows from developed countries to developing countries. The results further show that Doing Business indicators are almost unchanged in developed countries, while rapidly change their values in developing countries. There are significant improvements in starting a business, closing down businesses and protecting investors. Piwon & Ramírez (2010) considered whether the business indicators affected the FDI, and indicate that there is a positive link between the government's actions to increase FDI flows. Using the regression model, it is concluded that increasing the Doing Business rank by one place contributes to an increase in investments of over $44 million. Similar research indicates that starting a business, registering assets, obtaining loans, working on building permits, protecting investors, crossing borders and executing contracts are indicators that are directly and significantly related to FDI in Asian economies (Shahadan et al., 2014). The survey also showed that the closure of businesses or the resolution of insolvency are not desirable for total net FDI, but also that they do not have a significant impact on their attractiveness. On the one hand, net FDIs are in a positive correlation with the indicators of obtaining loans and investor protection, on the other hand, they have a slight negative correlation with indicators related to closing a business or resolving insolvency. A positive and significant effect on the flow of FDI has an indicator of asset registration, bearing in mind that ownership rights are the essence of providing investment, productivity and growth. The results of the analysis suggest that property owners who are registered can invest more easily, as well as having a greater chance of getting a loan when they use the property as a basis for a mortgage.

3. EASE OF DOING BUSINESS AND ITS IMPACT ON FDI INFLOWS

In order to improve the attractiveness of the developing country for FDI, an assessment of the importance of openness, infrastructure availability and sound economic and political conditions was carried out (Sekkat et al., 2007). Based on the results of the research, it was concluded that these factors are particularly significant in South Asia, Africa and the Middle East, and that the impact of these factors is higher on FDI in the manufacturing sector in relation to total FDI. In addition, the impact of infrastructure on FDI was examined and pointed to the significant positive impact of infrastructure, in the short and long term, on FDI inflows (Rehman et al., 2011). The results showed that in the short term, 1% increase of the infrastructure influences the increase of the FDI by 1.03%, while in the long run, the same percentage of infrastructure increase contributes to the increase of the FDI inflows by 1.31%. The survey also shows that the size of the market has a positive relationship, and the course has a significant negative impact on the infrastructure, in the short and long term. Better Doing Business ranking contributes to the higher FDI inflows, and it suggests that there is a more attractive investment climate in a country. FDI inflows are higher in countries with better Doing Business indicators, and economies that provide a good regulatory environment for domestic companies seek to provide the same for foreign companies.

Therefore, Doing Business set of indicators can be treated as the international instrument for changing behaviours, not only for the purpose of motivating national investors, but also for attracting foreign investors. The fact is that the attraction does not have to be linked to a high level of FDI. Doing Business indicators are compared with other known data on FDI inflows related to functioning of foreign business entities under the direct control of the government. The way that Doing Business indicators affect FDI is analyzed if the country's change in FDI inflow level is compared to Doing Business indicators' values for that year. Fostering FDI inflows is also affected by macroeconomic factors such as human capital, high per capita income, which cannot be influenced by the government. The working framework includes desirable legislation, an open business culture for foreigners, and valuable national institutions. The main indicators of FDI are: the size of the market, the growth of the market and the level of education of the domestic workforce, whereby the appropriate working framework for FDI is not sufficient for investment attraction. In order to enable the FDI inflow, it is necessary that the country has a certain positive location and good institutions.

The research identifies two groups of descriptive factors in terms of FDI inflows: gravity factors (legislation, closeness, market size) and factor endowments (labour force, capital) (Shahadan et al., 2014). Most of the FDI inflows are explained by gravity factors, but policy and institutional environment are also significant. Companies are expected to invest in those countries where governments are less likely to control their operational tasks. This means free capital movement, lower corporate taxes, less corruption, and possibility to hold majority ownership in a local subsidy. If government defines a lot of legal procedures, there is an increase in costs for the enterprise, which finds a way to reduce FDI flows to that country. In addition to being an FDI source of external capital, they significantly contribute to economic growth and development. Key determinants of FDI are market-based: GDP per capita, gross domestic product, natural resources, production costs, level of corruption and infrastructure. In addition, a significant feature is the provision of the working framework, an economic system created by the government on a long-term basis, to allow foreign investment based on the attractiveness with respect to other countries. Based on the World Bank policy research, it is suggested that, while elements in certain determinants of Doing Business ranking are associated with increased FDI inflows, the ranking for an average country has a significant signalling effect for investors. In addition, it has not been shown that a significant improvement in the Doing Business ranking (or "country reform") influences a higher inflow of FDI, given that in developing countries, the relationship is not significant (World Bank, 2011).

A survey of six Asian countries (Afghanistan, Pakistan, Iran, India, Sri Lanka and Bangladesh) considered the index of business simplicity as part of the working framework for describing FDI inflows (Shahadan et al., 2014). The link between the Doing Business indicators for the net FDI inflow in the period 2004-2013 was considered. Indicators aim to point to the level of quality of institutions in a country. The results of the survey demonstrate the importance of the link between the Doing Business indicators and the FDI inflow, and that Doing Business indicators reflect a general investment climate that is significant only for small and medium-sized domestic enterprises. The research also indicates that there is a direct link between FDI and actions taken by the government.

The impact of institutional performances on FDI is not easy to measure. Institutional factor is significant, especially for developing economies, where weak institutions create poor

infrastructure, which leads to a fall in profitability, and consequently to a decrease in FDI. The degree of institutional development is the essence of attracting FDI, based on a reduction in transaction costs of establishing local operations (Bevan & Estrin, 2004). The authors point out that countries with better developed institutions in the market economy have a higher FDI inflow, as well as countries with more advanced private sector development and greater privatization. The results also show that countries with more developed and more effective legal systems also have a higher inflow of FDI, and there is some evidence that the liberalization of domestic and international markets has a significant positive impact on FDI inflows. The importance of the quality of institutions is indisputable for multinational corporations, that is, the good quality of institutions creates a friendly environment and this is the main factor for attracting FDI. Wei (2000) concludes that there are three main factors in the quality of institutions, both regulatory and legal systems and legislation. They are key determinants of attracting FDI inflows, and have to be focused on attracting FDI inflows. The corruption factor has been identified as negative for the FDI inflow.

4. RESEARCH METHODOLOGY AND HYPOTHESES

In this paper, the key variables are FDI inflows and Doing Business indicators. The FDI dataset was used from the basis of the World Bank and measured using FDI inflows (in% of GDP), and Doing Business indicators were determined on the basis of the World Bank's Doing Business reports. Data refer to the period 2010-2017 for the Republic of Serbia. Dependent variable is FDI inflows expressed in % of GDP. Doing Business indicators are used for the purpose of research as independent variables. The index of Ease of Doing Business, as a composite index, is the non-weighted average of the value of each of these indicators. The value of this index ranges from 0 to 100. Based on the index values, an appropriate rank is assigned to a given country on a global list.

The aim of the paper is to analyze the link between the Doing business indicators and the FDI inflows, and to define possible directions of improving the business environment in the Republic of Serbia. In accordance with the goal of the research, the following hypothesis is defined and tested:

H1: There is interdependence between the Ease of Doing Business index (and its components) and the FDI inflows.

In order to analyze the relationship between the Doing Business indicators and the FDI inflows, dynamic and correlation analysis will be applied. Dynamic analysis will look at the trend of indicators values in the period 2010-2017, while the correlation analysis will assess the interdependence of FDI inflow and the value of the Ease of Doing Business index. The correlation analysis is based on Spearman's correlation coefficient (a nonparametric indicator of variation between variables). The values of this coefficient range from -1 to +1, with a coefficient greater than zero, indicating a direct or positive correlation between the variables, and a value less than zero on an inverse or negative relationship between the variables. A stronger correlation between the variables is achieved if the correlation coefficient is absolutely closer to 1, while the linear connection is weaker if the value is closer to zero.

5. RESEARCH RESULTS AND DISCUSSION

In relation to the aforementioned methodology and defined research hypotheses, the following variables will be included in the analysis:

FDI - Foreign direct investment, in percentage of GDP

EDB- Ease of doing business, indicator score

X1 - Starting a Business, indicator score

X2 - Dealing with Construction Permits, indicator score

X3 - Getting electricity, indicator score

X4 - Registering property, indicator score

X5 - Getting credit, indicator score

X6 – Protecting minority investors

X7 - Paying taxes, indicator score

X8 - Trading across borders, indicator score

X9 - Enforcing contracts, indicator score

X10 - Resolving insolvency, indicator score

In order to get data for the entire observed period, harmonization of methodologies was performed. Table 1 shows the scores of indicators used in the analysis. The Protecting Minority Investors indicator is excluded from further analysis, because it does not show changes in scores during the observed period.

Table 1 Scores of indicators

	FDI	Ease of doing business	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10
2010	4.291	57.57	87.15	19.27	75.63	62.26	75.00	46.67	53.38	69.5	59.51	27.35
2011	10.61	58.30	86.67	19.27	75.74	65.65	75.00	46.67	52.43	70.26	59.51	31.77
2012	3.132	59.60	86.69	19.27	75.86	78.36	81.25	46.67	52.43	70.52	58.61	26.31
2013	4.525	60.55	88.80	20.80	76.00	78.38	81.25	46.67	52.43	71.24	58.61	31.36
2014	4.523	60.57	88.86	20.80	75.99	78.36	81.25	46.67	52.44	72.48	57.59	31.24
2015	6.311	59.77	89.03	21.19	76.20	71.64	81.25	46.67	50.36	72.13	57.59	31.29
2016	6.148	62.20	89.06	30.49	72.39	71.96	81.25	46.67	63.33	72.13	57.59	31.62
2017	6.948	65.33	91.80	45.86	69.93	76.63	81.25	46.67	67.35	72.13	55.29	32.24

Source: https://www.worldbank.org/

Table 2 Relative changes of indicators

Year	X1	X2	X3	X4	X5	X7	X8	X9	X10
2011	-0.55%	0.00%	0.15%	5.44%	0.00%	-1.78%	1.09%	0.00%	16.16%
2012	0.02%	0.00%	0.16%	19.36%	8.33%	0.00%	0.37%	-1.51%	-17.19%
2013	2.43%	7.94%	0.18%	0.03%	0.00%	0.00%	1.02%	0.00%	19.19%
2014	0.07%	0.00%	-0.01%	-0.03%	0.00%	0.02%	1.74%	-1.74%	-0.38%
2015	0.19%	1.88%	0.28%	-8.58%	0.00%	-3.97%	-0.48%	0.00%	0.16%
2016	0.03%	43.89%	-5.00%	0.45%	0.00%	25.75%	0.00%	0.00%	1.05%
2017	3.08%	50.41%	-3.40%	6.49%	0.00%	6.35%	0.00%	-3.99%	1.96%
Average	0.75%	14.87%	-1.09%	3.31%	1.19%	3.77%	0.53%	-1.03%	2.99%
2017/2010	5.34%	137.99%	-7.54%	23.08%	8.33%	26.17%	3.78%	-7.09%	17.88%

Source: Author's calculation

The Construction Permits indicator shows the highest average annual change. The value of this indicator increases by an average of 14.87% in the observed period, although in the three observed years there were no changes regarding this indicator. The score of this indicator increased by 137.99% in 2017 compared to 2010. The only indicators that have recorded a decline in scores (by about 7%) are Getting Electricity and Enforcing Contract.

Table 3 Relative changes of FDI and Ease of Doing Business 2010-2017

	Relative change of FDI	Relative change of Ease of Doing Business
2010		
2011	147.26%	1.27%
2012	-70.48%	2.23%
2013	44.48%	1.59%
2014	-0.04%	0.03%
2015	39.53%	-1.33%
2016	-2.58%	4.08%
2017	13.01%	5.03%
Average	24.45%	1.84%
Relative change 2017/2010	61.92%	13.48%

Source: Author's calculation

During the observed period, the FDI inflows increased by 24.45% annually, and the FDI inflow in 2017 is 61.92% higher compared to 2010. The Ease of Doing Business indicator had much lower intensity dynamics, the average annual change amounted to 1.84%, while the score of this indicator in the latest year in relation to the first year increased by 13.48%.
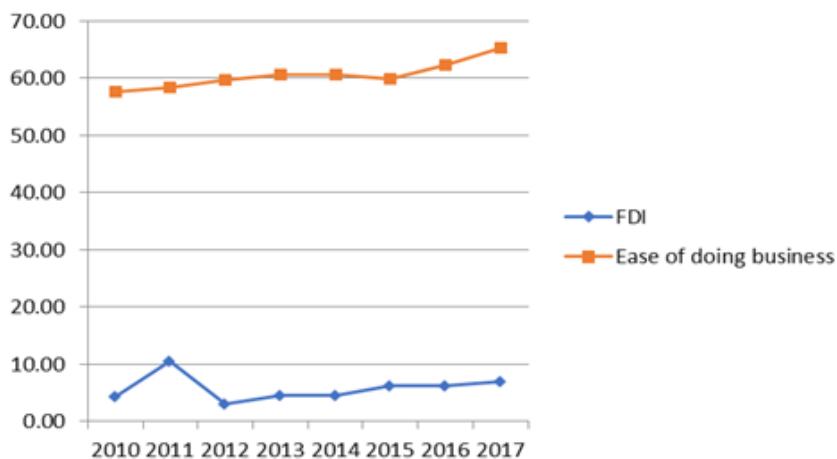
Fig. 1 Graphical presentation of the changes of indicators during the observed period
Source: Author's presentation

The dynamics of FDI is characterized by higher oscillations during the analyzed period. Both observed phenomena, FDI inflows and Ease of Doing Business indicators, are characterized by a positive tendency in the period beyond 2015.

Table 4 presents calculated values of Spearman's correlation coefficients. The Spirman's correlation coefficient is a non-parametric indicator of the variation between two variables. It's values range from -1 to +1, with coefficient values greater than zero, indicating a positive relationship between variables, while values less than zero refer to the existence of a negative relationship between the observed variables. Based on the values of the Spearman's rho coefficients in Table 4, it can be noted that there is a strong correlation between the Resolving insolvency indicator and FDI (0.905). In addition, there is a direct interdependence between FDI and the indicators Dealing with Construction Permits (0.454), Starting a Business (0.286), Trading across borders (0.171) and Paying taxes (0.024). Coefficient values less than zero indicate negative correlation between foreign direct investment and Registering property (-0.311), Getting credit (-0.126), Getting electricity (-0.19), as well as Enforcing contracts (-0.259) indicators.

Table 4 Matrix of correlation coefficients

	Coefficients	FDI	EDB	X1	X2	X3	X4	X5	X7	X8	X9	X10
FDI	r_s	1.000	.286	.286	.454	-.190	-.311	-.126	.024	.171	-.259	.905**
	Sig. (2-tailed)	.	.493	.493	.258	.651	.453	.766	.954	.686	.535	.002
EDB	r_s		1.000	.857**	.896**	-.262	.515	.756*	.512	.830*	-.902**	.524
	Sig. (2-tailed)		.	.007	.003	.531	.192	.030	.194	.011	.002	.183
X1	r_s			1.000	.970**	-.262	.156	.630	.512	.756*	-.914**	.429
	Sig. (2-tailed)			.	.000	.531	.713	.094	.194	.030	.001	.289
X2	r_s				1.000	-.233	.204	.650	.428	.755*	-.911**	.589
	Sig. (2-tailed)				.	.578	.628	.081	.291	.030	.002	.124
X3	r_s					1.000	.323	.252	-.878**	.146	.136	-.429
	Sig. (2-tailed)					.	.435	.547	.004	.729	.748	.289
X4	r_s						1.000	.760*	-.074	.454	-.354	-.096
	Sig. (2-tailed)						.	.028	.862	.258	.389	.821
X5	r_s							1.000	.000	.775*	-.784*	.000
	Sig. (2-tailed)							.	1.000	.024	.021	1.000
X7	r_s								1.000	.175	-.367	.342
	Sig. (2-tailed)								.	.679	.371	.408
X8	r_s									1.000	-.886**	.220
	Sig. (2-tailed)									.	.003	.601
X9	r_s										1.000	-.358
	Sig. (2-tailed)										.	.384
X10	r_s											1.000
	Sig. (2-tailed)											.

Source: Author's calculation

Table 5 Correlation coefficients between FDI and all other indicators

Indicator	Correlation Coefficient	Sig. (2-tailed)
Ease of doing business	0.286	0.493
Starting a business	0.286	0.493
Dealing with construction permits	0.454	0.258
Getting electricity	-0.19	0.651
Registering property	-0.311	0.453
Getting credit	-0.126	0.766
Paying taxes	0.024	0.954
Trading across borders	0.171	0.686
Enforcing contracts	-0.259	0.535
Resolving insolvency	.905**	0.002

Source: Author's calculation

The highest level of agreement with FDI is indicated by the indicator Resolving insolvency (0.905), with a significance level of 0.002, which indicates that this agreement is statistically significant. Further, there is a compliance between the FDI inflows and the Construction Permits indicator (0.454). FDI inflows are indirectly correlated with the indicators: Getting Electricity (-0.19), Registering Property (-0.311), Getting Credit (-0.126), and Enforcing contracts (-0.259). For the Getting electricity and Enforcing contracts, indicators are clear as their score decreases during the observed period. The score of the Getting credit indicator is slightly constant, so this value is obtained (there are no oscillations in the movement), so it is almost impossible to determine the relationship.
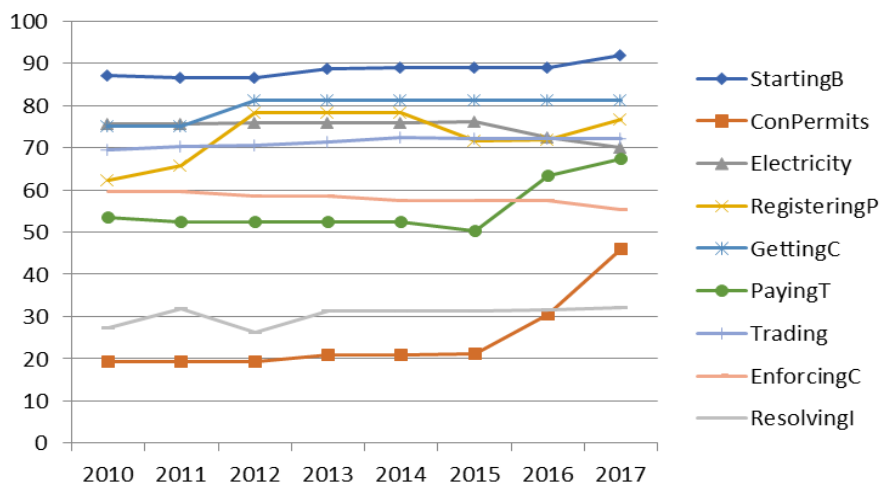
Fig. 2 Graphical presentation of indicator changes
Source: Author's presentation

5. CONCLUSION

The paper examines the interdependence of the indicators of Starting Business, Construction Permits, Getting electricity, Registering property, Getting credit, Paying taxes, Trading across, Enforcing contracts, Resolving insolvency and the FDI inflows (in percentage of GDP) in the Republic of Serbia during the period 2010-2017.

During the observed period, the highest level of agreement with FDI is indicated by the indicator Resolving insolvency (correlation coefficient is 0.905), while the following indicators have a statistically significant correlation with the FDI inflows: Construction Permits, Starting Business, Paying taxes, and Trading across borders. FDI inflows are negatively correlated with the indicators Getting Electricity, Registering Property, Getting Credit, and Enforcing contracts (-0.19, -0.311, -0.126, and -0.259, respectively).

The results of the survey indicate that the Resolving insolvency and Construction Permits indicators occupy a particularly important place among the Ease of Doing Business indicators, which indicates that there is a direct link between the FDI inflows and the quality of the regulations defined by Doing Business indicators. This can serve as a basis for government activities towards improving the quality of the business environment in order to attract as many FDI projects as possible.

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VEZA IZMEĐU INDIKATORA LAKOĆE POSLOVANJA I PRILIVA STRANIH DIREKTNIH INVESTICIJA U REPUBLICI SRBIJI

Značaj indikatora lakoće poslovanja kao determinante FDI priliva je privukao pažnju u utvrđivanju njihovih veza. Cilj istraživanja je da se ispita veza između indikatora lakoće poslovanja i priliva stranih direktnih investicija (SDI). Dinamička i korelaciona analiza su primenjene u sagledavanju međuzavisnosti indikatora lakoće poslovanja: Pokretanje poslovanja, Izdavanje građevinskih dozvola, Uvođenje električne energije, Registrovanje imovine, Dobijanje kredita, Plaćanje poreza, Prekogranična trgovina, Sprovođenje ugovora, Rešavanje nesolventnosti i priliva SDI. Dobijeni rezultati pokazuju da indikatori Rešavanje nesolventnosti i Izdavanje građevinskih dozvola imaju najveći stepen slaganja sa SDI, dok negativno slaganje sa kretanjem SDI pokazuju indikatori Uvođenje električne energije, Registrovanje imovine, Dobijanje kredita i Sprovođenje ugovora. Glavni rezultati ovog istraživanja su korisni kreatorima ekonomske politike jer pružaju dobru osnovu za formulisanje strategije unapređenja poslovnog ambijenta u Republici Srbiji.

Ključne reči: *SDI priliv, indikatori lakoće poslovanja, Republika Srbija*

Review Paper

SPECIFICITY OF PERFORMANCE MEASUREMENT IN THE MINISTRY OF DEFENSE AND THE SERBIAN ARMED FORCES

UDC 65.015.25:335(497.11)

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Abstract. *The purpose of this paper is to investigate the specific characteristics of performance measurement on the example of the Ministry of Defense and the Serbian Armed Forces. The calculation of financial and non-financial performance measures of the Ministry of Defense and the Serbian Armed Forces contributes to constant improvement or maximization of their ability to provide goods and services through the effective and efficient acquisition and use of different types of resources. The research was conducted using the data on selected financial and nonfinancial performances from the 31st Infantry Battalion reports in the period from 2012 to 2018. In order to confirm the hypothesis, the method of analysis, the synthesis method and the correlation analysis method were used. The empirical results of this study show that there is a high degree of interdependence between the financial management and control systems, on the one hand, and increased training of people and more adequate maintenance of motor vehicles, weapons and combat techniques, on the other. The main contribution of this paper is to emphasize the importance of performance measurement in the Ministry of Defense and the Serbian Armed Forces and their contribution to creating a certain level of socialwelfare.*

Key words: *performance measurement, financial and nonfinancial performance, Ministry of Defense, Serbian Armed Forces*

JEL Classification: M41

1. INTRODUCTION

The main goals of public sector organizations are to maximize the scope of public services provided from available resources and to use resources according to purpose, while respecting the quality of meeting the wider needs of the society and achieving maximum profits and certain surpluses. Full coverage of costs, minimizing subventions, as well as maximizing the amount of funds available for post- related goals are also the significant goals of these organizations. Difficulties in determining the optimal level of spending contribute to increasing the importance of budgetary control, i.e. controlling the cost-effectiveness in relation to the permitted budget of a public organization. The developed performance measurement system requires the budgeting systems based on achieved performances. An adequate implementation of the budgeting system is very important as a support when defining the planned goals, that is, the control of the execution of the budget, because this is the assumption of an adequate allocation of resources in the following period. All public goods in one country have a major impact on its economic development, political stability, and the quality of life of its citizens. For the above reasons, there is a constant tendency towards increasing the rationality in spending budgetary funds, improving the efficiency of providing and raising the quality of public services (Webb, 2010).

The purpose of measuring the performance of the Ministry of Defense and the Serbian Armed Forces is determined by the needs of the entity that uses this information. In general, information about the performance of the Ministry of Defense and the Serbian Armed Forces can be used for two basic purposes: making economic decisions and meeting the requirements for public accountability. Evaluation of the performance of the Ministry of Defense can be carried out at different levels, that is at the level of an individual organization in the Ministry of Defense, at the level of a certain type of activity or program or at the level of the Ministry as a whole. Otherwise, performance evaluation is an activity carried out in all organizations that have the character of a reporting entity.

 Very often, the purpose of evaluating performance is conditioned by the level at which the observed organization is located. For example, at the level of a single reporting entity or user of resource in the Ministry of Defense, such as the Military Security or the Military Intelligence Agency - the purpose of evaluating performance can be improving various aspects of the performance of the entity, evaluating the influence of the appropriate management on the performance of the entity, demonstrating public responsibility or allocating resources. Evaluating the performance of the Ministry of Defense and the Serbian Armed Forces is a complex system, primarily because of the primary goal - the production of services and goods, which in their nature are public goods, and in that way contribute to the creation of a certain level of social well-being. Because of this particular goal of functioning, military security intelligence organizations are accountable to the community, not to the amount of profit realized, such as for profit organizations, but for the efficient and effective using the collective resources entrusted to them.

In accordance with the laid goal, this paper, besides to the introductory considerations, consists of the several parts. In the second part of the article, attention is dedicated to the role, the importance, and the management of performance of the Ministry of Defense in the security sector of the Republic of Serbia. Third part of paper provides an insight into the research methodology and the initial research hypothesis. The research results and their discussion is given in the fourth part of the paper. Finally, concluding observations are made in the last part of the paper.

2. THE THEORETHICAL CONTEXT OF RESEARCH

2.1. The role of the Ministry of Defense in the security sector

The Ministry of Defense participates in the security sector through its agencies - the Military Security Agencies (MSA) and the Military Intelligence Agencies (MIA). These are military services, which are organized as administrative authorities within the Ministry of Defense. Their competencies and tasks are derived from their role in the defense system and the security sector.

The Military Security Agency (MSA) is formed within the Ministry of Defense and performs general security and counter-intelligence tasks. Within the framework of general public procurement tasks, the tasks of the MSA are the following: to analyze security risks that disturb normal functioning; to plan, organize and control the way of securing facilities and assets as well as the measures in implementation of certain activities; to apply and control the application of security measures; to perform security checks; to issue security certificates (permits and approvals); to carry out activities in the field of industrial safety; to provide information and network systems; to provide data leakage through cryptographic protection; to provide security protection to other entities and perform other general security tasks (Zakon o vojnobezbednosnoj agenciji i vojnoobaveštajnoj agenciji, 2013).

Within its counter-intelligence tasks, the MSA: monitors, analyzes and prevents the disintegration of intelligence, prevents intelligence by foreign bodies or bodies from collecting data against the Ministry of Defense and the Army of Serbia; exposes and eliminates domestic and foreign, as well internal and external terrorism and extremism; investigates and analyzes crimes, crimes against humanity and other goods protected by international law. In addition to the above-mentioned work related to organized crime, the cases of abuse of office, money laundering, as well as acceptance of bribes and bribery are also discovered and investigated by the MSA.

The Military Intelligence Agency (MIA) is also formed within the Ministry of Defense and its jurisdictions are the following: to collect and check data and information and than to process, analyze, evaluate and deliver them to the competent authorities; to exchange information and data with other organizations and services of the Republic of Serbia, as well as with foreign organizations of other countries; to keep the collected data and information and protect them from unauthorized discovery, giving, using, losing or destroying, in accordance with the law and bylaws; to plan to train their own persons for realization of tasks and activities as well as for protection of objects and documents; to protect persons who are sent to work abroad by the Ministry; to take care of the equipment and the means used in the work, without any unauthorized access; to acquire, develop and use information systems, communication systems and data transmission systems, as well as means for the protection of information; to organize training of members of the MIA or organize specialized courses, perform research, form archives and publish own editions; to plan, organize and conduct internal control of the work of MIA members; to request from the competent security services security checks of legal and natural persons when it is necessary for the performance of tasks within the jurisdiction of the MIA; to plan equipping and procuring things for their own needs; to perform other tasks within his/her jurisdiction (Zakon o vojnobezbednosnoj agenciji i vojnoobaveštajnoj agenciji, 2013).

The Act on Internal Organization and Systematization of both the MSA and the MIA as well as the way in which they operate is a state secret. Members of the MSA and the MIA are professional members of the Serbian Armed Forces, civil servants and attorneys.

The military intelligence and intelligence agencies have groups for financial, logistical, IT and other support, which perform different tasks within their scope of work.

2.2. The place and the role of the fourth level of beneficiaries in the Ministry of Defense and the Serbian Armed Forces

The Ministry of Defense, more precisely the administrative bodies within the Ministry of Defense that have the status of direct beneficiaries of the budget funds (Military Intelligence Agency, Military Intelligence Agency and the Defense Inspectorate) and institutions, units and commands of the Army of Serbia, are considered to be users of the budget funds of the Republic of Serbia.

The fourth level of funds users in the Army of Serbia is a battalion, which can be infantry, mechanized, engineering, logistic and others. The battalion is the basic united tactical unit, permanent formations. In peace, the battalion exists within the brigade of the Land Forces, Air Force and Airborne Defense, or the Training Command, and, in the war, it performs tasks individually and in the composition of more units or temporary composition. Figure 1 shows the organizational structure of the General Staff of the Serbian Armed Forces. It consists of the aforementioned three units of the Serbian Armed Forces, which consist of brigade units. The brigades further consist of battalions, while the battalions consist of company, company of lines and lines from the department.
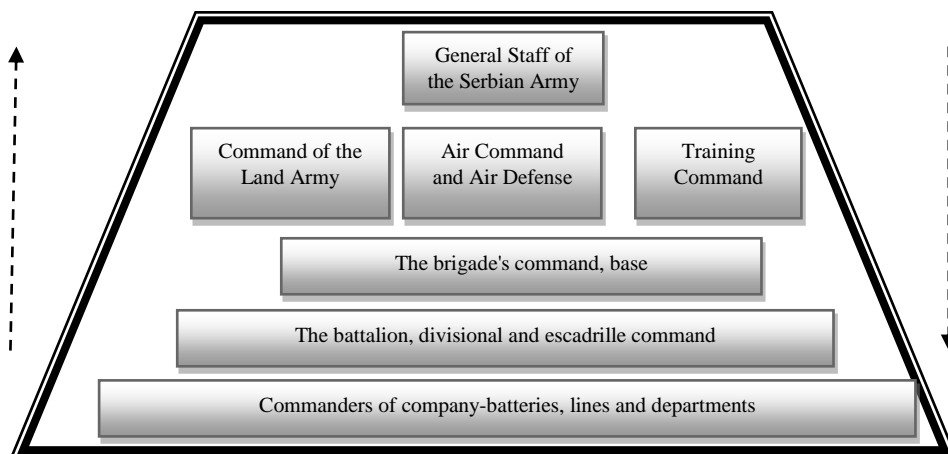
Fig. 1 Organizational structure of the General Staff of the Serbian Armed Forces
Source: Andrejić, M., Milenkov, M. (2010). Osnovi logistike. Beograd: Vojna akademija, p. 349.

The battalion represents the basic modular, tactically acceptable, existentially capable unit, with a solid capability to perform tasks and survive on a modern battlefield. It combines combat forces, forces for financial, logistical, IT and other support and combat support forces.

Infantry battalions are organized in such a way that, if necessary, they can receive the mark of another type of battalion with certain formative adjustments. The battalion is intended for performing various combat operations on the front, in its own background

and on temporarily occupied territory. Also, the battalion can perform other tasks within the defined missions of the Army.

The financial service of the Ministry of Defense and the Serbian Armed Forces is organized by the Rulebook on Financial Operations in the Ministry of Defense and the Serbian Armed Forces in five levels of planning, depending on the level of units, from the central level (organizational unit of the Ministry of Defense in charge of the budget and finances) to the fourth level (units of the Army of Serbia rank of the battalion command), whereby the organizational units of the financial service, scope, competencies and job descriptions are defined. The financial service of the Ministry of Defense and the Serbian Armed Forces is organized at the following levels (Pravilnik o finansijskom poslovanju u Ministarstvu odbrane i Vojsci Srbije, 2017):

1. the central level - organizational unit of the Ministry of Defense in charge of budget and finance,
2. the first level - departments and sections for finance in the administrative bodies within the Ministry of Defense, the sectors of the Ministry of Defense, the Secretariat of the Ministry of Defense and the General Staff of the Serbian Armed Forces,
3. the second level - departments, groups or independent executives for finances in the administrations of the Ministry of Defense and the Serbian Armed Forces and their equal composition and finance units in the commands of operational units,
4. the third level - sections for finances in brigade commands and their uniforms,
5. the fourth level - groups or independent executives for finances in battalion commands - divisions and their uniform composition.

The fourth level user in theoretical sense is a group, that is, an independent executive for finances in the battalion commands - divisions and their equal composition, to whom the superior command allocates funds that are further disposed of in accordance with the needs of the given unit. The financial service authority of the users of the fourth level funds is obliged to dispose of the funds in a legal, economical, effective and efficient way and record it in the appropriate business books.

The Financial Service is responsible for the analysis of executing the financial plan and inventory in accordance with this Rulebook. The Financial Service prepares the proposal of a financial plan, keeps books of accounts, prepares financial statements, performs control of accounting documents and manages funds in accordance with the provisions of the Financial Regulations and the orders of the authorizing officer. The material accountancy is managed by the beneficiary of the fourth level of the organization of the financial service, which has been assigned the status of the holder of the material accountancy maintenance and the unique identification number of the holder of the material accountancy maintenance. Material bookkeeping is conducted separately for the unit to which the accounting code was assigned and for a self-contained unit of war (Pravilnik o materijalnom poslovanju u Ministarstvu odbrane i Vojsci Srbije, 2017).

2.3. The characteristics of performance management process in the Ministry of Defense and the Serbian Armed Forces

The traditional form of budgeting in public sector shows the tendency to move towards budgeting based on results, i.e. achieved performance (Poister, 2003). Performance-based budgeting systems demand a more advanced performance measurement model that, in addition to the input criteria, includes some more difficult measurable performance indicators of the quality of services provided, as well as effectiveness and efficiency measures.

The importance of the Ministry of Defense as part of the non-profit public sector is great in modern conditions, especially in the developed countries. A large number of people are employed in this sector, so it has a great contribution to increasing the employment of a country. Also, the development of this sector is relevant for the development of commercial sector and, consequently, for the overall economic development of the country.

Performance management in the Ministry of Defense does not differ significantly from performance management in commercial enterprises and includes performance planning, performance measurement, performance analysis and reporting, and, finally, performance enhancement actions.

The process of performance planning is done through strategic and operational planning. Achieving the appropriate coordination of a military security agency with an external environment implies the implementation of strategic planning. The key is to identify the most important strategic issues and problems that the agency will face for a long time, and to develop a strategy for their effective solutions. Strategic plans define the strategic goals from which operational goals are performed, i.e. through business plans (budgets) the strategic goals are concretized and timed to dynamist and operational (Berman, 2007).

Measuring performance of the Ministry of Defense carries certain specifics, since the results arising from the mission often are not measurable by financial traditional performance measure. Namely, in the Ministry of Defense non-financial performance criteria are much more relevant. In most cases, the underlying reason is that the product or service is difficult to measure and intangible. In this connection, it is necessary to include a system of financial and non-financial performance measures, which is not based on profit, as in the case of profit organizations, but on meeting the needs of the organization (Antony & Govindarajan, 2007). Thus, the system of criteria for measure performance of military security agencies should be conceived in the light of four main dimensions: the coherence of goals and means for their realization, the coherence of the source (the volume of resources) and their spending, the achievement of the balance of meeting the interests of current and future generations of users and the sustainability of the agencies (Brujin, 2007).

Performance analysis is done according to the same methodological principles as in organizations that are profit-oriented. The system of monitoring and analyzing business performance of the Ministry of Defense is conceived and operational at regular time intervals based on the chosen performance criteria system. Adequate tracking and monitoring for appropriate time periods (monthly, quarterly, six month, yearly) creates an information basis that will serve for analysis in the succession of the period. The performance data are accumulated and the corresponding time series of data are formed. On the basis of these, it is possible to identify the current state and trend of performance (growth, decline or stagnation), or it is possible to compare the achieved performance in different periods.

In order for the Ministry of Defense and the Serbian Armed Forces to successfully carry out their missions in the security sector, they must first of all be operatively capable. Operational capability and its development, in line with resource constraints, are aligned with the funds set for the defense system (Doktrina Vojske Srbije, 2010). In this regard, financial and non-financial performance measures are formed.

Evaluating the financial performance of public and non-profit oriented organizations is a far more complex, more challenging and more difficult task than evaluating the financial performance of profit oriented and private sector entities (Barton, 2004). The primary source of differences between public and private sector organizations, which makes the evaluation of financial performance of public organizations more complex, is found in their primary goals

(United States Government Accountability Office, 2008). The primary goal of private and profit oriented organizations is to make a profit and thus create value for investors, or increase their well-being. Therefore, exploiting the opportunity for gain this goal is the main driving force behind the private organizations management in the process of making economic decisions, which is primarily responsible to investors. The primary goal of the public organizations, and also the Ministry of Defense in the security sector, is the production of services and goods, which are in their nature public goods, for the benefit of all those who make up a certain community (and thus create value for all its members) and thus achieving a certain level of social well-being. Due to this particular goal, public organizations are accountable to the community not for the amount of gain, but for the effective and efficient use of collective resources entrusted to them (Popper & Wilson, 2003). Therefore, in order to evaluate the financial performance of the Ministry of Defense, which prepares and presents its financial statements according to accounting requirements based on an accrual basis, it should be used the financial analysis tools that are used by private organizations, but with the necessary degree of critical thinking that respects all the differences between public and private sector (Barton, 2004).

The methods of traditional financial analysis are studied and quantified the relationship between the specific and interlinked positions of the financial statements (Wilson & Kattelus, 2002) in order to systematically determine the financial position and financial performance of the Ministry of Defense in the current, but also in future reporting periods. The indicators of financial positions are classified into following groups: liquidity indicators, indicators of asset utilization efficiency, financial structure indicators, profitability indicators, and market value indicators. The indicators from the first three groups are, to a certain extent and under certain assumptions, applicable to all individual and economic organizations of the public sector, while the latter two (profitability and market value indicators) are relevant only for public enterprises (Stevanović, 2013). Given that the Ministry of Defense in the security sector consists of a military security and military intelligence agency, as well as they by classification are not public companies, we will only monitor the first three indicators in the future, as financial measures of the performance of the Ministry of Defense in the security sector.

2.4. The analysis of relevant financial and non-financial performance measures of the Ministry of Defense and the Serbian Armed Forces

According to the general definition, liquidity is the ability of the Ministry of Defense to pay off all its maturing obligations unconditionally, at a certain point and in the required amount, while still possessing craft assets that enable it to smoothly continue its activities and not impair its ability. The purpose of calculating any measure of liquidity is to obtain a general impression of the degree of short-term creditors protection. The quantification of these liquidity measures, when available with relevant data from the financial statements, is a simple process. However, the lack of standardized indicators in the public sector is objectively conditioned by the fact that the Ministry of Defense is significantly different in relation to other public organizations, and that the organizations within it differ considerably from one another in terms of the height and structure of working capital, amount, structure and deadlines the maturity of short-term liabilities, as well as in terms of the type of activity conditioned by the period of time during which working capital must inevitably have to be available. Therefore, the calculated liquidity

measures should always be used in the context of the relative share of working capital in total assets and the relative share of short-term liabilities in total liabilities. In addition, each of these measures is static size, that is, it is calculated on a database that is relevant at a certain point in time (the reporting day). This disadvantage can be reduced in several ways: comparing with historical achievements and assessments, using a statistical methodology, whether there are characteristic trends and deviations from them (trend analysis), comparing with other organizations that have the same or similar characteristics and analysis of origin, time schedule and amount of cash inflows and outflows.

Basically, investing in any form of organized activity, there is always the assumption that the invested resources will be efficiently used, is that certain investments will have as much activity as possible (or that a certain volume of activities will be achieved with the lower investment) (Flynn , 2007). The financial indicators of the activity include all the relative relationships between income and expenses, from one and single and total investments in business assets, on the other hand, which are called turnover coefficients of business assets. The financial information presented in the financial statements of the Ministry of Defense and in the Notes to the financial statements enables the calculation of the purposeful indicators of the efficiency of using trusted resources. As well as indicators of liquidity, all activity indicators are static measures. Therefore, in order to better understand the efficiency of resource use, it is necessary to compare the current indicators of activities with historical achievements using the statistical methodology, and to determine if there are characteristic trends and deviations from them (trend analysis), as well as to make comparisons with other organizations that have the same or similar characteristics.

The financial structure of the Ministry of Defense (MSA and MIA) is determined by the structure of the sources from which its activities are financed as well as the relationship between the approved and spent funds. All the data necessary for calculating the financial structure indicators are on the side of the liabilities in the Statement of financial position. In order to examine the development of a financial structure, its deterioration or improvement, it is necessary to compare the current indicators of the financial structure with historical data. The Ministry of Defense, by comparing these indicators with the same kind of indicators for organizations with the same or similar characteristics, in addition to gaining insight into the state of its financial position in relation to it similar, may possibly use this information for negotiations aimed at improving its financing. Calculation and analysis of the financial structure indicators based on the information from the Financial Performance Report are also important because they are based on the solvency, is the ability to settle liabilities within the defined deadline.

The calculation of the financial performance indicators of the Ministry of Defense is not only an objective but a means to examine the current situation and trends and to find ways to constantly improve or maximize its organizational capacity, or to constantly improve or maximize its ability to provide goods and services through effective and efficient acquisition and use different types of resources. The financial information presented in the financial statements enables the calculation and use of financial performance indicators of the Ministry of Defense in the security sector. In addition to financial performance measures, the use of non-financial performance measures is extremely important to provide a complete picture of the Ministry of Defense in the security sector on the results achieved.

One of the key reasons for boosting and monitoring non-financial performance measures, in addition to improving financial performance measures, is the clearer articulation of the goals of the Ministry of Defense and their linking to the strategy (Novićević et al., 2006). In

particular, in controlling the achievement of strategic goals, it is extremely important to apply certain non-financial performance measures of public (social) responsibility (Myhrea et al., 2013). Performance of social responsibility is the driving force of financial performance, and in the final and reputation (image) in the public. Then, financial performance is the driving force behind the performance of social responsibility. Finally, the interactive relationship between the performance of social responsibility, financial performance and reputation of the organization is emphasized (Krstić, 2006).

The right choice of non-financial criteria of the Ministry of Defense in the security sector, closely linked to the strategy, i.e. the criteria for monitoring the implementation and success of the strategy, and can be considered through nine areas (Pravilnik o elementima i kriterijumima za ocenu stanja, operativnih i funkcionalnih sposobnosti Vojske Srbije, 2019): Human Resources Management, Intelligence Scouting, Operations, Logistics, Planning and Development, Telecommunications and Information Technology, Training Activities, Financial jobs and military-political affairs. In order for the Ministry of Defense to define adequate behavior in each of the nine areas, it is necessary to identify the list of criteria. It is important to emphasize that achieving adequate behavior in each area depends on several factors: financial conditions, size of organization, location, legal system, management, etc.

On the basis of the formed areas, non-financial measures of the performance of the Ministry of Defense in the security sector were defined. Thus, within the field of human resource management, the following are distinguished: performance measures related to personnel, such as resolving the situation in the service and other relationships in the service of professional members of the VS or keeping records of personal data of members of the VS; Educational performance measures, such as the realization of selection activities and sending members of the VS to schooling and upgrading, or keeping a database of personnel that is sent for education and training; performance measures related to psychological activity, such as the improvement of psychological activity in the Serbian Army or the provision of psychological support to command.

In the field of intelligence scouting, measures of intelligence security of the Army of Serbia, as well as measures of cooperation and data exchange, are set out. The field of operational affairs refers to the planning of work (preparation of annual and monthly plans for the work of the General Staff of the Army of Serbia, the General Staff of the Serbian Armed Forces and commands-institutions), deployment, order and internal service (deployment and order in the military complex, facility and camp room, and reporting services, on-call services), and control (implementation of control and reporting).

The scope of logistical activities consists of a number of sub standards and their performance measures, such as: operational logistical operations (development of guidelines for logistical planning, planning and management of displacement of material reserves, planning and organization of fire protection, planning and organization of occupational safety and health), supply (planning, organization and monitoring of the filling of units of the Serbian Armed Forces with moving things), maintenance (monitoring of the state of correctness of exploitation and weather resources and development of maintenance plans), saber planning and organizing of dispatching services for transport and transportation, planning and organizing of food, water supply, dressing, service activities, health care (planning, organization and control of care for injuries and illnesses, planning, organization and control of veterinary protection of animals), infrastructure (maintenance of military real estate, handling and overhaul of TEPs).

The planning and development area includes amendments to the book formations and instructions for the internal organization of work, based on the decision of the Minister of Defense, the drafting, updating and keeping of the Army of Serbia mobilization plan, control of preparations for mobilization in institutions, units and commands. Information and telecommunications technology deals with telecommunication-information security (planning, organization and functioning of telecommunication-information security and military transportation), information protection, official correspondence and office operations.

Training activities are related to training planning (training assessment, risk assessment and resource protection, defining training goals, specification of training tasks), training (preparation for training, pre-training, protection during training), evaluation of training (evaluation of individual training, evaluation of collective training, control of the functioning of the training system in the Ministry of Defense), training means (insight into the state of the means of training, development of training assets).

The field of financial affairs includes the organization of financial and material operations, the implementation of a financial plan, analysis and reporting on the financial operations execution. Finally, the area of military-police affairs concerns the protection of the most important military facilities, certain persons, documents and weapons, and general security measures within the jurisdiction of the Military Police (security protection of classified information, planning and organization of security measures arising from normative documents and orders of the superiors and their command).

3. RESEARCH METHODOLOGY AND HYPOTHESIS

Managing the financial and non-financial performance of the Ministry of Defense and the Army of Serbia has a powerful effect on the defense system in the Republic of Serbia. Analysis of business performance aims to determine the extent to which unlawful spending of budget funds allocated to the Ministry of Defense and the Serbian Armed Forces has been used, as well as their use in accordance with the principles of economy, efficiency and effectiveness.

In this section we will look at performance management in the 31st infantry battalion. The basic hypotheses from which the research begins include the following:

H1: Missing and damage to movable objects in the 31st infantry battalion arise with the higher spending of approved funds, which is seen as a value measure for the number of tasks performed.

H2: Filling with moving assets in the 31st infantry battalion depends on the total number of units available.

H3: Financial Management and Control System (FMC) contributes to increasing human training and more adequate maintenance of motor vehicles, weapons and combat techniques.

In order to confirm the above hypotheses, the correlation analysis method was used, using the Pirson coefficient of correlation. Correlation coefficient is a measure that shows how much of a certain size is related. The information base for the realization of this research is data on selected financial and non-financial performances from available Reports in the period from 2012 to 2018 (see Table 1).

Table 1 Selected financial and non-financial indicators of business performance, in the 31st infantry battalion in the observed period, 2012-2018

	2012.	2013.	2014.	2015.	2016.	2017.	2018.
Selected financial indicators							
Consumption of approved funds in (1000) RSD	9,476	18,254	23,466	66,701	2,049	9,788	32,458
The amount of defects and damages in (1000) RSD	68	2,345	0	457	1.977	845	158
Selected nonfinancial indicators							
Percentage of keeping a large number of people in relation to the following	72.4	64.8	61.6	54.4	53.7	49.6	48.5
Percentage of filling with mobile means	94	96	93	97	96	98	98
Percentage of establishment of the FMC system (financial management and control)	67.4	69.2	72.4	72.7	73.2	75.6	78.3
Percentage of defective motor vehicles	23	25	17.5	17	16	16	14.5
Percentage of employee training attendance	85.5	90	87.5	92	93.5	93	94

Source: Authors systematization according to the internal annual reports of the 31st infantry battalion (2012,2013, 2014, 2015, 2016, 2017, 2018).

4. RESEARCH RESULTS AND DISCUSSION

The Pirson coefficient of correlation is used in cases where there is a linear connection between the variables of the observed model and an unintended normal distribution. The value of the Pirson coefficient of correlation ranges from +1 (the perfect positive correlation) to -1 (the perfect negative correlation). It is denoted by a small letter r and accounted with the following formula:

$$r = \frac{SSxy}{\sqrt{SSxx \cdot SSyy}}$$

Table 2 Correlation coefficient of financial performance measures

Financial performance measures	Consumption of approved financial assets in RSD	Amount of deficiencies and damages in RSD
Consumption of approved financial assets in RSD	1	-0,36
Amount of deficiencies and damages in RSD	-0,36	1

Source: Authors own calculations

The correlation coefficient between the financial indicators, i.e. between the expenditure of the approved financial assets and the amount of deficiencies and damages is -0.36, which means that the connection is relatively weak and that it is negative. The negative correlation in this case means that the greater the cost of the approved financial means, the less the amount of defects and damages. From the observed hypothesis 1, this should not be so, since any unit in the Serbian Armed Forces executes a large number of tasks and activities at the expense of the approved financial resources, and therefore it is exposed to the greater impact of defects and damage. Based on the results obtained, it is necessary to observe the relationship of these dimensions in the following period, and focus more attention on the proper use, maintenance and maintenance of movable assets, i.e. motor vehicles, weapons, combat techniques and other.

Table 3 Correlation coefficient between a significant number of people in relation to the following and fillings with moving means

Non-financial performance measures	Percentage of keeping a large number of people in relation to the next	Percentage of filling with mobile assets
Percentage of keeping a large number of people in relation to the next	1	-0.78
Percentage of filling with mobile assets	-0.78	1

Source: Authors own calculations

As can be seen in Table 3, the coefficient of correlation between the percentage of the state of the human condition relative to the next and the percentage of filling with mobile means is -0.78, which tells us that this is a medium strong correlation and that it is negative, which means that a larger number of people are the smaller the percentage of filling with mobile means. From the obtained results, it can be concluded that the unit has the necessary resources, since the percentage is over 90%, but that year after year there is a reduction in the number of jobs or employment, which leads to a decrease in operational capacity. From this it follows that hypothesis 2 is disproved and this leads to the fact that certain funds are put out of use, given the reduced number of people, and makes it difficult for members of that unit to carry out tasks. In the upcoming period, it is necessary to intensify the improvement of working conditions in order to increase the employment rate according to the prescribed unit formation.

Table 4 Correlation coefficient between the establishment of the FMC system, the correctness of motor vehicles and the presence of employee training

Non-formal performance measures	Percentage of establishment of the FMC system (financial management and control)	Percentage of defective motor vehicles	Percentage of employee training attendance
Percentage of establishment of the FMC system (financial management and control)	1	-0.86	0.83
Percentage of defective motor vehicles	-0.86	1	-0.59
Percentage of employee training attendance	0.83	-0.59	1

Source: Authors own calculations

The multi-correlation coefficient between the non-financial performance measures in Table 4 is 0.82, which means that there is a high degree of direct agreement between them. Partial correlation coefficients show that there is a strong inverse relationship between the percentage of the establishment of the FMC system and the percentage of defective motor vehicles, as well as between the percentage of the establishment of the FMC system and the percentage of the presence of employee training, while the medium strong inversion is between the percentage of defective motor vehicles and the percentage of the attendance of employee training. Financial Management and Control encompasses the entire system of financial and other controls and is implemented by activities,

procedures and policies whose task is to provide reasonable security that the unit will achieve the set goals through: business operations in accordance with contracts, internal acts and regulations, integrity and reality of business and financial reports, economical, effective and efficient use of funds and protection of funds and data (Strategija razvoja interne finansijske kontrole u javnom sektoru u Republici Srbiji, 2009). The higher the percentage of the establishment of the FMC system, the smaller the percentage of defective motor vehicles, the higher the percentage of the attendance of employees. The 31st infantry battalion seeks to encourage the training of employees and the increased presence of employees through the FMC system. This is for the purpose of proper handling of assets and knowledge of their own duties, in order to reduce damage and defects caused by inadequate handling and use of motor vehicles, weapons, combat techniques, and more. This hypothesis 3 is confirmed, however, there is still room for improvement of these non-financial performance measures, since the correlation coefficient is 0.82.

5. CONCLUSION

The performance of the Ministry of Defense in the security sector has a significant impact on the long-term stability of the country's financial system. Strategic plans identify the most important strategic issues and problems over a longer period, and they are contained in a strategy which enables their effective realization. The strategic goals and plans are concretized and dynamited through adequate business plans. Since the results arising from the mission mostly are not measurable solely by financial expression, measuring performance of the Ministry of Defense carries certain specifics. It is conceptualized and operational at regular time intervals, based on the chosen performance measurement system and it is linked to a system of monitoring and analysis of business performance of the Ministry of Defense. The management process is rounded off by determining the program of measures and activities for continuous improvement of the performance of the Ministry of Defense and the Serbian Armed Forces.

The information presented in the financial statements enables evaluation of the performance of the Ministry of Defense and the Serbian Armed Forces. In addition to providing an assessment of the compliance of actual payments and collection with the appropriate amounts envisaged in the budget - financial plan, the financial statements allow the determination of liquidity, asset efficiency and financial structure indicators.

Measurement of non-financial performance of the Ministry of Defense and the Serbian Armed Forces can be considered through nine areas: human resources management, intelligence scouting, operational tasks, logistics, planning and development, telecommunications and IT affairs, training activities, financial affairs and military policing. Based on the establishment and control of non-financial performance measures, it is possible to clearly define the objectives of the Ministry of Defense and their link with the strategy.

The calculation of the indicators of financial and non-financial performance of the Ministry of Defense and the Serbian Armed Forces is a means of reviewing the current situation and trends and finding ways to constantly improve or maximize their ability to provide goods and services through the effective and efficient acquisition and using different types of resources. This claim is confirmed by the results of the research, which created the basis for the following conclusions.

In case of higher spending of approved funds, a greater number of tasks and activities are carried out, which is why the units of the Serbian Armed Forces themselves are exposed to the greater impact of defects and damage. Therefore, more attention should be paid to the proper use, storage and maintenance of movable assets, i.e. motor vehicles, weapons, combat techniques, and more.

The unit monitored has the necessary resources, given that the percentage is over 90%, but there is a decrease in employment each year, which leads to a decrease in operational capacity. From this it follows that certain funds are put out of use, and makes it difficult for members of that unit to execute tasks. Therefore, in the forthcoming period, it is necessary to work on improving the working conditions in order to increase the employment rate, in accordance with the prescribed unit formation. A higher percentage of the establishment of the Financial Management and Control system reduces the percentage of defective motor vehicles, and increases the percentage of employees' training attendance. The 31st infantry battalion seeks to encourage the training of employees through the FMC system in order to properly manage assets and knowledge of their own duties, and to reduce damage to motor vehicles, weapons, combat techniques and other.

The system of managing and measuring performance of the Ministry of Defense and the Serbian Armed Forces is a dynamic system that requires continuous work on its improvement and practical implementation and raising awareness of employees. This is because it will produce real effects when applied from the highest management levels to the lowest executive level. Benefits of this system are numerous, but only when its creation is based on rational bases and when it is looked at in an adequate manner by all employees. From all of the above, it follows that through the system of management and measurement of the performance of the Ministry of Defense and the Serbian Armed Forces, the effects of the decisions made are being monitored and it allows for identification of potential risks, in order to avoid problems in the future.

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SPECIFIČNOST MERENJA PERFORMANSI
U MINISTARSTVU ODBRANE I VOJSCI SRBIJE

Svrha ovog rada je da istraži specifičnosti merenja performansi na primeru Ministarstva odbrane i Vojske Srbije. Izračunavanje pokazatelja finansijskih i nefinansijskih performansi Ministarstva odbrane i Vojske Srbije doprinosi konstantnom unapređenju ili maksimiranju njihovih sposobnosti da obezbeđuju dobra i usluge putem efektivnog i efikasnog pribavljanja i korišćenja različitih vrsta resursa. Istraživanje je sprovedeno korišćenjem podataka o odabranim finansijskim i nefinansijskim performansama iz izveštaja 31. pešadijskog bataljona u periodu od 2012. do 2018. godine. Za potvrdu hipoteza korišćena je metoda analize, metoda sinteze i metoda korelacione analize. Empirijski rezultati ovog istraživanja pokazuju da postoji visok stepen međuzavisnosti između sistema finansijskog upravljanja i kontrole, sa jedne strane, i povećane obuke ljudi i adekvatnijeg održavanja motornih vozila, oružja i borbenih tehnika, sa druge strane. Glavni doprinos ovog rada sastoji se u isticanju značaja merenja performansi u Ministarstvu odbrane i Vojsci Srbije i njihovog doprinosa stvaranju određenog nivoa društvenog blagostanja.

Ključne reči: *merenje performansi, finansijske i nefinansijske performanse, Ministarstvo odbrane, Vojska Srbije*

Original Scientific Paper

WHY PAY MORE – WORLD EVIDENCE ON M&A BID PREMIUM DETERMINANTS

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Abstract. *Corporate mergers and acquisitions represent one of the most dynamic fields in the world of business finance. These remarkably complex transactions' success may vary depending on the economic and institutional environments in which the transactions are performed. This paper investigates the information content of the bid premium determined in the M&A transactions and focuses on the identification of significant differences in its amount depending on: (1) the observed timeframe (width of the event window observed relative to the moment of the transaction announcement); (2) current equity market trends (3) institutional environments and the degree of the economic development of the countries in which the transaction participants operate; and (4) selected payment method and motive for entering the transaction in regard to space and time dimensions of bid premium. Examining the sample of 783 merger and acquisition transactions at the global economy level, the research explores the importance and range of time and space determinants of bid premiums in M&A transactions.*
Our results confirm that bid premium carries significant information and that is highly dependent on the observed timeframe, i.e. we find evidence of information "leakage" prior to transaction announcement and sluggish adaptation to expected value creation due to market characteristics, level of economic development of countries in which M&As are operated and specific transaction characteristics such as payment method and motive for participating in such transaction. The paper shows that the results can often differ depending on whether the analysis includes dominant trends in the most important capital markets.

Key words: *mergers, acquisitions, bid premium, market for corporate control, institutional environment, payment method*

1. INTRODUCTION

Rarely does an issue in the area of corporate finance attracts so much continuous attention and interest as does the matter of mergers and acquisitions ("M&As"). In both academic and business circles debates are constantly held on the underlying motives for such transactions and whether they are justified, whether the amounts paid are adequate, who wins and who loses and what information regarding a particular M&A may be revealed from the response of the market prices to the M&A announcement. A particularly interesting series of questions arise upon analysis of the phenomenon of information "leakage" into the market prior to the official M&A announcement as well as whether the market perceives the price offered for the target's shares as realistic. However, the question of all questions is why the market is so skeptical and strict in anticipation of the successfulness of those transactions.

What is substantially typical of the largest number of M&As is payment of an acquisition premium (the so-called *bid premium*), which is the difference between the price offered by the bidder and the currently trading price of the target's shares. The empirical research suggest that the average bid premium ranges between 20% and 40% (Goergen & Renneboog, 2004). The premiums offered by bidder to take over control over the target significantly raise the market expectations and make the market more rigid in comparison to some other transaction types. In fact, when a bidder offers a price above the target's share price, the bidder must justify the premium paid through the post-transaction integration, through exceeding the market expectations and doing something that the target was unable to do on its own. This exclusively relates to the synergy effects. So, the market is strict and skeptical about M&A transaction success, primarily because the investors are skeptical whether the bidder will be able to firstly conserve the value created within the target prior to the transaction, and on top of that, succeed in creating the expected synergy effects (Sirower & Sahni, 2006).

Now that we have considered the main reasons for the market's caution about M&A transactions, let us state here that different theories address different determinants of M&A transaction successfulness. For instance, upon identification of determinants for the bid premiums in international M&As, the classical M&A theory focuses on the factors such as risk diversification, increased operational effectiveness and change in the market power. On the other hand, the neoclassical theory emphasizes changes in the shareholder rights and changes in the features of the corporate governance resulting from the bidder and the target operating in different institutional environments (Bhagat, Malhotra & Zhu, 2011). Xie et al. (2017) find that "institutional and regulatory framework, tax provisions, economic performance, financial markets development, investor protection, geographical setting and cultural factors have differential effects on the inward and outward capital flows". Further, they find that "institutional dichotomous issues like the ruling political party influence, government intervention, higher levels of corruption, and erratic behavior of bureaucracy have detrimental effects on the completion likelihood of publicly announced acquisition transactions".

What makes the field of mergers and acquisitions dynamic and vibrant at all times is the fact that characteristics of these transactions are not universal and static but varying in terms of both space and time. The intention of this paper is to highlight the space and time dimension of M&A transactions.

2. LITERATURE REVIEW

Characteristics of M&A transactions may vary depending on the economic and institutional environments in which the transactions are performed. Rossi and Volpin (2004) confirm that target companies operating in the United States realize statistically significantly higher abnormal returns against the comparable companies operating in other markets. In fact, it is identified that the average bid premium in the US-based transactions is by 7 percentage points higher than the premiums paid in the non-US transactions. Although it has been established that in the US-based M&A transactions statistically significant synergy effects are realized, it turns out that those are not sufficient to account for the differences in bid premiums between the US entities and entities operating in other markets. This means that the explanation for bid premium differences ought to be sought in different legislation and different scope of shareholder rights which are closely related to stronger bargaining power.

The main distinction about the US market in comparison to the other countries is higher competition in the market for corporate control reflected in the higher volume of M&A transactions and more diverse and potentially more efficient defense measures against hostile takeovers. M&A activities are considerably higher in volume in the countries with better investor protection, which is regarded as the key prerequisite of an active market for corporate control (Rossi & Volpin, 2004). The final conclusion hence could be that in the USA there is a higher level of protection of target shareholders than in the practices of other countries, which improves their bargaining power and enables higher bid premiums and the abnormal returns of the targets than those realized by the targets in other markets.

It is interesting that the conclusions reached are somewhat modified if the abnormal returns of the bidders are analyzed. Alexandridis et al. (2010) show that bidders operating in the markets of Continental Europe, Australia, Japan and other countries with relatively low competition in the market for corporate control realize significantly higher returns than the bidders operating in the USA, Canada, and the UK. This is in line with the thesis that high competition in the market for corporate control, although having a positive impact on the returns of the targets, may have negative ultimate implications on the returns of the bidders. In fact, the high competition levels in the market for corporate control causes bidders to increase gradually the bid premiums offered for target takeover, resulting in payment of excessive premiums, which are often not justified by commensurately higher synergy effects.

In order to measure the competition level in the market for corporate control Alexandridis et al. (2010) focus on listed target companies involved in the completed M&A transactions in the specific year relative to the total number of listed companies operating in the market under analysis. The highest competition levels in the market for corporate control are recorded in the US, the UK and Canada since these are countries with the largest numbers of listed companies that are subject to control takeover in the specific year. The average bid premium values identified in those markets equal 45.79%, 42.02% and 37.01%, respectively, whereas in the rest of the world the average bid premium recorded in the same period is merely 31.91%. Moreover, the abnormal returns of the bidders operating in Europe (excluding the UK), Japan, the rest of Asia, Australia and Oceania, South Africa and Latin America are non-negative and statistically significantly higher than those of the bidders from the countries with the largest volume of M&A transactions.

Ylmaz and Tanyeri (2016) find that, viewed on the global level, M&A transactions create value with the cumulative average abnormal return of 1.7%. When it comes to the

differences in respect of three-day cumulative abnormal returns identified between the companies in developed countries and companies operating in developing countries, results are somewhat different from Alexandridis et al. (2010). In terms of the results relating to the returns realized by the target shareholders, there are no deviations from the above discussed results. The results show that CAR of the targets operating in developed countries equals 8.1%, while that of the targets in developing countries is as low as 2.8%. While the difference between CARs realized by the targets was anticipated, the research shows that returns realized by the bidder shareholders are also higher for companies operating in developed countries, although the difference is of a much less scale than the difference identified for the targets. One of the explanations for the divergent results of the aforesaid two studies in terms of abnormal returns realized by the bidders is the use of different event windows for measurement of cumulative abnormal returns. Since the developing countries are characterized by a slower pace of the market adaptation to new information (lower market efficiency), the use of shorter event windows for CAR measurement might cause underestimation of the returns realized by the bidder shareholders upon transaction announcement. Relaying on this finding we are introducing time frame as one of the key features of our bid premium analysis.

With regard to the generation and distribution of the total gains realized in M&A transactions, results of the sample studies encompassing international M&As ought to be considered, especially those where companies operating in the countries with developed market economies were observed as bidders and companies operating in developing countries as targets. The results of related studies show that shareholders commonly realize positive combined returns in such transactions, whereby the gains are unevenly distributed in favor of the bidders (Bellotti & Williams, 2008).

The increasing volume of international M&As involving companies from developing countries as bidders made some researchers deal with the characteristics of such transactions in more detail. The highest growth in value of such transactions of as much as 392% was identified in the period from 2004 through 2008. In 2006 consulting firm BSG published a study demonstrating that 100 most successful companies from developing countries are constantly strengthening their global influence by increasing their presence in various industries, with such influence strengthening realized not exclusively through export as one of the possible channels, but rather through the ever growing volume of international M&A transactions in which these companies appear as bidders (Bhagat & Malhotra, 2011).

In general, the main drivers of the bidders from developing countries in targeting companies from the countries with developed market economies are classified into two major groups: (1) acquisition of strategically valuable resources such as technology, brand, managerial talent, distribution channels and natural resources and (2) avoidance of institutional restrictions existing in their countries of origin. These transactions create value on the average, where the cultural differences between the bidders and the targets pose the most significant barrier to value creation. In fact, in instances of international M&As, the capacity to learn and the level of adaptability to a new cultural environment are crucial determinants of success. Realization of abnormal returns is in line with the so-called *bootstrapping hypothesis* assuming that bidders realize positive abnormal returns upon transaction announcement where the quality of the target's corporate governance system is on a higher level. It is assumed that, in such an instance, the bidder enters into the transaction, among other reasons, in order to adopt and implement the higher corporate governance

quality standards the target has in place (Bhagat et al., 2011; De Buele and Sels, 2016, Li et al., 2016). Brock (2005) also finds that "the cultural match or mismatch between the parties in international M&As shape their ability to successfully integrate and share resources, which in turn affects the ability to realize synergies".

Apart from institutional environment and economic development of M&A transaction participants, payment method and motives for entering the deal are important bid premium determinants.

Numerous empirical studies investigating the impact of the selected payment method on the bid premium amounts and successfulness of M&A transactions have not produced uniform conclusions. Great many studies conducted in the USA almost unanimously found that transactions entirely financed with shares result in negative returns and low performance to the bidders. On the other hand, studies conducted in Europe demonstrate that share-based financing of transactions may result in positive and sometimes statistically significant returns to the bidders. Similarly, certain authors claim that higher bid premiums positively correlate to the predominant cash payments (De La Bruslerie, 2013). Chatterjee and Kuenzi (2001) find that announcements of M&A transactions involving bidders with surplus cash funds ought to bring about negative returns to the bidder shareholders. The payment method is frequently associated with the level of the shareholder legal protection. The probability of control takeover being financed entirely with cash declines as the level of the shareholder protection in the target's country of origin rises, which is explained by the fact that the high levels of shareholder protection increase the availability of financing with equity instruments. On the other hand, in the countries with low levels of shareholder protection, shareholders will be more willing to accept offers for payment in cash than share-based payment offers (Rossi & Volpin, 2004).

Based on empirical and theoretical findings most commonly expressed motive for entering an M&A transaction is creation of value, which may be realized through synergy effects arising from either the strategic fit (operating synergy) or through utilization of the financial benefits from the combination (financial synergy). Although both types of synergy effects are perceived as desirable, it is expected that an existing strategic fit between the bidder and the target increases readiness to pay higher bid premiums. In this regard, a number of empirical studies point out that takeovers realized within the same industries enable realization of higher returns than takeovers aimed at business portfolio diversification. Gupta and Misra (2007) and Golubov et al. (2016) actually confirm the economic theory views that expansion into the related industries enables more successful and faster activation of synergy effects in comparison to that of diversification.

In line with the previous research results that are presented in literature review section and our research objective the following hypotheses will be tested:

H1: There are statistically significant differences between bid premiums calculated 1 day and 30 days prior to/after the official M&A announcement.

H2: There are statistically significant differences in the bid premium amounts calculated prior to/after the official M&A announcement depending on the institutional environment and economic development of the countries the participants in international M&As come from.

H3: There are statistically significant differences in the bid premium amounts calculated prior to/after the official M&A announcement depending on selected payment method.

H4: There are statistically significant differences in the bid premium amounts calculated prior to/after the official M&A announcement depending on bidders act as strategic or financial buyers.

3. DATA AND SAMPLE

In our research we create the sample by using the data from the Mergermarket database that includes mergers and acquisitions at the global economy level, with individual values of above USD 5 million. The analysis focuses on M&A transactions announced in years 2015 and 2016, two periods relevant for examination of M&A transactions characteristics and their behavior in regard to the condition and trends identified in the equity markets throughout the world. In fact, we identify three periods and regard them as three sub-samples. The first, from January 1, 2015 to June 12, 2015 is a period prior to the general decline of the investor confidence (pre-confidence decline period). The second period, from June 12, 2015 to February 12, 2016, is a period when in almost all stock markets around the world the investor confidence decreased and the stock exchange indices recorded the most severe drops since the beginning of the global financial crisis in 2008 (confidence decline period). Such a trend was not identified in the USA only, where the most significant stock exchange indices recorded either no decline at all or decline much less severe than what happened in other markets. The third period, from February 12, 2016 to December 31, 2016, is a period of recovery and the investor confidence growth, i.e., a period of positive trends identified in all significant stock markets in the world (confidence recovery period).

As previously highlighted, in the second half of 2015 a drastic fall in share prices occurred in almost all large equity markets in the world as a result of a number of adverse events that took place in the global economy that year which had extremely negative effects on the global economic trends. One of the key circumstances that stopped the period of the steady increase in share prices in the global stock markets was the crash of the Chinese stock market that began in June 2015. From June 12 to August 24, 2015 the Shanghai Composite Index fell by 38% despite the efforts of the Chinese Government to prevent the negative tendencies in the economy. In addition, due to its default on liabilities toward IMF, on June 30, 2015 Greece declared bankruptcy. Among factors that led to the undoubtedly largest drop of the share prices after 2008, there were a plummet of oil prices, Chinese currency devaluation, decrease in investments in developing countries and investor expectations regarding the discontinuation of the expansionary monetary policy of the US Federal Reserve that would be expected to lead to a rise in general interest rate levels. Unlike 2015, which featured dropping share prices in the markets throughout the world, 2016 was a year of recovery and stabilization of the financial markets. As from February 2016, all the stock exchange indices recorded continuous rise apart from the short-term crash immediately before and after the UK referendum (Brexit). Increase in oil prices, recovery of the demand in the commodity and services markets, positive political trends in some countries and consistent policies of cheap money implemented by almost all central banks are some of the key factors that led to the recovery of the financial markets throughout the world and created positive investor expectations regarding the future performances of the major world economies.

The sample includes transactions announced during 2015 and 2016 and completed by the end of Q1 2017. Given that the focus of our analysis is on target share prices upon the M&A transaction announcement, the sample includes only transactions with targets in the form of public companies whose shares are publicly traded and whose prices are disclosed at the stock exchange. All transactions financed with debt instruments or hybrid equity instruments are excluded from the sample as well as all the transactions for which there is no full set of data required for the analysis. Out of the total number of the announced transactions, 834 transactions meet all the pre-defined criteria.

Due to the specificities of operations of the financial institutions in comparison to the real sector companies, we exclude from the sample all transactions involving financial sector entities as targets. In addition, in order to reduce the influence of extreme bid premium values on the statistical testing results, the sample is winsorized by 1% at both the left and right distribution tail, separately for the bid premiums calculated prior and after the official merger announcement. Thus the final sample of 783 M&A transactions is obtained. Viewed per the three previously defined periods relevant for our research: in the first period 218 transactions meeting all of the required criteria were identified, 312 transactions were identified in the second period and 253 M&A transactions were identified in the third period.

Beside numerous approaches that may be used in examining the characteristics and successfulness of M&A transactions, the methodological event study approach stands out in literature as particularly suitable (Bruner, 2002). Adnan and Hossain (2016) accentuate some benefits of event studies such as: "(1) short-term event study can screen the influence of outside factors to large extent; (2) data are easy to get publicly, allowing study on large sample; and (3) it is relatively objective public assessment". Upon definition of the methodology framework for the research our starting point relies on the powerful influence of the assumption of the semi-strong equity market efficiency on economic theory, whereby the existing share prices always incorporate and reflect all publicly available and relevant information. This hypothesis provides a theoretical foundation for the dominant implementation of the cumulative abnormal return methodology. Given that the contemporary empirical studies more and more often question whether the dominant use of CAR methodology is justified and that, according to some authors (Lim, Brooks & Kim, 2008), the equity market efficiency form is not unalterable in time but may be changed from a pre-confidence decline, to a crisis and confidence recovery periods, in our research, although we remained within the event study field, we applied a slightly different approach. In this paper we examine the informative content of the bid premium and identify differences in the value of the bid premium depending on: (1) the observed timeframe; (3) characteristics of the market for corporate control in which the target operates and the degree of the economic development of the countries in which the transaction participants operate; and (4) selected payment method and motive for entering the transaction in regard to space and time dimensions of bid premiums.

4. RESEARCH RESULTS

4.1. Bid premium behavior before and after the official M&A announcement

When the sample is taken on the whole, the expected results are obtained showing that at the significance level of 5% the average bid premium calculated 30 days prior to the official M&A announcement is statistically significantly higher than the average bid premium calculated 1 day prior to the official transaction announcement. Such a result is in line with Keown and Pinkerton (1981) who find that "stock prices react to future mergers about one month before announcements". There are some authors such as Halpern (1973) and Mandelker (1974) who find "the price run-up may start several months before M&A announcements" but in our paper we are not considering price run-ups that may occur more than one month before official M&A announcement. While some researchers believe the run-up is caused by market anticipation or toehold acquisition, Tang et al. (2016) find "neither of the two is able to explain the target stock price run-up prior to M&A announcements. Instead, variables that are associated with unreported insider trading are significantly associated with the run-up".

Anyway, the use of bid premium calculated 1 day prior to the official transaction announcement for the purposes of analyzing the expected synergy effects and abnormal returns upon transaction announcement could lead to their inadequate evaluation.

If, on the other hand, testing is performed on each individual sub-sample defined, the results obtained are not uniform. In the confidence decline and confidence recovery period, the results arrived at, match the results obtained for the entire sample. However, in the period preceding the plummet of the share prices in almost all global stock markets (confidence pre-decline period), the results show that there is no statistically significant difference between the bid premiums calculated 30 days and 1 day prior the official merger announcement. For the sake of consistency, we elected to use the bid premium calculated 30 days prior to the official merger announcement in each of the three observed periods for the purposes of examining the bid premium informative content.

The bid premium calculated subsequent to the official M&A announcement is used as a measure of the market response to the information reaching the market with regard to the transaction announcement. If the bidder appropriately measured the expected benefits from the transaction and defined the appropriate bid premium amount accordingly, and if, additionally, there is no uncertainty in respect of the transaction completion at the price defined in the offer, the market ought to equal the target share price to the share price defined in the offer. Statistically, this would mean that the bid premium calculated after the official M&A announcement should not be statistically significantly different from zero.

We first test whether there is a statistically significant difference between the values of the bid premiums calculated 1 day and 30 days after the official M&A announcement. Thereby we want to investigate whether the character of the market response to the transaction announcement changes with the passage of time and whether the market changes its initial "attitude" regarding the justification of the price offered in a particular transaction. Testing is first conducted on the entire sample and thereafter on each of the three sub-samples. In both instances identical results are obtained – there is no statistically significant difference between the amounts of 1-day and 30-day post announcement bid premiums. Naturally, this still tells little about what attitude the market assumed or whether the attitude changes over a period longer than a month following the official transaction announcement. The results obtained are provided in table 1.

Table 1 Bid premium trends prior and after to transaction announcement

Paired Samples Test	Mean	Std. Deviation	T statistic	Sig. (2-tailed)
For the entire sample				
Bid Premia Share Price -1, -30	-0.05684	0.31190	-5.100	0.000
Bid Premia Share Price +1, +30	-0.01134	0.35101	-0.904	0.366
Pre-confidence decline period				
Bid Premia Share Price -1, -30	-0.05280	0.47005	-1.658	0.099
Bid Premia Share Price +1, +30	-0.00646	0.12170	-0.784	0.434
Crisis period				
Bid Premia Share Price -1, -30	-0.03750	0.24832	-2.667	0.008
Bid Premia Share Price +1, +30	-0.00595	0.13537	-0.776	0.438
Confidence recovery period				
Bid Premia Share Price -1, -30	-0.08418	0.18519	-7.230	0.000
Bid Premia Share Price +1, +30	-0.02220	0.58890	-0.600	0.549

Source: Authors' calculation

In order to examine the character of the market response to the transaction announcement we test whether the average bid premiums calculated at +1 and +30 points in time statistically significantly differ from zero, which would mean the market's perception of the prices defined in the offer is unjustifiably high, i.e., that the bid premium value is above its realistic value (results are presented in table 2). When viewed per sub-sample, the testing results on the first two periods are identical, the average bid premiums at +1 and +30 points in time are statistically significantly higher than zero. On one end, these results may be interpreted in the context of the market's inability to incorporate the new information in the target share prices in the relatively short period of 30 days only. On the other, the explanation may be found in the fact that, despite the adequate and timely market response, the target share prices do not reach the level of the prices offered because the bidder offered an unjustifiably high premium in a particular transaction or there is uncertainty in respect of the transaction completion at the price defined in the offer. We decided to use the bid premium calculated 30 days after the transaction for measurement of the market response to the merger announcement. The main reason for this choice was the fact that we used the bid premium calculated 30 days before the official transaction announcement to measure the expected synergy effects on the bid premium amount.

Table 2 Bid premium and the market response to the transaction announcement

One Sample Statistics (t=0)	Mean	Std. Deviation	T statistic	Sig. (2-tailed)
For the entire sample				
Bid Premia Share Price +1	0.0461	0.18289	7.051	0.000
Bid Premia Share Price +30	0.0574	0.38695	4.153	0.000
Pre-confidence decline period				
Bid Premia Share Price +1	0.0344	0.18680	2.722	0.007
Bid Premia Share Price +30	0.0409	0.24718	2.443	0.015
Crisis period				
Bid Premia Share Price +1	0.0608	0.17368	6.179	0.000
Bid Premia Share Price +30	0.0667	0.19295	6.106	0.000
Confidence recovery period				
Bid Premia Share Price +1	0.0380	0.18992	3.186	0.002
Bid Premia Share Price +30	0.0602	0.60476	1.584	0.114

Source: Authors' calculation

4.2. Bid premium – institutional environment and the degree of the economic development of the countries in which the transaction participants operate

Due to complexity of the international M&As, we decide to focus on this particular type of transactions and investigate if there are any differences in the bid premium amounts depending on the economic development of the countries of origins of the transaction participants. To this end, based on the United Nations' classification we made four sub-samples: sub-sample one, comprised of transactions involving both bidders and targets from developed countries; sub-sample two, comprised of transactions involving both bidders and targets from developing countries; sub-sample three with bidders from developed countries and targets from developing countries; and sub-sample four with bidders from developing countries and targets from developed countries.

The testing results demonstrate there are statistically significant differences in the bid premium amounts calculated prior to the official merger announcement depending on the

level of economic development of the countries the participants in international M&As come from. It is interesting that the highest average bid premium of as much as 37% was identified within the subsample of transactions involving bidders from developing countries and targets from developed economies. Such a high average bid premium amount is in line with the previously stated theoretical assumptions and empirical evidence from (Li et al., 2016; De Buele and Sels, 2016; Bhagat et al., 2011). Almost identical average bid premium of 36.7% was identified, as expected, in the transactions where both bidders and targets come from developed countries. Somewhat lower average bid premium (33%) was recorded in the transactions involving bidders from developed and targets from developing countries, which may be due to lower synergy effects expected in such transactions and weaker bargaining power of the target shareholders. Definitely the lowest average bid premiums of only 18% were recorded in transactions involving both the bidder and the targets from developing countries. The average bid premiums presented above range between 18% and 37% which is almost in line with Goergen and Renneboog (2004) 20% - 40% bid premium range.

Next we test if the average bid premiums recorded after the official M&A announcement are statistically significantly different from zero. We are interested in the differences, if any, in the market responses to the transaction announcement depending on the economic development of the country. The testing results show that, in all instances save the one where both bidders and targets operate in the developing countries, the bid premiums calculated upon the transaction announcement are statistically significantly above zero. The highest average bid premium (9%) was identified in the transactions involving bidders from developing and targets from developed economies. As it was previously found that the highest takeover premiums are offered in transactions of this type, the question is whether bidders from developing countries overestimate benefits from penetration in the developed markets and/or have insufficiently strong bargaining power in such circumstances, which all together results in unjustifiably high bid premiums offered and consequent overpayment of transactions. On the other hand, insufficiently positive market response to the announcement of this type of transactions may be a consequence of the market's skepticism about success of the post-merger integration due to cultural differences and insufficient absorptive capacities of the bidders. In transactions involving both bidders and targets from developed countries, the identified overpayment may be due to the high competition levels in the market for corporate control Alexandridis et al. (2010), while the transactions involving bidders from developed and targets from developing countries the high bid premiums at +30 may be caused by both overpayment and the fact that the developing countries are characterized by a slower pace of adaptation to new information coming to the market (lower market efficiency). On the other end, the average bid premium +30 in transactions involving both the bidders and the targets from developing countries is identified as not statistically significantly different from zero, which leads to a conclusion on adequately measured prices offered for takeover of the target shares. It is particularly interesting that in this group of transactions we find a negative average bid premium at +30 point in time (-1.4%), which mean that these transactions are not only not overpaid but that the premiums offered are too low which is in line with Ang and Ismail (2015).

Table 3 Bid premium in regard to economic development of the paticipants' countries

ANOVA	F statistic	Sig. (2-tailed)
For the entire sample		
Bid Premia Share Price -30	9.347	0.000
Bid Premia Share Price +30	1.545	0.201

One Sample Statistics (t=0)	Mean	Std. Deviation	T statistic	Sig. (2-tailed)
For the entire sample				
Bid Premia Share Price +30 (segment 1)	0.0606	0.41491	3.470	0.001
Bid Premia Share Price +30 (segment 2)	0.0114	0.02329	0.489	0.625
Bid Premia Share Price +30 (segment 3)	0.0499	0.08002	3.414	0.002
Bid Premia Share Price +30 (segment 4)	0.1434	0.42288	2.492	0.016

Source: Authors' calculation

4.3. Bid premium - payment methods and motives for M&A transactions

We first test whether there are statistically significant differences in the bid premium amounts calculated prior to the official transaction announcement depending on whether the transaction is financed with cash, shares or a combination thereof. The results show that there are statistically significant differences in the bid premium amounts per payment method, where the highest average bid premium is identified in cash-financed transactions, and the lowest in entirely share-financed ones. This result correlates to Goergen and Renneboog (2004) who claim that higher bid premiums positively correlate to the predominant cash payments.

However, the testing results per sub-sample suggest that statistically significant differences in the bid premium amounts per selected payment method arise exclusively in the crisis period, while no such differences are identified in the pre-confidence decline and confidence recovery periods. The stronghold for this result we find in the different level of M&A participants' legal protection relative to general market trends. Shah and Arora (2014) finds that the level of investor protection is lessened in the period of crisis.
On the other hand, analysing the market response to the transaction announcement, the results obtained at the entire sample level show that the average bid premium calculated 30 days after the transaction announcement is statistically significantly above zero for each of the three payment methods. However, at the level of individual period, the results were heterogeneous. In fact, the results demonstrate that the prices offered by bidders in cash-financed transactions are perceived as adequate on the average in both the pre-confidence decline period and confidence recovery period, while in the crisis period such prices are perceived as overestimated. However, the results suggest that, in instances of share-financed transactions and those financed with cash and shares combined to some extent, the market perceives the prices offered as unrealistically high, irrespective of the current situation in the equity market which is in line with Gupta and Misra (2007). Here we need to underline another important finding, that in the crisis period, target share prices remain below the price offered after the transaction announcement irrespective of the selected payment method. Among other things, this may be a consequence of the market's higher skepticism during the crisis period as to whether the transactions announced will be completed.

Table 4 Bid premium in regard to selected payment method

Descriptives / ANOVA	Mean-cash	Mean-equity	Mean-mixed	F statistic	Sig. (2-tailed)
For the entire sample					
Bid Premia Share Price -30	0.3570	0.2655	0.2911	3.968	0.019
Bid Premia Share Price +30	0.0408	0.1008	0.0963	1.801	0.166
Pre-confidence decline period					
Bid Premia Share Price -30	0.3079	0.2335	0.2877	0.652	0.522
Bid Premia Share Price +30	0.0187	0.0842	0.787	1.619	0.200
Crisis period					
Bid Premia Share Price -30	0.3675	0.2648	0.2465	2.973	0.053
Bid Premia Share Price +30	0.0449	0.1414	0.1148	6.066	0.003
Confidence recovery period					
Bid Premia Share Price -30	0.3812	0.2966	0.3640	0.824	0.440
Bid Premia Share Price +30	0.0525	0.0741	0.0951	0.067	0.935

One Sample Statistics (t=0)	T statistic	Sig. (2-tailed)
For the entire sample		
Bid Premia Share Price +30 (Cash)	2.210	0.028
Bid Premia Share Price +30 (Equity)	4.460	0.000
Bid Premia Share Price +30 (Mixed)	6.359	0.000
Pre-confidence decline period		
Bid Premia Share Price +30 (Cash)	0.840	0.402
Bid Premia Share Price +30 (Equity)	2.012	0.051
Bid Premia Share Price +30 (Mixed)	3.646	0.001
Crisis period		
Bid Premia Share Price +30 (Cash)	3.612	0.000
Bid Premia Share Price +30 (Equity)	4.132	0.000
Bid Premia Share Price +30 (Mixed)	4.754	0.000
Confidence recovery period		
Bid Premia Share Price +30 (Cash)	1.042	0.299
Bid Premia Share Price +30 (Equity)	1.779	0.083
Bid Premia Share Price +30 (Mixed)	2.576	0.017

Source: Authors' calculation

In the next instance, we focus on the motive for entering the M&A transactions as one of the key determinants of bid premium value. We test the hypothesis that bid premiums calculated prior to the official M&A announcement involving strategic buyers as bidders are statistically significantly higher than such transactions with financial buyers as bidders. The hypothesis is confirmed at the level of the entire sample (all three periods jointly). Such a result unambiguously suggests that acquisition strategy (expansion or diversification) has an impact on the bid premium amount as well as on the willingness to offer higher premiums. These higher premiums should be justified by the "core business" strengthening, strategic fit activation and gaining or increasing of the competitive advantage in the process of post-merger integration.

When hypothesis is tested on the sub-samples of pre-confidence decline and confidence recovery periods, the results obtained are identical to those for the entire sample. However, when we observe transactions performed in the crisis period, we come to a conclusion that there

is no statistically significant difference between the bid premiums calculated prior to the M&A announcement in instances of strategic buyers as bidders and those of financial buyers as bidders. This indicates that in periods featuring negative trends in the stock markets the values of operating and financial synergies become convergent. A relevant study of J.P. Morgan that was focused on the research of M&A characteristics in the crisis periods found that, even in such circumstances, due to a more difficult access to the stock market and due to higher capital costs, companies much more turn to achievement of financial synergies (J.P.Morgan, 2009).

When it comes to the market response to the transaction announcement depending on the primary acquisition motive, viewed at the entire sample level, the market makes no distinction between strategic and financial buyers and perceives both types of bidders as offering unjustifiably high bid premiums. However, somewhat different conclusions imposed on us upon separate testing of the sub-samples. In similarity to the analysis of the impact of the payment method, here as well the market sees prices offered by bidders as unrealistically high in the crisis period, irrespective of the motive for entering the transaction. This may be attributable to the higher market skepticism as to whether the announced transactions will be realized. Moreover, upon respective analyses of the pre-confidence decline period and the recovery period, we observe that the +30 bid premium was statistically significantly above zero only when strategic buyers appeared as bidders. On the other hand, in transactions involving financial buyers as bidders, the bid premium values did not differ statistically significantly from zero. Therefore, we may ultimately

Table 5 Bid premium in regard to payment method and the motive for entering the transaction

Independent Samples Test	Mean-strategic	Mean-financial	T statistic	Sig. (2-tailed)
For the entire sample				
Bid Premia Share Price -30	0.3532	0.2632	3.255	0.001
Bid Premia Share Price +30	0.0663	0.0246	2.026	0.043
Pre-confidence decline period				
Bid Premia Share Price -30	0.3103	0.2026	2.356	0.021
Bid Premia Share Price +30	0.0510	-0.0054	1.292	0.198
Crisis period				
Bid Premia Share Price -30	0.3517	0.2857	1.303	0.194
Bid Premia Share Price +30	0.0692	0.0565	0.465	0.643
Confidence recovery period				
Bid Premia Share Price -30	0.3961	0.2780	2.167	0.031
Bid Premia Share Price +30	0.0769	0.0120	0.745	0.457

One Sample Statistics (t=0)	T statistic	Sig. (2-tailed)
For the entire sample		
Bid Premia Share Price +30 (Strategic)	3.836	0.000
Bid Premia Share Price +30 (Financial)	2.192	0.030
Pre-confidence decline period		
Bid Premia Share Price +30 (Strategic)	2.545	0.012
Bid Premia Share Price +30 (Financial)	-0.339	0.737
Crisis period		
Bid Premia Share Price +30 (Strategic)	5.755	0.000
Bid Premia Share Price +30 (Financial)	2.171	0.034
Confidence recovery period		
Bid Premia Share Price +30 (Strategic)	1.507	0.134
Bid Premia Share Price +30 (Financial)	1.234	0.221

Source: Authors' calculation

conclude that the strategically oriented bidders overestimate the expected synergy effects on the average and offer unrealistically high premiums irrespective of the current stock market trends, while bidders focused on financial synergies on the average, save in the crisis periods, adequately value the premiums they offer for takeover of control.

5. CONCLUSION

The research demonstrates that in the crisis and confidence recovery periods there are phenomena of the information "leakage" and insider trading in the market, which cause underestimations of the bid premium amounts calculated immediately before the official transaction announcement. However, analysis of the transactions announced in the pre-confidence decline period show that there is no statistically significant difference between the bid premium calculated 30 days and those calculated 1 day before the official transaction announcement. Upon analysis of the market response to the official transaction announcement, the conclusion arrived at suggests that, irrespective of the current stock market trends, the target shares do not reach the price defined by the takeover bid. On one end, these results may be interpreted in the context of the market's inability to incorporate the new information in the target share prices in the relatively short period of 30 days only. On the other, the explanation may be found in the fact that, despite the adequate and timely market response, the target share prices do not reach the level of the prices offered because the bidder offered an unjustifiably high premium in a particular transaction. Deepening our analysis, rather interestingly, we identify that the highest average bid premium was recorded in transactions involving bidders from developing countries and targets from developed economies. On the other hand, by examining the bid premium calculated at the +30 point in time, we identify a positive correlation with the competition level in the market for corporate control, as well as a strong influence of bidder and target country economic development on the determination of the bid premium amount. Additionally, we focus on and selected payment method as well as strategic vs. financial takeovers and find evidence of different behaviors in respect to the market conditions (different points in time) and institutional environments (space dimension) where M&A transactions are being conducted.

Findings from our study mostly correlate to the empirical research body in the area of mergers and acquisitions. As an extension of this analysis, on one hand, a wider time frame ought to be introduced to verify the implications of the time frame proposition. On the other hand, a broader approach on transaction participants, especially on the bidders' side would deepen the scope and quality of the research. The broader perspective would be expected to provide more evidence on the bid premium determinants and the willingness of the bidders to pay in an M&A transaction.

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ZAŠTO PLATITI VIŠE – DETERMINANTE VREDNOSTI PREMIJA ZA PREUZIMANJE U MERDŽERIMA I AKVIZICIJAMA NA SVETSKOM NIVOU

Merdžeri i akvizicije predstavljaju jednu od najdinamičnijih oblasti u svetu korporativnih finansija.Uspeh ovih izuzetno kompleksnih transakcija može varirati u zavisnosti od ekonomskog i institucionalnog okruženja u kojima se transakcije realizuju U ovom radu se analizira informacioni sadržaj premija za preuzimanje kao i razlike koje se javljaju u njihovim vrednostima u zavisnosti od: (1) posmatranog vremenskog okvira pre i nakon M&A transakcije (2) trenutnih kretanja na tržištima kapitala (3) karakteristika institucionalnog okruženja i nivoa ekonomske razvijenosti zemalja iz kojih učesnici u transakcijama potiču i (4) izabranog metoda plaćanja i motiva za ulazak u transakciju. Na uzorku od 783 merdžera i akvizicija realizovanih na globalnom nivou potvrđeno je da se visina premije za preuzimanje razlikuje u zavisnoti od posmatranog vremenskog okvira uz prisustvo fenomena "curenja" informacija kao i uz prisutno neprilagođavanja cena u ponudi cenama akcija targeta u vremenskom okviru +30. Vrednost premije za preuzimanje pod jakim je uticajem karakteristika instiucionalnog okruženja i nivoa ekonomskog razvoja zemalja iz kojih potiču preduzeća bidderi i targeti kao i pod uticajem metoda plaćanja i motiva za ulazak u M&A transakcije. U radu je pokazano da se rezultati često razlikuju u zavisnosti od toga da li su u analizu uključeni dominantni trendovi na najznačajnijim tržištima kapitala.

Ključne reči: *merdžeri, akvizicije, premija za preuzimanje, tržište za korporativnu kontrolu, institucionalno okruženje, metode plaćanja*

Review Paper

SOME ASPECTS OF SUSTAINABLE DEVELOPMENT OF TOURISM

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Abstract: *This paper analyzes the basis of the concept of sustainable development and refers to the optimal level of space use for tourist purposes. In doing so, a special attention is mostly paid to negative impacts of tourism on space, i.e. the necessity of spatial limitation of tourism development in order to preserve and protect natural and created resources. An intensive and uncontrolled development of tourism in the second half of the 20th and the beginning of the 21st century caused the degradation of the environment, the destruction of ecosystems and other social and cultural conflicts in the tourist area. For these reasons, it is necessary to align the planning of the future development of tourism with the principles of sustainable development by using different indicators. The main goal of this paper is to analyze various indicators of sustainable development that determine the possibility of using space in tourism, as well as sustainable tourism development. When selecting the indicators of future development, certain criteria must be taken into consideration, such as the criterion of relevance, feasibility (availability), credibility, and so on. The essence of use of the indicators is to determine the optimal number of potential visitors and facilities in the tourist area, without significantly affecting the environment, reducing the quality of tourist experience (sensation) or jeopardizing the sense of identity, lifestyle and activities of the domicile population.*

Key words: *sustainable development, tourist area, carrying capacity, indicators, the limit of acceptable changes*

INTRODUCTION

Intensive tourism flows at the end of the 20th and the beginning of the 21st century left noticeable negative consequences on the surroundings and natural environment. Negative consequences are especially evident in tourist destinations where significant tourist movements and high tourist seasons are present during a certain part of the year. The best example are the coastal destinations in the Mediterranean, where the concentration of tourists is high during the summer tourist season, especially in the period from July to August. A similar situation occurs in the winter months in some mountain destinations such as the Alps. Exactly as a consequence of the negative impact of tourism on the surroundings, the tourist value of not only natural, but also anthropogenic resources is reduced. In this way, the tourist area loses the attractiveness and importance of destination for vacation, recreation and satisfaction of other tourist needs. Due to unplanned construction, air and water pollution and increased noise, tourist destinations with intensive tourism turnover start to resemble cities and increasingly take on the appearance of city agglomeration, which reduces the difference between emitting and receptive areas.

1. SUSTAINABLE TOURISM AND ENVIRONMENT

Bearing in mind that in the 21st century a further increase in tourist turnover has continued, and the relationship between the environment and tourism becomes more and more complex, it is clear that the use and protection of the tourist area, as a basic tourist resource in the context of sustainable economic development, is gaining its importance. In order to realize the goals of sustainable tourism and enable their implementation on a wider scale, it is necessary to abide by basic principles that represent the framework and practical guide for practical implementation. The modern concept of sustainability does not only take into account the traditional economic aspect, but also some quantitative indicators that measure social (socio-cultural) and environmental impact. Three basic principles are usually emphasized, based on three pillars of sustainability: economic, ecological and socio-cultural sustainability. This measuring approach of corporate sustainability performance in literature is called the Triple Bottom Line (TBL) ((Tourism Working Group, 2013). Namely, sustainable tourism implies the level of tourism activity that can be sustained in the long term, because it rests on the benefits of the socio-cultural, economic and natural environment of the area in which it is taking place. Therefore, sustainable tourism is defined as a form of tourism that "finds a balance between economic prosperity, environmental protection and social equity" (Stoddard et al., 2012). Apart from these three pillars, the principles of sustainability, the literature also distinguishes the transverse pillar that supports economic, socio-cultural and ecological pillars through management, infrastructure, etc. (Tourism Working Group, 2013). With appearance of the globalization process, besides the immediate ecological, economic and socio-cultural benefits, the geopolitical dimension of sustainable tourism is increasingly included, which contributes to world peace and understanding among people (Weaver, 2010).

Tourism has a significant role in sustainable development of environment for two reasons. The first is that tourism, as a sector with the most dynamic development, has a significant impact on economies of many countries and destinations in the world. The second is related to the tourist activity that creates a special relationship between consumers (visitors), environment and local community, or domicile population (Tourism Working

Group, 2013). At the beginning of the 90s, the debate on sustainable tourism became more complete, encompassing not only the environmental issue, but also the socio-cultural, economic and geopolitical dimensions of this problem. In contemporary literature, problems related to the definition of sustainable development and sustainable tourism, are increasingly emphasized. Namely, there is a big difference between sustainable tourism, where the emphasis is on the consumer and on the market conditions, in order to maintain tourism industry, and sustainable development, where the emphasis is placed on the development of tourism as means of achieving broader social and environmental goals (Holden, 2008, Sneddon et al., 2006). Therefore, the goals of sustainable tourism will not always coincide with goals of sustainable development.

Sustainable tourism should imply a balance between the environmental, social and economic aspects of tourism and the need to maintain sustainability in all segments of tourism. According to WTO, principles of sustainable tourism development are applicable to all forms of tourism, including mass tourism and specific segments of tourism, as well as all types of tourist destinations. From the above, it follows that sustainable tourism is not a particular form of tourism; On the contrary, all forms of tourism can strive for sustainable development (UNEP and UNWTO, 2005). Sustainable tourism refers to "tourism that fully respects current and future economic, social and environmental impacts that will not endanger the environment, the needs of visitors, economy and local community" (UNEP and WTO, 2005, page 11). Sustainable tourism should meet the needs of current participants in tourism, at the same time preserving and increasing the potential for using tourist resources in the future, without compromising their rights of future generations to meet their needs.

It can be said that sustainable development of tourist destination implies a right to tourism and freedom of tourist flows, a satisfaction of economic, social and aesthetic needs, while maintaining the characteristics of natural, social environment and cultural-historical heritage. Accordingly, sustainable tourism should (UNEP and WTO, 2005, p. -12):

- Ensure optimum utilization of environmental resources, which are a key element of tourism development, maintaining important ecological processes and helping to preserve natural heritage and biodiversity;
- Respect the socio-cultural authenticity of tourist destinations, protect their modern cultural heritage and traditional values and contribute to understanding and tolerance between cultures;
- Provide sustainable long-term business by generating socio-economic benefits that are fairly distributed to all stakeholders, including stable employment, income generation and social housing for host community, contributing to poverty reduction in domicile population.

The following are the basic goals for the development of sustainable tourism (Fennel, 1999, p. 14):

- Developing greater awareness and understanding of the impact of tourism on environment and economy;
- Promoting equality and development;
- Improving standard of living of local communities;
- Increasing the quality of experience for visitors;
- Maintaining the quality of the environment of which the aforementioned goals depend.

Sustainable tourism should enable people to enjoy and acquire knowledge about the natural, historical and cultural values of a given area, while preserving the integrity of a

destination and fostering economic development and well-being of the local community. In other words, sustainable tourism does not have a goal to prevent the development of tourism, but to enable its development in a way so that tourists visit attractions and meet tourist needs without destroying the attributes that have attracted them.

2. INSTRUMENTS OF SUSTAINABLE TOURISM DEVELOPMENT POLICY

The relationship between the environment and tourism has become increasingly complex, and sustainable use and protection of space, as a basic tourist resource, is becoming more and more important. In order to prevent conflicts in relation to tourism – tourist area, it is necessary to integrate environmental protection planning and tourism management into a unique spatial planning process for tourism development (Wall & Mathison, 2006). Adequate planning and management of sustainable tourism development in tourist destinations involves the use of various methods and techniques. Apart from tourism policy instruments and planning and other incentives, more radical changes and behavior towards the surrounding environment can be achieved by repressive measures, such as taxes, fees, etc. (Budeanu, 2007).

There is a wide range of instruments that can be used to achieve sustainable development in tourism. Of course, legislation is and will be irreplaceable in defining the legal framework in which tourism entities can operate, as well as in establishing basic standards and procedures for sustainable development. Environmental instruments have been increasingly used by governments and state administration to emphasize the importance of preserving surrounding environment. However, voluntary proactive approaches are certainly the best way to ensure long-term commitment and improvement of sustainable tourism development (Holden, 2008, p. 203). Nowadays, various means and techniques are used to assess and measure different aspects of sustainable tourism development. First of all, they include (Mowforth & Munt, 2003, p.116):
- Creation of protected areas (national parks, wildlife areas, biosphere reserves, etc.);
- Regulation of tourism economy (legislation of states, regulations and norms of professional associations, etc.);
- Technique of visitors' management (spatial distribution of tourists, directing the flows of visitors, etc.);
- Environmental impact assessment (balanced planning of tourism development, mathematical models, geographic information systems, etc.);
- Determination of the carrying capacity;
- Meeting-participation techniques (meetings, review of public attitudes, etc.);
- Ethical codes (for tourists, for tourist economy, for the local government, etc.);
- Sustainable development indicators.

These quantitative and qualitative indicators aim to limit the use of tourist resources in a deliberate and justified way and limit tourism development to a border (threshold) that does not endanger the surrounding environment and optimal tourism development.

Formation of protected areas refers to the designation of certain areas protected by natural resources. The establishment of protected areas allows for the preservation of a type of biophysical process or condition. The regulation of the tourism industry is an important tool for implementing the concept of sustainable tourism and is guided by legal measures, norms, rules, social responsibility, etc. Determining the capacity of the bearer means an analysis of the physical, ecological, social bearing capacity, environmental capacity, and so on. Sustainable

tourism indicators include the use of resources, the degree of pollution, waste, local participation, tourist facilities, diversity of natural and cultural life, etc. (Mowforth & Munt, 2003). Also, environmental protection and sustainable development tools include visitor management techniques, ethical codes related to tourists, local economy, domicile population, etc. And precisely, the main goal of the paper is to analyze the role of some measures and indicators that significantly determine the upper limit of possible use of space in tourism and sustainable tourism development.

3. INDICATORS OF SUSTAINABLE DEVELOPMENT IN TOURISM

Sustainable Development Indicators are the youngest assets among sustainable development instruments whose use began after the World Summit in Rio in 1992. According to the World Tourism Organization (UNWTO, 1996), "indicators measure or evaluate certain information, with which the decision makers (administrative bodies) reduce possibility of unconsciously making bad business decisions." It is recommended that the indicators be used successively over a period of time to determine evolutionary changes important for tourism development and management. There are three different aspects that can be measured: "Changes in tourism structure and internal factors, changes in external factors that affect tourism and tourism impacts" (Tourism Working Group, 2013, p. 7).

Sustainable tourism indicators mark the presence and scope of a particular current phenomenon, tendency of future development, identification of risks or the need for action. In fact, indicators are sets of information selected to measure changes important for tourism development and management. When selecting indicators of future development, certain criteria must be taken into account, such as the relevance, feasibility, reliability, precision and comparability criterion (Manning, 1999). Relevance means that a particular indicator provides adequate information and a response to a particular outcome. Feasibility (availability) refers to the ways and possibilities of collecting relevant data or information. Credibility of information and its reliability for the user depends on the accuracy of information provided by the data provider, which enables the creation of indicators of sustainable tourism. Accuracy implies clarity and comprehensibility of data and information to the user regarding their knowledge and skills about the indicator itself. Comparability is a criterion that indicates changes over time and the possibility of comparing spatial units of a different hierarchical rank (locality, tourist center, region, destination, etc.) (UNWTO, 2004).

The factors influencing the selection of indicators and determining the management of a particular destination include: access to sustainable development (minimal or comprehensive), indicator measurements, available financial, human and other resources, interests of key subjects of tourism development in a given destination, public support and political influence – Butler, 1996). Bearing in mind that tourism is a complex system; the selection of the indicators of sustainable development is determined by the type of destination and it is in accordance with the capacity of the tourist area for the development of certain forms of tourism.

The difficulty in using indicators of sustainable tourism most commonly is a consequence of bad interpretation of the concept of sustainable development, by different actors in the tourism system. This problem is initiated by the absence of stronger social responsibility, which is the result of incompatibility between needs and objectives of science and political institutions (Tanguay, et al., 2011). For politicians, indicators of sustainable tourism should point to internal

and external factors that affect the structure of tourism sector. They should point out the benefits and tourism influence in a specific area and identify the priority tourism activities (UNWTO, 2004). For tourism operators, the process of defining indicators is an effective means of obtaining information on the status and values of natural and anthropogenic resources. In 2004, WTO outlined 748 indicators classified into 29 base groups of indicators that can be applied to all types of destinations. However, a complete list of indicators is optional and can be reduced. In development of tourism strategies, depending on the characteristics of a destination, indicators recommended by WTO were used to a different extent. For example, in the development of Tourism Development Strategy of the Balearic Islands, where tourism is the main sector of economy, 50 indicators were used, in the Canary Islands nine, and in the Caribbean 20 indicators, etc. (Tanguay, et al., 2011). So, today the number of indicators is reduced due to more often chosen criteria and it uses those that best emphasize the dimensions and issues of sustainable tourism development.

In 2013, the European Commission launched the European Tourism Indicators System (ETIS) "with the aim to help destinations track and measure sustainable tourism development, using commonly comparable approach and indicators" (European Commission, 2013). So, the ETIS (European Tourism Indicator System) is a tool for managing, informing and monitoring development, especially for tourism destinations. It is designed as a "process for collecting and analyzing data with the overall objective of assessing impact of tourism on the destination" (European Commission, 2016, p. 10). Collecting data and information on a wide range of issues related to the local economy, community and environment helps determine a degree and directions of development of a tourist destination.

Feasibility and practicality of The European Tourism Indicator System (ETIS) at the destination level was tested during a two-year period through two pilot phases. More than 100 destinations throughout Europe "have been implemented and tested by ETIS and provided feedback to the Commission about their experience" (European Commission, 2016, p. 10).

The European Tourism Indicator System has defined 43 basic indicators covering basic aspects of sustainability monitoring and providing basis for an effective destination management. Basic indicators enable monitoring of development of sustainable tourism in a certain period of time, as well as a comparison of degree of sustainability of tourism between destinations. These indicators are classified into four sections of indicators (thematic areas). These thematic areas include indicators that best reflect sustainable development of tourism in a destination (European Union, 2016, pp. 21-22):

1. **Management indicators** emphasize the role of public policy and businesses, as well as consumer satisfaction on sustainable development of tourism destinations;

2. **Economic indicators** point to the economic effects of business in tourism, tourist company performance, quantity and quality of employees, supply chains (percentage participation of local companies in production of food, beverages and other products and services, etc.);

3. **Social and cultural indicators** reflect social impact of tourism, health and safety in a destination, gender equality, accessibility of tourist facilities to disabled people, preservation and protection of cultural heritage and local identity;

4. **Environmental Impact Indicators** focus on elements that are crucial for sustainability of the environment in a destination: the impact of traffic, climate change, solid waste management, water consumption and method of wastewater treatment, use of energy, landscape and biodiversity protection, etc.

In addition to basic ones, additional indicators can be used to measure sustainable development. Additional indicators complement basic information and customize evaluation systems to specific needs or destination category, e.g. coastal, mountainous, urban, rural, island, urban areas and others.

However, the highest number of additional indicators of the European Tourism Indicator System (ETIS) is dedicated to the economic sphere (e.g. percentage of destination with recognizable strategy and development control and the evaluation of sustainable tourism), social sphere (equality and accessibility of tourist facilities to all categories of tourists etc.) and cultural aspects of sustainable tourism (e.g. whether a destination is a part of the cultural road certified by the Council of Europe; the influence of other cultures on culture and the identity of domicile population, etc.) (European Union, 2016).

At the beginning of the XXI century, in numerous strategies for sustainable tourism development, the most commonly used indicators were: water consumption in tourism, the total number of tourists in the destination, the average stay of tourists in the destination, occupancy rate, the level of satisfaction of tourists, the level of satisfaction of local population, the existence of adequate tourist development plans, the relationship between culture of tourists and the local population and other (Tanguay, et al., 2011). Most of the indicators used are at the same time the elements of the carrying capacity of the tourist destination. The difficult application of quantitative indicators has led to the use of alternative approaches aimed at identifying potential problems and determining the levels of acceptable changes in the tourist area (LEC) or to assess the environmental impact (EIA), i.e. to identify the environmental impact of tourism development on the surrounding environment (Mowforth, Munt, 2003; Holden, 2008).

3.1. Carrying capacity as an indicator of sustainable development

The concept of carrying capacity was used within the framework of recreational studies of the 1960s, while the subject of greater interest in tourism development planners started in the 1980s of the last century. However, even in 1966, a study, under the patronage of the United Nations, was conducted and it was an attempt to apply the carrying capacity of the tourist destination. The study has defined the number of tourists who can stay in different destinations in Donegal (The Republic of Ireland) without compromising the physical environment (Butler, 1996).

Optimal use of tourist attractions, as the key elements of tourism development, implies the preservation of ecological processes, natural resources and biodiversity, as well as cultural and historical heritage. In this respect, a number of conditions must be "fulfilled to enable tourism to become sustainable, as social and economic development within the available capacity of ecosystems and socio-cultural thresholds" (United Nations Environment Program, 2011).

The carrying capacity refers to the maximum use of any tourist space without causing the negative effects on the resources of the environment, without reducing the satisfaction of visitors nor adversely affecting the society, economy and culture of the destination (Holden, 2008). It is most often determined on the basis of the chosen development scenario of tourism development, respecting the given limitations. Therefore, the optimization of the use of environmental components implies determining the carrying capacity of the tourist destination, i.e. the zoning of tourist areas according to the quantity and quality of certain components of the environment (Dulčić & Petrić, 2001). According to the World Tourism

Organization (WTO) the term carrying capacity implies, "the maximum number of tourists who visit a tourist destination simultaneously, which does not lead to a significant disruption of the physical, economic and socio-cultural environment, as well as a significant decrease in the quality of tourists satisfaction" (PAP / RAC 1997).

The carrying capacity refers to the maximum use of the destination, provided that the resources are not threatened, that the satisfaction of the visitors is not reduced, and that there is no negative impact on the society, economy and culture of the local community. Based on these definitions, it is obvious that there are different elements of the carrying capacity. In literature, at least three types of threshold levels (thresholds) are distinguished as relevant to tourism:

- Physical (ecological) bearing capacity;
- Economic bearing capacity;
- Social support capacity.

These carrying capacities have boundary levels above which saturation levels are considered to be exceeded, which leads to a decrease in the quality of individual components or the total space for the development of individual forms of tourism (Holden, 2008).

The physical carrying capacity indicates how many visitors and objects can be accommodated in a particular area without significant disturbance of the surrounding environment. In doing so, it is necessary to define the size and capacities of each individual tourist object and the distribution of various contents and accordingly plan and manage the development of tourism. It is also necessary to determine the maximum use of natural resources, the manner of functioning of municipal facilities, the manner of waste management, the adequate availability of other facilities and services to the community that are taken to public health and safety, housing, etc. (Laboratory of the University of the Aegean, 2001). For example, for coastal destinations, this refers to the depth of space that is activated in a particular destination. Namely, today it is not enough for tourists to be offered the sun, the sea and the sand, but much more. So, the beach is not the only limit that determines the carrying capacity of the coastal destination. When it comes to cultural and historical monuments, physical carrying capacity signifies the level of use for tourist purposes, without damaging buildings (Authors Group, 2005).

Social-bearing capacity is used as a generic term that includes relationships and tolerance between domicile population on one side, and the quality of visitors' experience, on the other side. The sociological aspect of the carrying capacity is widely understood and implies the possibility of maintaining the social and cultural specificities of the local community, despite the development of tourism and the acceptance of communication with people of different cultural, value, ethnic and other characteristics.

Economic (economic-political) bearing capacity is a set of tourism's impacts on local economic structures and activities, including a competition with other sectors. It also includes the institutional issues of local tourism management. The components of this carrying capacity are (Laboratory of the University of the Aegean, 2001, p. 14):

- Degree of specialization in tourism;
- Transfer of labor from other sectors to tourism;
- Tourism revenues and distribution issues at the local level;
- Level of employment in tourism in relation to the available potential of human resources of a destination.

Accordingly, the economic bearing capacity implies the development of tourism and related activities, without suppressing other activities that are necessary for the life of the

local population, or a sharp increase in the price of products and services on which the existence of the population of the tourist destination depends.

The levels of carrying capacity are interconnected, and overrun of the limit level of a type of load capacity over a given period, does not necessarily have a detrimental effect on the limit level of another type of capacity. For example, increasing the number of mountaineers in a mountainous destination can endanger the plant world and disturb the ecological balance, while ensuring that the quality of visitors' satisfaction is not compromised. However, if the increase in the number of mountaineers continues to increase, the environmental damage will be proportionally increased. In the end, the level of ecological damage will lead to overcoming the level of burden, which will reduce the level of satisfaction of mountaineers in the mountainous destination (Holden, 2008).

Each spatial entity has its specificities, the complexity of ecosystems, different attractions, conflict zones, infrastructure elements, recreational and cultural contents, different number and structure of the population, protected areas, etc. It is also necessary to determine the optimal standards for tourists, their activities and built objects in assessing the carrying capacity. For the planning of tourism destination development, the most useful is the establishment of standards relating to the maximum capacity of a space expressed in units of area per user or in certain cases (such as driving a canoe along the river, biking along the track, walking and hiking along the trail, etc.) in linear units of length per user. For example, when determining the standards for beaches, it is necessary to perform a complete analysis with the evaluation of both the quality of the environment and the quality of the tourist experience. The subjective perceptions of tourists are the biggest problem in the assessment of the carrying capacity, since often the opinions of tourists about quality differ from the attitudes of the local population or tourist organizations and companies (Authors Group, 2005).

The calculation of the carrying capacity based on standard norms has its drawbacks because it starts from the assumption that the tourist space is a homogeneous spatial unit. However, the tourist area is heterogeneous and consists of several spatial units characterized by a different degree of ecological sensitivity, and, therefore, their carrying capacities are different (Jovičić, 2008).

Consequently, the calculation of the carrying capacities of larger spatial units must be the result or the sum of the individual carrying capacities of the spatial units of a lower hierarchical rank. In other words, general standards are difficult to apply to all parts of the tourist area without respect for their particularity, different purpose and intensity of use. Additionally, it should be considered that the spatial distribution of tourists and tourist flows is not even, but tourists mostly concentrate on certain attractive points (Šušić, 2017).

A special attention is paid to the seasonal character of tourism, so the carrying capacity should be determined in relation to the maximum concentration of demand when the destination is facing the greatest burden. In addition, one of the deficiencies in the calculation of the carrying capacity is that, in particular, the ecological threshold or threshold of the tolerance of the ecological system is omitted; the threshold of tolerance of the local population, as well as the threshold of the tolerance of tourists and their tourist experience.

3.2. Concept of limits of acceptable change (LAC)

Due to difficulties related to the quantification and determination of the level of load capacity of tourist area, an alternative approach has been increasingly applied, aiming at identifying potential problems rather than determining the optimal number of tourists in a

destination (WTO, UNEP, 2005). In that sense, "limits of acceptable change" (LAC), also known as the limits of acceptable use, have been applied increasingly. The concept of limits of acceptable change, i.e. the LAC system, as well as the level of supporting capacity, has its origins in the management of protected areas and planning of recreational activities (McCool, 1996, p. 1).

LAC "represents a way of managing a destination that enables the identification of specific indicators of quality and impact of tourism on environment, as well as the definition of thresholds for the protection of tourist area" (CAB International 2001). This LAC system does not determine the number of tourists that can be accommodated in a given space, but it analyzes acceptable ecological, economic and social conditions, as well as overall potential for tourism development in a given destination. The system, therefore, relies on the identification of desired economic, social and ecological conditions of the destination.

LAC is a nine-step technical process — from identifying issues and problems as the first, to carrying out an action and monitoring the situation as the final step. The most important steps are (WTO, UNEP, 2005, p. 76):

- Identification of impacts that limit development or use;
- Identification of usable indicators related to these impacts;
- Identifying a range of values of these indicators that are considered to be acceptable or unacceptable (based on evidence, professional consultation, etc.).
- Maintaining monitoring process to ensure that a research remains within the acceptable range.
- Taking steps to adjust usage control levels without exceeding the limit.

Thus, the mechanism of LAC system encompasses the application of a series of indicators that point to the environmental conditions of a particular area by which we can carry out a standard estimation and determine the rate of change. Typically, the indicators should relate to the state of natural resources, economic criteria, and the experience of the local people and tourists in a particular destination. For example: the levels of water and air pollution, as well as the levels of noise can be controlled; furthermore, the percentage of labor force in tourism sector, the rate of crime and traffic accidents associated with tourism, as well as the level of tourist satisfaction can be estimated. These indicators show the impact that tourism has on a particular destination, and on the quality of life of the local population (Holden, 2008, p. 191).

CONCLUSION

The application of the concept of sustainable development in tourism implies the use of a wide range of measures, resources and instruments. In addition to the legislation that defines the legal framework in which tourism entities can operate, there are other means and instruments that determine the upper boundaries of the load/use of the tourist area.

The most significant quantitative and qualitative indicators, which consciously and justifiably restrict the use of tourist resources and limit tourism development to the boundary (threshold) that does not jeopardize the surrounding environment and optimal tourism development, are different indicators of sustainable development. Choosing and evaluating relevant indicators of sustainable development in tourism is a very demanding process.

Taking into account that tourism is a complex system, there are numerous indicators that determine the opportunities and constraints of tourism development in a particular tourist destination. It should be pointed out that in the estimation of tourism development opportunities in destinations, a wide variety of indicators can be used. These indicators can be divided into four groups: management, economic, socio-cultural and ecological. Sustainable development indicators aim to identify the conditions in which sustainable tourism and harmonious social and economic development can be developed within the available ecosystem support capacity and socio-cultural thresholds.

The carrying capacity represents a conscious limitation of the level of exploitation of space, i.e. tourism potentials to the border that provides minimal negative ecological, social, economic, psychological and other consequences for the tourist destination. For these reasons, a reasonable restriction on the exploitation of tourism potential is the most effective way of actively protecting the tourist area. Although the theoretical concept is clear, due to the different approaches to determining the average standard of the surface belonging to the user of the space, the calculation of the optimal carrying capacity of a particular spatial unit is considerably more difficult. In addition, the calculation of the bearing capacity of the space must be the result or the sum of the individual carrier capacities of the spatial units of the lower hierarchical rank. In other words, in calculating the carrying capacity of the destination, the characteristics, purpose and intensity of the use of its smaller parts must be respected. Also, it should be taken into consideration that the spatial distribution of tourists and tourist flows is not even, but tourists mostly concentrate on certain attractive points. In other words, when determining the carrying capacity, one should not rely on unique criteria, but create them for certain parts of the destination. The evolution of the technique of carrying capacity is represented by the concepts of the "acceptable boundary" (LAC) and "environmental impact assessment" (EIA) concepts.

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NEKI ASPEKTI ODRŽIVOG RAZVOJA TURIZMA

U radu se analiziraju osnove koncepta održivog razvoja i ukazuje na optimalan nivo korišćenja prostora u turističke svrhe. Pri tome se posebna pažnja poklanja pretežno negativnim uticajima turizma na prostor, odnosno neophodnosti prostornog ograničenja razvoja turizma radi očuvanja i zaštite prirodnih i stvorenih resursa. Intenzivan i nekotrolisan razvoj turizma u drugoj polovini XX i početkom XXI veka uticao je na degradaciju životne sredine, uništavanje ekosistema i do različitih društvenih i kulturnih konflikata u turističkom prostoru. Iz tih razloga planiranje budućeg razvoja turizma potrebno je, uz korišćenje različitih indikatora, uskladiti sa načelima održivog razvoja. Kod izbora indikatora budućeg razvoja moraju se uzimati u obzir određeni kriterijumi, kao što su kriterijum relevantnosti, izvodljivosti (dostupnosti), verodostojnosti i dr. Suština korišćenja indikatora je da se utvrdi optimalan broj potencijalnih posetilaca i objekata u turističkom prostoru, a da se pri tome bitnije ne naruši životna sredina, smanji kvalitet doživljaja turista i ne ugrozi osećaj identiteta, stila života i aktivnosti domicilnog stanovništva.

Ključne reči: *održivi razvoj, turistički prostor, noseći kapacitet, indikatori, granica prihvatljivih promena*

Review Paper

THE SCOPE AND STRUCTURE OF THE INCENTIVES IN AGRICULTURE AND RURAL DEVELOPMENT IN THE REPUBLIC OF SERBIA

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Abstract. *The aim of the paper is to point out the scope and structure of the incentives from the agricultural budget of the Republic, as well as from the IPA Fund which are intended for the agricultural and rural development sector in Serbia. A brief overview of the chronology of harmonization of national legislation in the field of agricultural production with European rules is given as well as the plan for realization of IPARD funds for the period 2014-2020 and a review of incentives from the agricultural budget for the period 2016-2019. EUR 175 million from the EU budget and EUR 55 million from the national budget are allocated for supporting the agriculture and rural development sector of Serbia within the IPARD measures. The largest amount of funds within the IPARD measures is planned for investments in the physical assets of agricultural holdings (43%). Somewhat less contribution is scheduled for the investments in processing and marketing in agricultural holdings (37%). The leftover measures include only 19% of the planned funds intended to support agricultural holdings within the IPARD assistance program. On the other hand, an analysis of the incentive structure from the Republic's agrarian budget indicates that the largest share has direct payments of over 50%, while the rural development measures are averagely financed with 12.3%..*

Key words: *agriculture, financing, IPARD, the agrarian budget*

JEL Classification: F30, H25, H61

1. INTRODUCTION

The Republic of Serbia is recognizable as an agricultural country because this activity, to a certain extent, contributes to economic development, and it is in the state's interest to continue with further development of this field. According to the Statistical Office of the Republic of Serbia (SORS), the contribution of the agriculture, forestry and fishing sector to the creation of gross domestic product (GDP) was 6% in 2017. However, in the same year, observed by activity, the agriculture, forestry and fishing sector recorded a real decline of 11.2% of gross value added (SORS, 2018) .

The favorable natural conditions and climatic factors distinguish the agriculture of Serbia as the primary activity. Financial support to the agricultural producers in this paper was considered at two levels: 1. *funds of the IPARD (Instrument for Pre–Accession in Rural Development) program;* 2. *Agrarian budget funds.*

Agricultural producers of Serbia are at the disposal funds of the so-called IPARD program. Since Serbia acquired the EU candidate status at the beginning of 2012 and accredited the Agency for Agrarian Payments, it was granted the right to use EU funds under the fifth IPA component known as IPARD. The pre-accession support measure is intended for the agriculture and rural development, and larger part of the funds are provided by the EU. The first call for applications for IPARD funds was announced at the beginning of 2018, and the interest of farmers for financial resources is growing increasingly. The payment of IPARD funds is designed through the contribution of the EU and the national contribution expressed in percentages. The largest percentage contribution of the EU funds is scheduled for Measure 5 – LEADER approach and amounts to 90%, while the remaining 10% will be provided by the Republic of Serbia.

As the Republic of Serbia recognized the importance of agriculture, it was decided that each year grants from the agricultural budget are paid to agricultural producers. The right to subsidies is achieved as individuals as legal persons and entrepreneurs in the sector of plant and animals production only if they implement all the requirements prevised by the tender. The agrarian budget is adopted annually and is an integral part of the Republic budget. From 2016 to 2019, the agrarian budget increased by 15.1%, or by RSD 164.2 bln. During 2016, the agrarian budget had a share of 3.73%, and already in 2019 of 4.14% in the total budget of the Republic, which is the highest value of participation in the four-year period.

Ivanović et. al. (2012) consider that the accession of the Republic of Serbia to the European Union (EU) could bring benefits arising from membership and that the future development of Serbian agriculture must be focused on financing agricultural holdings.

Although agriculture is important for Serbia, it is not sufficiently developed. Prodanović et. al. (2018) quote some reasons why Serbia's agriculture can not be rated as developed: a reduction in livestock funds, fragmentation of parcels, yields below the European average, lack of financial resources for new investments, reduction of rural population, small investments in new equipment and machinery, insufficient insurance coverage in agriculture etc. Accordingly, it is necessary to turn to the newer sources of financing of agriculture that come from both the EU budget and the national budget.

Certainly, the state has recognized the importance of agriculture for the country and continuously increases the funds that it pays from the agrarian budget in the form of subsidies. It also provides a contribution from the national budget when it comes to the payment of funds for the IPARD program, all for the purpose of developing and improving rural life.

2. The Material and Method of Work

The subject of the research is an analysis of the scope and structure of incentives for agriculture and rural development from the two most important sources of financing: the agricultural budget of the Republic of Serbia and the IPA Fund. The research used and analyzed available data sources to which the descriptive statistics methods were applied with the interpretation of the acquired indicators.

3. The EU Support to Agricultural Development of the Republic of Serbia

Serbia has the opportunity to use pre-accession agrarian funds if it reformes and adjusts its agricultural policy to the EU agricultural policy (Grujić, 2017). Consequently, it is very important that national agrarian policy is aligned with CAP (Common Agricultural Policy), which means establishing cooperation with institutions. Popović and Grujić (2015) consider that harmonization with institutions must be achieved both horizontally and vertically, and harmonization of legislation is mandatory especially in the field of production of health-safety food.

The first ideas and changes in the field of agricultural production in the Republic of Serbia started only just in 2000, and the chronology of harmonization in the last fifteen years has been as follows:

- The Agricultural Development Strategy of Serbia was adopted in 2005;
  - The Law on Agriculture and Rural Development, which adapts the development policy of Serbia to development policy within the EU Member States, was adopted in 2009;
- In 2010, the National Program for Agriculture for the period 2010-2013 was adopted;
- During 2014, the Strategy for Agriculture and Rural Development of the Republic of Serbia for the period 2014-2024 was adopted. The goals of the long-term development of the Serbian agrarian sector are in line with the goals and principles of the development of agrarian sector in the EU.

The Instrument for Pre-Accession Assistance (IPA) contains incentive measures designed for both countries that have not acquired candidate status and countries that have obtained the status of candidates for the EU membership. In other words, IPA funds are a form of preparation for joining the EU. The IPA instrument consists of five components (Pejović et. al., 2011):

1. *institution building and support for transition,*
2. *support for cross-border cooperation,*
3. *support for the regional development,*
4. *support for the development of human resources and*
5. *support for agriculture and rural development (IPARD – Instrument for Pre-Accession in Rural Development).*

Countries that have not obtained the status of candidate for the EU membership have the right to support which is made by the first two components. Countries that have obtained the status of a candidate for the EU membership, such as Serbia since March 1, 2012, are eligible for financial support and on the basis of the remaining three components.

The IPARD program for Serbia is the EU pre-accession assistance program for increasing the productivity and competitiveness of the agrarian sector (production and

processing of agricultural products). Also, the IPARD program enables the achievement of EU standards in the field of food production, which primarily refers to harmonization with veterinary, ecological and food safety standards of the EU.

Assistance from the IPA fund for IPARD measures for Serbia includes the participation of funds from the EU budget and the national budget. In the period 2014-2020 almost EUR 230 million are available for farmers, of which EUR 175 million comes from the EU budget, and the remaining EUR 55 million from the national budget (IPARD Program for 2014-2020).

An overview of the financial plan for the payment of IPARD funds from the EU and the national budget for individual measures for the period 2014-2020 is given in Table 1.

Table 1 Financial plan for IPARD payments, 2014-2020

Measures	Total public aid (EUR)	EU contribution (EUR)	EU contribution (%)	National contribution (EUR)	National contribution (%)
Investments in physical assets of agricultural holdings	101,386,667	76,040,000	75	25,346,667	25
Investments in physical assets concerning processing and marketing of agricultural and fishery products	87,346,667	65,510,000	75	21,836,667	25
Agri-environment-climate and organic farming measure	10,294,118	8,750,000	85	1,544,118	15
Implementation of local development strategies – leader approach	5,833,333	5,250,000	90	583,333	10
Farm diversification and business development	20,000,000	15,000,000	75	5,000,000	25
Technical assistance	5,235,295	4,450,000	85	785,295	15
Total	230,096,080	175,000,000	-	55,096,080	-

Source: IPARD Programme for 2014-2020, Republic of Serbia

The table shows that it is planned that 76.1% of payments for IPARD funds is going to be realized from the EU budget, and the remaining 23.9% from the national budget of the Republic of Serbia. The highest rate of the EU contribution was recorded in the measure "Implementing Local Rural Development Strategies - LEADER Approach" reaching 90%. Observing the structure of payments from the EU budget for the above measures, it is obvious that the largest percentage of funds in the seven-year period is allocated for investments in the physical assets of agricultural holdings with a share of 43% or EUR 76 million. Litlle less contribution is scheduled for investments in processing and marketing in agricultural holdings with a share of 37% or EUR 65.5 million. The remaining measures make up only 19% of the planned funds intended to support agricultural holdings under the IPARD assistance program.

According to the latest valid IPARD Program for 2014-2020, the implementation of the IPARD program will be implemented in three phases. The first phase consists of investment support measures, and the order is as follows:
1. investments in the physical assets of agricultural holdings (Measure 1);
2. investments in the physical property related to the processing and marketing of agricultural products and fishing products (Measure 3).

The second phase consists of measures for supporting the diversification of agricultural holdings and business development (Measure 7), as well as technical assistance (Measure 9).

The third phase consists of measures that are under preparation and include LEADER approach (Measure 5) and Agri-environment-climate measures and measures of organic production (Measure 4). For measures 4, 5 and 9, the procedural framework is under preparation, and the conditions for competition, the required tender documentation, and the maximum values that would be available to agricultural producers until 2020 are still unknown.

IPARD funds will be paid for Measure 1 and Measure 3, in 2019, which means that the realization of the program has been started with measures of support for investments. The call for IPARD incentives in 2019 suggests the implementation of Measure 7 and Measure 9, which is expected to be announced in the last quarter of 2019.

The IPARD program also defines the maximum funds available to agricultural producers, published in *IPARD Program for 2014-2020*. When it comes to *Measure 1*, the user can receive maximum EUR 1 million of support. *At Measure 3*, users have a maximum of EUR 2 million of support, and *for Measure 7* only EUR 400,000.

Conclusions from the IPARD Monitoring Committee meeting held in May 2019 point to a high response from farmers to apply for funds are significantly higher than expected (http://www.minpolj.gov.rs/odziv-poljoprivrednika-za-ipard-program-veci-od-ocekivanog/).

4. Incentives to Agricultural Producers from the Agrarian Budget of the Republic of Serbia

Agriculture of the Republic of Serbia in the period 1994-1996 is financed from the primary issue of the Central Bank. Since 1996, our country's agriculture has been financed from the so-called agrarian budget which is an integral part of the budget of the Republic (Radović G., 2009). Many experts dealt with agrarian policy models and expressed their views on the problems of financing the agrarian sector.

Pejanović and Radović (2011) consider that with the start of payment of subsidies to agricultural producers in 2004, and not to processors of milk, the focus in agrarian policy was shifted from a policy of income incentives to investments incentive policy.

According to other authors, there are claims that the agrarian budget regressed agricultural production and rural development, and did not finance it (Jovanović and Lakićević, 2012). This procedure is in the opposite with the method of funding that is represented in the European Union (EU). The authors state that in the EU (from 25 Member States) at the end of 2006, average subsidies per capita were EUR 127, and in the Republic of Serbia, EUR 17-20. In the same year, subsidies in the EU amounted to EUR 360/ha, and in our country EUR 32/ha.

The participation of the agrarian budget in the total budget of the Republic of Serbia will be analyzed further in the paper. The obtained percentages in the period 2016-2019 point to inadequate allocations of the Republic budget for agricultural development (Table 2). Besides, Article 4 of the Law on Incentives in Agriculture and Rural Development (Official Gazette of RS, No. 10/13, 142/14, 103/15 and 101/16) clearly states that "the budget of the Ministry cannot be less than 5 % of the budget of the Republic of Serbia for a certain year ". However, we conclude that the agrarian budget in the period 2016-2019 is not even close to the defined legal minimum.

Table 2 Share of agricultural in total budget of RS in the 2016-2019 period (in billion RSD)

Year	Budget of RS	Agricultural budget of RS	Share (in %)
2016	1,085.3	40.5	3.73
2017	1,123.2	43.8	3.90
2018	1,179.2	44.1	3.74
2019	1,249.5	51.8	4.14

Source: Law on the budget of RS for annual years and authors calculating

The table review shows that the share of the agrarian in the total budget ranged from 3.73% in 2016 to 4.14% in 2019. Also, Table 2 shows that only in 2019 the participation of the agrarian budget is planned to be higher than 4%, which is also the highest value of participation for the observed period. In other words, the average annual share of the agrarian budget in the observed four-year period was about 3.9%.

The Law on Incentives in Agriculture and Rural Development in Article 3 defines four types of incentive measures:

1. *direct payments* involving subsidies for the following purposes: milk premium, basic incentives in plant production[2], incentives for quality breeding and fattening cattle, bee hives, as well as storage costs in public warehouses;
2. Incentives with measures of *rural development* and include support: investment in improving competitiveness, preserving and improving the environment and natural resources, programs that contribute to income diversification and improvement of quality of life, local rural development strategies, and creation and transfer of knowledge;
3. *Special incentives* which are distributed for: implementation of breeding programs, promotional activities, production of planting material and certification and clone selection;
4. *Credit support* that involves facilitating access to the use of agricultural loans through subsidizing a part of interest on loans from commercial banks.

Regulations on the distribution of incentives in agriculture and rural development, which are issued annually, must be in accordance with Article 4 of the Law on Incentives in Agriculture and Rural Development and Article 8 of the Law on the Budget of the Republic of Serbia. The purpose of the Decree on the allocation of funds is to specify the extent, type and maximum amount of incentives per year in agriculture and rural development.

Graph 1 shows the structure of the incentives scheduled by the Republic's agrarian budget in the period 2016-2019.

In the structure of planned annual incentives, *direct payments* are dominant with over 50%. However, in the analyzed period, the share of this measure is gradually decreasing also in 2019, compared to 2016, it makes 60.1% of planned funds. Considering the planned absolute values, their increase is evident, with the allocation of RSD 16,968.7 million, in 2016 and RSD 17,220.3 million in 2019. This inversely proportional share of planned funds for direct payments can be justified by the fact that the total value of the planned funds grows more dynamically than the funds allocated for payment on the basis of a concrete measure increase.

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[2] Since 2019, incentive funds for fuel regression have been returned, which were abolished in 2016

	2016	2017	2018	2019
IPARD	0.5	1.1	6.6	21.2
Special incentives	1.2	1.1	1.2	0.8
Credit support	3.0	3.0	2.1	1.4
Rural development	9.3	12.5	11.1	16.5
Direct payments	86.0	82.3	79.0	60.1

Graph. 1 Structure of incentives in agricultural budget of RS (2016-2019, in %)
Source: Regulation on the distribution of incentives in agriculture and rural
development for annual years and authors calculating

The allocations for *rural development* in the four-year period were increased by 7.2 p.p. The Regulation on the distribution of incentives for 2019 foresees that rural development measures amount to 16.5% or RSD 4,727.5 million of planned funds, while in 2016 they amounted to RSD 1,839.3 million or 9.3%. In contrast to the direct payment measures, the share of the mentioned funds for payment was adjusted in proportion to the increase or decrease of the scheduled total funds.

The most significant increase in the share of planned incentives for agricultural producers was observed in *IPARD* funds. In 2019, the scheduled funds for the payment are RSD 6,073.5 million and they are larger by about 21 p.p. compared to 2016. The share of IPARD funds in 2019 is 21.2% of planned incentives. As a reminder, in 2016, the planned funds for IPARD measures were an integral part of the measures for rural development, accounting for only 0.5% of incentive funds or RSD 100 million. Since 2017, they are presented as a separate measure in the Regulation on the distribution of incentives for IPARD funds.

The scheduled funds for credit support and special incentives in 2019 are only 2.2% of the total planned funds. For *credit support* in 2019, 1.4% was allocated in total planned funds (RSD 400 million), which is significantly less than in 2016 when it was 3% (RSD 600 million).

For the payment of *special incentives* in 2019, RSD 230 million or 0.8% of total planned incentive funds are allocated. However, in 2016 the value of these funds was somewhat higher at RSD 232.6 million and amounted to 1.2% of planned funds.

The data about the use of incentives for agriculture and rural development are also given by the Census of Agriculture 2012, conducted by the Statistical Office of the Republic of Serbia (SORS). Out of the total number of agricultural holdings listed (631,552), 179,775 or 28.5% used incentive funds for agriculture and rural development in the period 2010-2012. According to this source, the structure of agricultural holdings in the territory of the Republic according to the type of used incentives is as follows:
- 94% of agricultural holdings used subsidies for agricultural production;
- 1.8% of agricultural holdings used only subsidized credits;
- only 0.8% of farmers used incentives for rural development.

The obtained calculations of the authors show that the agricultural producers are familiar with the national measures prescribed by the Ministry of Agriculture and applied each year for the measures that are available to them, provided they contribute to their further development.

5. CONCLUSION

Current measures of agrarian policy can contribute to further modernization of agricultural production, which would directly influence the improvement of the living standard of agricultural producers. Bearing in mind the incentives for IPARD measures that can be applied for according to the appropriate plan also in 2019, the number of requests is expected to be significantly higher, as funding will be provided for measures that were not current during 2018.

Support to agricultural producers from the agricultural budget of the Republic contributes to increasing competitiveness, marketability and sustainability of production. Since 1994, Serbia's agricultural policy has been constantly changing and adapting to the growing needs of farmers. In order to ensure further development of agriculture, continuous financing of agriculture is required primarily from the national budget funds.

It is suggested that the scheduled funds for IPARD and national measures could provide the improvement of economic position of agricultural producers.

Considering the fact that some of the reasons why Serbia's agriculture cannot develop faster are mentioned, the authors think that one of the ways to eliminate them would be increased awareness and education of farmers about changes that accompany both agricultural production and the processing and financing sector.

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OBIM I STRUKTURA PODSTICAJA POLJOPRIVREDI I RURALNOM RAZVOJU U REPUBLICI SRBIJI

Cilj rada je da ukaže na obim i strukturu podsticaja iz agrarnog budžeta Republike, kao i iz IPA fonda koji su namenjeni sektoru poljoprivrede i ruralnog razvoja u Srbiji. Dat je kratak prikaz hronologije usklađivanja nacionalnog zakonodavstva u domenu poljoprivredne proizvodnje sa evropskim pravilima, plan realizacije IPARD sredstava za period 2014-2020. godine, kao i pregled podsticaja iz agrarnog budžeta u periodu 2016-2019. godine. Za podršku sektoru poljoprivrede i ruralnog razvoja Srbije u okviru IPARD mera, iz budžeta EU namenjeno je 175 mil. EUR, a 55 mil. EUR iz nacionalnog budžeta. Najviše sredstava u okviru IPARD mera planirano je za investicije u fizičku imovinu poljoprivrednih gazdinstava (43%). Nešto manji doprinos predviđen je za investicije u preradu i marketing na poljoprivrednim gazdinstvima (37%). Preostale mere čine svega 19% planiranih sredstava predviđenih za podršku poljoprivrednim gazdinstvima u okviru IPARD programa pomoći. Sa druge strane, analiza strukture podsticaja iz agrarnog budžeta Republike ukazuje da najveće učešće imaju mere direktnih plaćanja sa preko 50%, dok su mere ruralnog razvoja prosečno finansirane sa 12.3%.

Ključne reči: *poljoprivreda, finansiranje, IPARD, agrarni budžet*

Contents