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Review paper

MANAGING THE EXPATRIATION PROCESS

UDC 005.96:334.726

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Abstract. *The present paper stresses the fact that the expatriation process is extremely important for companies that intend to internationalize their operations, as well as for companies that have already internationalized their operations. This is owing to the fact that expatriation is a continuous process, whether viewed in its narrow or broad sense. Furthermore, the most successful approach to expatriation is the holistic approach which entails an active role of the company in the preparation for expatriation, expatriation, and repatriation. This is further confirmed by the presented practices of selected companies.*

Key words: *expatriates, self-initiated expatriates, host country, home country, expatriation, cultural shock*

INTRODUCTION

The labor market always contained mobile individuals, prepared to accept an appropriate position outside their home country. These individuals go under the joint name *expatriates* (EXs). *Joseph Campbell* called their movement "the hero's journey" (Hudson et al., 2006, 307), because they were *heroes* that adventurously embarked into the unknown in order to perfect their trade and acquire broader knowledge. With the onset of multinational companies (MNC), there appeared a need for the employees of the parent company to leave for foreign subsidiaries and spend the required amount of time there in order to complete certain tasks. As they mostly moved from the U.S. overseas, these heroes were named *overseas expatriates* (OEXs). Soon, the term *overseas* became inadequate, as the mobile individuals also started moving within the same continent; consequently, the employees who moved to foreign subsidiaries to perform their tasks were called *foreign expatriates* (FEXs) (Doherty et al., 2013, 101).

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As over time the world became divided into developed, developing, and underdeveloped countries, individuals from underdeveloped and developing countries started making independent decisions to move in order to seek temporary employment outside their home countries: sometimes on their own, sometimes through an appropriate intermediary organization. They are called *self-initiated expatriates* (SIEs) (Doherty et al., 2013, 98). At first, this was unqualified labor force, 'imported' by the developed countries (usually through employment agencies). In the Socialist Federal Republic of Yugoslavia (SFRJ), the period of intensive 'export' of unqualified workers lasted from 1965 to 1975. Later, and especially today, SIEs are highly competent professionals of non-managerial tiers (engineers of electronics, doctors, but also construction workers, hairdressers, etc.). This is why the term *Independent internationally mobile professionals* (IIMPs) was introduced (Doherty et al. 2013, 98).

Volunteer overseas workers (VOWs) are individuals who voluntarily leave for another country through the mediation of an appropriate organization, for the purpose of aiding in the completion of certain humanitarian tasks (Fee, Gray, 2011, 530). Their effort is altruistic; however, they acquire experience and informal knowledge, which can help them become expatriates.

Regardless of the name, it is a fact that globalization is creating a global labor force market, and individuals in that market go under the joint name *globally mobile workers* (Doherty et al., 2013, 100). For a company that is making its business international, or has already made it international, it is important to understand the motives of the globally mobile workers, the space where they will perform their task (the host country), and the time required to complete the task.

The goal of the present paper is to show companies that, in addition to the internal, there is also an external market for recruiting professionals to perform tasks overseas, because the chosen recruitment strategy determines the duration of the expatriation process, expenditure related to expatriation, expatriates' success in competing their tasks, and, finally, return obtained from expatriates (ROI). This is further supported by the provided examples of practices in some companies. The paper includes the following sections: introduction, five sections (structure of internationally mobile workers; structure of the expatriation process; essence and types of cultural shock; expatriates' personal traits; and expatriation practices in some companies), and conclusion.

1. The Structure of Internationally Mobile Workers

Literature discusses several types of *internationally mobile workers*, and these include the following:

- expatriates (EXs),
- self-initiated expatriates (SIEs),
- international volunteers (IVOs), and
- refugees.

Expatriates. Multinational companies (MNCs) represent a typical form of business internationalization, since the parent company establishes subsidiaries in foreign countries. Moreover, parent companies hire the local labor force in their foreign subsidiaries, while the managers are from the parent company's home country. This is why the earliest literature defined the *expatriate* (EXs) as "a male on middle-to senior-level managers from large MNCs

in the developed country (usually the U.S.) sent on assignment or sojourn to another country for a period of 2-3 years" (Brewster et al., 2014, 1922). Since the subsidiaries on other continents (overseas) were established by American companies, these managers were called *overseas expatriates* (OEXs).

Practice showed that in order for assignments in a subsidiary to be completed, in addition to managers other professionals also needed to be sent (e.g. technical staff), so the term *expatriate* also started to include "expensive people employed in key positions" (Brewster et al., 2014, 1921), sent by the company to perform assignments in the host country. Since they are sent to perform specific assignments, they are called *assignments expatriates* (AEXs) (Vaiman et al., 2015, 283). The number of such employees is continually increasing (Fee, Gray, 2011, 68), even during the crisis that started in 2008 (Brewster et al., 2014, 1921). Therefore, ***expatriates*** *are the employees sent by the company to the host countries to perform a specific assignment, upon the completion of which they return to the home country.*

The place (the host country) is determined by the company, and it can entail the following: a stay in the host country and the return to home country upon task completion, a continual stay in multiple host countries and the return to home country, and the rotation between subsidiaries in host countries throughout the employment. The greater the number of foreign subsidiaries a company has, the greater the number of such expatriates, and the greater the company's obligations in managing expatriates.

The time for completing the assignment is also determined by the company, and it can vary (e.g. 6-18 months, 1-5 years), but the stay in the host country is always temporary. Only the expatriates who are rotating between subsidiaries in host countries throughout their employment have permanent residence outside their home country.

Motivations can be viewed from both the perspective of the company and the perspective of expatriates, although contemporary literature also introduces the motives of the family and countries (both home and host countries) (Brewster et al., 2014). *Company motives* can include the transfer of knowledge to subsidiaries in foreign countries and organizational development through expatriates' acquisition of global competencies. *Expatriates' motives* can be individual career development, higher salary and career development of family members. With young expatriates the most salient motives are personal and business-related, i.e. the pursuit of adventure, desire to meet new cultures and form new friendships, and career development. Company motives and expatriates' motives need to be compatible, since that is the only way for the expatriation process to be successful. Compulsory relocation of expatriates and insufficient company support in the adjustment phase leads to failure on both personal and organizational level.

Self-initiated expatriates. Individuals can independently move to foreign countries in pursuit of temporary or permanent employment. That can include unqualified labor force, but also highly competent professionals (doctors, engineers, etc.). They also represent a form of expatriates, and are referenced in various ways in literature: self-initiated expatriates (SIEs), employees with overseas experience (EOEs), or self-selecting expatriates (SSEs) (Cerdin, Selmer, 2014, 1281-1301). The most frequent terms is SIEs – an independent move to a foreign country in pursuit of temporary or permanent employment. This is not a novel phenomenon, since even in medieval times craftsmen from many countries (e.g. France, Germany, etc.) would spend years traveling the world in order to perfect their skills. In 2013, the United Nations Organization recorded 232 million of international migrants, one fifth

of whom were highly skilled. It is believed that tens, even hundreds of thousands of SIEs are residing in the OECD countries (Vaiman et al., 2015, 281).

In recent years the literature is showing a trend for differentiating between *self-initiated expatriates* (SIEs) and *expatriates* (EXs). Relying only on the literature from the previous five years, *J.L.Cerdin* and *J. Selmer* (2014, 1284) provided a comprehensive overview of definitions concerning the essence of SIEs, which includes the following:

- "… SIEs are internationally mobile individuals who move to a foreign country for indeterminate time periods, rather through the mediation of specialized agencies than through an organizationally assigned expatriation" (Arris, 2013, 79);
- "SIEs come from developed countries, and they have the following traits: they have a strategic approach to career development, their knowledge and skills are transferable across countries, they approach the idea of international mobility as desirable (rather than necessary), and they are easily accustomed and integrated into the host country" (Arris, 2012, 237);
- SIEs are "individuals not supported by any organization, so it is less likely that they will accomplish their goal in developing their career during expatriation" (Andersen, Bergdolt, Margenfeld, 2012, 12);
- "An SIE is defined as an employee who migrates voluntarily to a foreign country on his or her own initiative, seeks actively a new employment and is hired by a foreign organization under a local host-country contract" (Andersen, Biemann, 2012, 105);
- SIEs have the following features: individuals make a decision about moving to a foreign country, the decision about their employment is made by the host-country organization, personal and professional goals are the most dominant, individuals are governed by their personal biographies (gender, age, education, career stage, etc.), they finance the move alone, and they arrange the expatriation phase on their own (Andersen, Gutschin, 2012, 185).

Based on the overview of definitions of the essence of SIEs, the same authors (Cerdin and Slemer, 2014, 1290) outline four conceptual criteria that an individual should meet in order to be an SIE, and these are the following: self-initiated international relocation, regular employment, intention of a temporary stay (3-5 years), and skilled/professional qualifications. All four criteria must be met, and failure to meet even one of them does not qualify an individual to be an SIE.

Instead of the term *self-initiated expatriates* (SIEs), *Inkson et al.* (2013, 352) introduced the term *overseas experienced individuals*, and they differ from expatriates in their initiative, goals, financing, and career type.

- An expatriate receives the *initiative* for performing the assignment in the host country from the company, while SIEs leave on their own initiative (through the mediation or without any mediation of an appropriate organization from the home country, in coordination with the employment organization form the host country, or in coordination with the company from the host country). SIEs' stay in the host country is normally legally regulated.
- *The goal* for expatriates' migration is determined by the company and it can include: the performance of a specific assignment, knowledge transfer to the subsidiary in the foreign country, and organizational development of the company. The main goal for SIEs is employment and individual development, and if they are leaving with their families, then they also take into account the goals of their family members.

- *Expatriates' careers* are planned by the company in accordance with its business strategy, while SIEs plan their careers by themselves. Therefore, they can perfect their knowledge and skills, earn money, and come back to their home country where they can start their own business. If they stay in the host country, SIEs can be a good base for recruiting expatriates.

Refugees (RFs). Bearing in mind that SIEs leave their home country voluntarily, *J-L. Cerdin* and *J. Selmer* (2014, 1291) distinguish them from *refugees*, as *refugees* go to a foreign country out of necessity: for political and economic reasons, in a disorganized fashion, without any financial support, with the basic goal to survive and find a country where they could lead a better life. They do not plan the development of their career at all, although there are highly-competent professionals among them.

International volunteers is also a term found in literature on expatriates. International volunteers (IVOs) traditionally refer to individuals going to a foreign country driven by humanitarian reasons, under the auspice of an organization, and their main goal is altruistic satisfaction (Fee, Gray, 2011, 530). They differ from expatriates in that they are mostly engaged in humanitarian activities and they are not permanently employed in the organizations that hire them. However, contemporary practice has shown that, in addition to altruistic satisfaction, IVOs also have other goals, the achievement of which can help them become expatriates. Through volunteering, they acquire valuable global knowledge and skills, like cross-cultural communication skills and knowledge of the global business operations. Additionally, they are in a position to acquire the *Big Five personality characteristics* that are better than those of EXs and SIEs, so they do not require any time for adjustment.

The Big Five personality characteristics include the following: extroversion, agreeableness, conscientiousness, emotional stability, and openness, and these are the characteristics that render them a high-quality base for both recruiting expatriates, and becoming serious competitors to expatriates. Owing to the fact that they have already undergone the adjustment, they possess positive affectiveness, which, unlike negative affectiveness, leads to faster work adjustment, better work performance, higher work effectiveness, and higher job satisfaction (Selmer, Lauring, 2013, 569-570).

Expatriates are a very expensive human resource and they are considered cheaper only compared to the company president. Therefore, each company needs to take care of the return from investments in expatriates (ROI), i.e. of the expected task performance with expected costs (McNulty, Tharenoy, 2004, 71). Costs can be determined much easier and with higher accuracy than the benefits provided by expatriates, and they are made up from the sum of direct and indirect costs. The amount of the compensation package alone (pay, bonus, and premiums) revolves in the neighborhood of $300,000 and $1,000,000 per year (Toh, Denisi, 2003, 611), while indirect costs (accommodation costs, allowance for the education of children, allowance for unemployed spouses, etc.) are even higher. Additionally, each company fears hidden costs that expatriates can incur, like, for example, damaging the organization's image and disrupting relationships with host country nationals (McNulty, Tharenoy, 2004, 71-72). That is why companies with internationalized operations should familiarize themselves with the structure and characteristics of the internationally mobile workforce. In this way, the classic practice of recruiting expatriates can spread onto the recruitment from the ranks of SIEs and IVOs, thereby facilitating and making the expatriation process cheaper, increasing work performance, and increasing the ROI in the expatriates.

2. STRUCTURE OF THE EXPATRIATION PROCESS

Expatriation can be a short or long process, depending on whether it is viewed in the narrower or broader sense. In the narrow sense, the expatriation process consists of a single phase, which many authors label as the phase of international adjustment (Oberg, 1960; Adler, 1975; Torbiorn, 1982; Selmer, 1999). In the wider sense, the expatriation process is called the expatriation cycle and it includes three phases: the phase of preparation for expatriation, the expatriation phase, and the repatriation phase. The present paper will be dealing with the expatriation process in the narrow sense.

Bearing in mind that expatriation is a complex process, even if viewed in the narrow sense, some authors (Selmer, 1999, 516) discuss expatriation as a process comprised of multiple successive stages (Selmer, 1999, 516).

K. Oberg (Selmer, 1999, 516) refers to expatriation in the narrow sense as the international adjustment process. This process includes four phases, metaphorically labeled:

- honeymoon,
- crisis,
- recovery, and
- adjustment.

Honeymoon is the first phase of the international adjustment process which an expatriate enters with positive expectations and without the assumption that there will be any difficulties in performing the task in the host country. Positive expectations give way to positive affectiveness, which is in turn expected to lead to job satisfaction and satisfactory work performance.

However, an expatriate is soon faced with reality, which often does not match his expectations, so that sooner or later he enters the crisis phase. It is the phase in which positive affectivenes is weakening, and there is a smaller or greater extent of negative affectiveness. First the job satisfaction decreases, followed by a decrease in satisfaction with work and life environment. Consequently, this leads to a reduction in work performance. This is a very critical period for both an expatriate and for the company that sent him to perform the task. An expatriate needs to be aware of the fact that he is working and living in a different environment of the host country, and needs to stay emotionally stable in order to be able to adapt to it. The parent company from the home country also needs to accept his work results, although below average, i.e. it needs to have understanding for his adjustment process, especially if it has not prepared him enough for the expatriation process. The crisis will either pass, or the expatriate will return to the home country. Some data suggests that 10-20% of American expatriates return to the U.S. because they are unable to adjust, while the return rate increases up to 70% if they do not have the support of the headquarter company (Black, Gregersen, 1999). If the crisis is overcome, the expatriate enters the recovery phase.

Recovery shows an improvement in expatriate's affectiveness, in his satisfaction with his job, coworkers, and work performance. The shorter the crisis phase, and the milder the crisis, the quicker and smoother will the recovery phase be. However, an expatriate requires support from the home country and co-workers in the host country during this phase as well. In other words, the company headquarters in the home country must never forget about their expatriates.

It is only the fourth phase in this expatriation process that represents the phase of complete adjustment. An expatriate shows expected performance and he is completely satisfied with both his work and external environment. He establishes good cooperation

with his co-workers, he is happy with his job and work results. Additionally, he has been able to create social networks in his external environment: with other expatriates, with friends living abroad, and with local nationals.

Based on the three dimension of adjustment to the host country, J. Selmer (1999) distinguishes three stages in the adjustment phase:

- adjustment to work,
- adjustment to interacting with the host nationals, and
- adjustment to the general non-work environment.

This structure shows that his classification matches that of the classification of the adjustment phase in Oberg (Selmer, 1999, 516).

Black and Stephens wrote as early as 1989 (Selmer, 1999, 530) about the process (not the phase) of adjustment, which included three types of adjustment:

- general adjustment (food, healthcare in factory of the host country, entertainment, general living conditions, cost of living, shopping, housing conditions),
- work adjustment (performance standards and expectations, supervisory responsibilities and specific job responsibilities), and
- interaction adjustment (interacting with host nationals outside of work, interacting with host country nationals on a day-to-day basis, speaking with host country nationals and socializing with host country nationals).

Torbiorn (Selmer, 1999, 516-517) also discusses the adjustment process and distinguishes it into three phases with the following figurative labels:

- the tourist phase,
- the culture shock phase,
- the conformist phase, and
- the assimilation phase.

The tourist phase is marked by euphoria that appears as soon as an expatriate arrives in the foreign country. He is overwhelmed by the new environment, just like a tourist visiting a foreign country. He notices only elements that are impressive and he is completely unaware of what actually awaits him. In brief, he is superficial about everything: coming to the host country, the house he will be living in, the equipment in the office he will be working in, immediate co-workers, etc. The more the home country company was involved in organizing his move from the home country and his stay in the host country, the longer the tourist phase will last.

The culture shock phase is the phase of facing the real life, both in the subsidiary in the host country and outside the office. An expatriate becomes aware that he is not on holiday, but sent to perform a task under different conditions (work, cultural, social, life, etc.) for a longer period. Therefore, the euphoria phase is followed by the mental stress phase that causes crisis with the expatriate. Support from co-workers to adjust to the new work and local conditions, support from the headquarter company through tolerating lower performance that expected, support of expatriate's friends and family, are extremely important, firstly, for the expatriate to remain in the host country, and secondly, to overcome the cultural shock as soon as possible.

Once the cultural shock has been overcome, an expatriate enters *the conformist phase*. This is the phase of gradual or even progressive recovery. The expatriate realizes that he was sent to perform a professional assignment, that he needs to complete that assignment

with co-workers from a different culture, that his everyday life is linked to novel conditions and that he needs to fulfill the expectations of the headquarter company, as well as the expectations of his family and friends.

The assimilation phase entails that an expatriate has adjusted to both work and life conditions: he is satisfied with his work and co-workers, his is satisfied with his life outside work and he is recording expected performance. He can reach this phase early if he enjoys the support of previously listed entities, but also if he realizes that, no matter the label of the phase, adjustment does not entail only complete assimilation into the host country culture, but also cultural learning. Cultural learning, as a model of cross-cultural exposure, implies that an expatriate's main task is not complete adjustment to the new culture but learning its important characteristics, i.e. selective use of attitudes and values of another culture and incorporating them into his own behavior, just like people learn new languages and add the acquired knowledge to their knowledge of their mother tongue (L. Andersen, according to: Selmer, 1999, 519).

If the mentioned phases of the expatriation process are plotted on a graph, a characteristic **'U'** shape emerges, which gave way to the term *U-curve*. U-curve "shows changes over time in the degree of adjustment to the foreign environment" (Selmer, 1999, 517). The bottom of the curve, which shows the state of cultural shock, is considered the most critical phase. It is the culmination of crisis in the expatriation process (for Oberg in the crisis phase; for Torbiorn in the culture shock phase). The creator of this term is the anthropologist K. Oberg, and he defines it as "distress felt by sojourns where they loose all of their family marks and symbols of social interaction" (Selmer, 1999, 517). The majority of researchers, as well as the creator of the term, see the cultural shock as a normal occurrence in the process of adaptation to another culture. Furthermore, when an expatriate returns to the home country he also goes through a cultural shock, because he needs to readjust himself to his own culture. In that case, the culture shock curve includes two connected 'U' shapes, thus becoming a *UU-curve*. This curve is considered when the expatriation process is discussed in the broader sense, so the first U-curve represents expatriation, while the second U-curve represents repatriation. However, the literature does not discuss a continuous U-curve, although this is what it essentially represents, but the *W-curve*.

All expatriation phases are more easily overcome if expatriates socialize with the nationals – at work with their co-workers, and outside of work with the locals (Maurer, Li, 2006; Toh, Denisi, 2003). Empirical research conducted in 2010 (The Expat Explorer Survey) shows that expatriates are unaware of this fact, as 58% of them were more likely to go out with expatriate friends from the home country than with friends who are local nationals (Van Bakel et al., 2014, 2051). This situation is called *the expatriate bubble syndrome* and it needs to be overcome as soon as possible in order to make the expatriation process as 'painless' and as efficient as possible.

3. Essence and Types of Cultural Shock

Culture can be defined in various ways, and one of the most comprehensive and most applied definitions is that it represents "the accumulated sum of knowledge, experiences, beliefs, values, relations, opinions, hierarchies, religion, [etc.]" (Milovanović, 2015, 2). All of these elements constitute national culture, and an expatriate needs to temporarily

'renounce' the home country culture and 'embrace' the host country culture. G. Hofstede grouped all elements of a national culture into five dimensions, a classification widely accepted both in literature and in practice, and it includes the following dimensions (Milovanović, 2015, 17-24):

- power distance (high and low),
- uncertainty avoidance or readiness for uncertainty,
- individualism vs. collectivism,
- feminine vs. masculine values, and
- long-term vs. short-term orientation.

Starting from these dimensions, Hofstede, as well as other authors, ranked some countries based on the character of their national cultures. It is known that the US occupies the first place in individualism, Japan in masculine responsibility, Greece in uncertainty avoidance; Hong Kong is in the second place in long-term orientation, etc. Such lists can help companies to decide on a country where they will move part of their business, in the sense that they can choose a host country whose culture is the most similar to that of the home country. This will, in turn, allow the expatriation process to be quicker, more economical, and more effective. The crisis phase will, in this case, be very short, the cultural shock weak, and the recovery and adjustment phases also shorter than compared to business internationalization to a country where the dimensions of national cultures are completely different.

The cultural shock is very important in the expatriation process, so it is defined from two aspects:

- from the aspect of the form of business and
- from the aspect of factors that condition it.

From the aspect of the form of business, the creator of the term himself, K. Oberg (1960), listed six forms of manifestation of a cultural shock:

1. anxiety, which stems from the effort to achieve the necessary psychological adaptation,
2. the feeling of loss, which stems from the separation from family, friends, colleagues from the home country, status in the home country, and everything that an expatriate owned in the home country – his house, car, etc.,
3. the feeling of being rejected by the co-workers and local nationals in the host country,
4. confusion in relation to expectations, values, emotions, and self-identity,
5. disgust and indignation upon becoming aware of the cultural difference, and
6. the feeling of being unable to fit into the environment of the host country, which poses as the true 'bottom' of the U-curve, and sometimes even the end of the expatriation process, since an expatriate in such a position returns to the home country.

K. Juffer analyzed 35 definitions of the cultural shock (Selmer, 1999, 517-518) and established several basic factors leading to the cultural shock. So, according to this author, the cultural shock is caused by:

1. confrontation with the new environment or the new situation,
2. ineffective intercultural or interpersonal communication,
3. dangers posed for the emotional or physical state of an individual,
4. need to modify behavior in the new environment,
5. need to acquire and develop experience.

The introduction of the learning model instead of the assimilation (integration) model (Anderson, 1994; according to Selmer, 1999, 518-519), facilitates the overcoming of the cultural shock "as the main task of an expatriate is not integration into a new culture, but learning its important characteristics" (ibid. 519).

4. EXPATRIATES' PERSONAL CHARACTERISTICS

Regardless of which expatriation model is adopted, the literature discusses the *Big Five Personality Characteristics* (Caligiuri 2000, 67-75), which every expatriate needs to possess:

- extroversion,
- agreeableness,
- conscientiousness,
- emotional stability, and
- openness or intellect.

Extroversion is a "necessity to learn the work and non-work social culture in the host country" (Caligiuri, 2000, 73), and individuals who possess this characteristic achieve greater performance and preservation. *Agreeableness* is the ability to form reciprocal social networks through extroversion (Caliguiri, 2000, 73). *Conscientiousness* expresses a high degree of dedication to work. *Emotional stability* is an adaptive mechanism enabling humans to live with stress in the environment (Caliguiri, 2000, 74). *Openness or intellect* refers to the fact that "perceiving, attending and acting upon differences in others is crucial for solving problems of survival and reproduction" (Caliguiri, 2000, 74-75).

Van Bakel et al. (2014, 2050-2067) point out that expatriates must possess intercultural competencies, for which also other terms are used, like: cross-cultural competencies, intercultural communication competencies, and cultural intelligence (ibid. 2051). Intercultural competence entails "the knowledge, motivation, and skills to interact effectively and appropriately with members of different cultures" (ibid. 2051). Furthermore, the authors recommend the *Multicultural Personality Questionnaire (MPQ)* as an instrument for assessing intercultural competence. The questionnaire contains the following five characteristics (Van Bakel et al., 2014, 2051-2055):

- open-mindedness,
- cultural empathy,
- social initiative,
- emotional stability, and
- flexibility.

Open-mindedness is defined as openness to others and assuming an open position towards different opinions and cultural norms. *Cultural empathy* or sensitivity represents an ability to be involved in the feelings of individuals from different cultures. *Social initiative* entails the ability to communicate effectively and establish interpersonal relationships. *Emotional stability* is "the ability to reveal little anxious emotions in intercultural communication" (Van Bakel et al., 2014, 2054). *Flexibility* is the ability to adjust to novel circumstances and situations.

L. Andersen (Selmer, 1999, 518) classifies potential expatriates into three groups, depending on their ability to adjust themselves to the host country:

1. "Going Native" are individuals who quickly abandon their former identity, and in every way and every aspect imitate the nationals in the host country.
2. "Fight" are those individuals capable of adjustment even in extremely novel conditions compared to those in the home country.
3. "Flight" are those individuals who are unable to adapt to the conditions in one of the foreign countries.

The afore presented classification shows that the most suitable individuals for recruitment as future expatriates are "Going Natives", followed by "Fights", while "Flights" are the least suitable.

5. EXPATRIATION PRACTICES OF SOME COMPANIES

In practice, phases or stages of the expatriation process are not as clearly defined as literature presents them. Since it is a complex and difficult process, great attention is dedicated to the preparation for expatriation, as this facilitates the process itself. In some companies the expatriation process also includes the repatriation phase. The following examples show different practices utilized by companies.

John Huntsman, Jr., vice president of a large chemical company *The Huntsman Corporation*, developed a simple, informal method over a five-year-period, for evaluating the ability of his employees to work in the subsidiaries in the foreign country, and this method has proven to be very successful. During his business trips abroad he would bring along the employees whose abilities he wished to evaluate. He would then monitor their behavior at the subsidiary, at restaurants, in shops, in the street, i.e. at every place where a future expatriate is expected to find himself. Additionally, he also monitored the behavior of the future expatriate in the company in the home country during the visits of business partners from abroad (Black, Gregersen, 1999, 58). This represents a financially economical method for recruiting expatriates, but a huge "time consumer," as it requires long time periods for monitoring the behavior of potential expatriates. It is suitable for those companies which manage the expatriation process continually.

LG Group, a large Korean conglomerate applies a formal method for recruiting expatriates, and it is suitable for companies that manage expatriates continually. At the beginning of the managerial career, potential subsidiary managers are given a questionnaire containing 100 questions they are required to answer. *LG Group* purchased the questionnaire from an organization that specializes in the recruitment of expatriates, and the questionnaire was obtained at a price of $500 per person. Based on the obtained responses, it is possible to evaluate employees' cross-cultural skills and their ability to perform tasks in the global environment. Therefore, in addition to cultural intelligence, the ability to think globally is also highly valued. After the questionnaires have been processed, a small number of potential managers expatriates is selected, with whom interviews are conducted regarding their actual plans for performing tasks in the host country. After the interview, a plan for career development of the selected expatriates is prepared and efforts are dedicated to the improvement of some of their skills. Therefore, it is not surprising that 97% of managers expatriates in this company fulfill the expectations of the company headquarters (Black, Gregersen, 1999, 58).

Colgate-Palmolive company sells approximately 70% of their production at foreign markets and aims to increase that share. It uses the so-called *cheap expatriates recruitment strategy*, as it recruits them from the student population in countries where it holds subsidiaries, as well as from the ranks of its younger employees. Graduate students receive scholarships under the condition that they need to stay at the company's subsidiary in the country where they are receiving their education. This way the cultural adjustment phase is avoided, because the students have already adjusted themselves to the host country culture. Younger employees at the company usually do not have families so it is easier for them to accept a stay abroad. They are more economical for the company, as they do not require any allowances necessary for expatriates with families (e.g. higher accommodation costs, child education allowance, unemployed spouse allowance, etc.). They are also not interested solely in their careers, but also in meeting new cultures, making friends abroad, and travel, so it is easier for them to overcome the cultural adjustment phase. Using their affinity towards travel and readiness for frequent changes of the environment, the company recruits them for a stay at individual subsidiaries in the duration from 6 to 18 months, after which they rotate across other subsidiaries in the foreign country (Black, Gregersen, 1999, 60).

Honda of America Manufacturing developed a holistic approach for the recruitment of expatriates, the application of which resulted in the expatriate replacement rate of only 5% (Black, Gregersen, 1999, 63). The approach is labeled holistic because it includes all phases of the expatriate cycle. Managers expatriates are recruited either for the development of a new car model, or for improving the relationships with suppliers. Company top management provides a list of potential candidates for expatriates. The evaluation of their abilities and their selection is entrusted to a specialized organization. It is interesting that this organization also takes care of the repatriation process: e.g. six months prior to the return to the home country expatriates know what their responsibilities will be when they come back, and during the assignment of duties the new competencies that they acquired during their stay in the host country are taken into consideration also.

The most successful expatriation practice is that which includes the preparations for expatriation, expatriation, and repatriation. This entails a holistic approach to expatriation, and to the process of expatriation in the wider sense (the expatriation cycle).

CONCLUSION

Modern conditions require companies to internationalize their business. It is no longer only important for growth and development, but it is important for the very survival. Additionally, internationalization requires professionals of various profiles, not only managers. They can be recruited from either the internal market, or the external market of internationally mobile workers. The internal market is made up from company employees in the home country (potential expatriates – EXs), while the external market is made up form self-initiated expatriates (SIEs) and international volunteers (IVOs).

The notion of the expatriation cycle is introduced, and it consists of multiple phases, as well as expatriation as one of the three phases of the expatriation cycle. An expatriate goes through different substages of the expatriation process, ranging from euphoria, through crisis and recovery, to complete adaptation. These form the so-called U-curve, where the most critical bottom of the U-curve corresponds to the cultural shock. Unless

an expatriate overcomes the cultural shock, the expatriation process ends, and he returns to the home country. This is why it is of paramount importance that companies organize a preparation for expatriation, as well as to provide a continual support to the expatriate during the completion of his assignment in the host country.

However, in addition to applying didactic and experiential methods for preparation, it is necessary to also evaluate the personal characteristics of potential expatriates. These are called the *Big Five Personality Characteristics*, and they include the following: extroversion, agreeableness, conscientiousness, emotional stability, and openness (intellect). They express individuals' cultural intelligence, and those who possess them are considered adequate candidates for expatriates. SIEs and IVOs can acquire the afore mentioned characteristics while working in foreign countries, and, therefore, pose as a more economical base for the recruitment of expatriates. Still, companies should not forget that SIEs and IVOs take time to adjust to the organizational culture of the company.

In conclusion, only the holistic approach to expatriation can give way to successful expatriation, which entails the preparation for expatriation, expatriation, and repatriation, i.e. the continual management of the expatriation cycle. This is further evidenced by the presented practices of selected companies.

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UPRAVLJANJE PROCESOM EKSPATRIJACIJE

U ovom radu se ističe da je proces ekspatrijacije veoma značajan za kompanije koje nameravaju da se internacionalizuju, ali i za one koje su internacionalizovane. Jer, ekspatrijacija je kontinuiran proces, bilo da se posmatra u užem, bilo u širem smislu. Najuspešniji je holistički pristup ekspatrijaciji, a to znači aktivnu ulogu kompanije u pripremi za ekspatrijaciju, ekspatrijaciju i repatrijaciju. Praksa navedenih kompanija to potvrđuje.

Ključne reči: *ekspatrijate, ekspatrijate na svoju inicijativu, strana zemlja, domaća zemlja, ekspatrijacija, kulturološki šok.*

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MEASURING MARKET CONCENTRATION IN MOBILE TELECOMMUNICATIONS MARKET IN SERBIA

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Abstract. *Mobile telecommunications markets across the world are characterized by a modest number of suppliers and a large number of subscribers. Nevertheless, the degree of market concentration varies from country to country. The purpose of this paper is to establish a methodological framework for measuring and analysing market concentration in the mobile telecommunications market in Serbia. The degree of market concentration is calculated using the annual data for the period 2009-2014. The research is made by applying a set of statistical-mathematical methods for measuring market concentration, comparative analysis and descriptive statistics. The analysis finds that mobile telecommunications market in Serbia is highly concentrated and that the degree of concentration exceeds the average of European Union member states. The study is useful to Serbian authorities such as Commission for the Protection of Competition and Regulatory Agency for Electronic Communications and Postal Services, providing significant findings of structural features of the mobile telecommunications market in Serbia.*

Key words: *market concentration, mobile telecommunications market, Serbia*

INTRODUCTION

The telecommunications sector is one of the most vital industries and a significant factor of economic growth in many countries. The importance of this sector arises from its high technological intensity and the necessity of telecommunications infrastructure for the development of other sectors of the economy. This causal relation between the telecommunications industry and almost all other sectors of the economy emphasizes the

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need for a permanent monitoring of the current situation and the dynamics in the telecommunications sector. Such monitoring has become particularly important in the last twenty years, which are characterized by large and rapid changes in the field of information technologies.

The mobile telecommunications industry is one of the most important and the most dynamic fields of telecommunications sector. For the economy, mobile telecommunications are the necessity tool for the modernization and improvement of competitiveness. For the society, they represent a tool for better access to information and for improving the quality of life. From a broader perspective, mobile telecommunications industry through new methods of communication and social dialogue contributes to the development of democracy and the reduction of social and geographical discrimination. These are the reasons for continued growth of the demand for mobile services in last two decades.

In line with global trends, mobile telecommunications industry in Serbia is an important factor of growth, innovation and competitiveness of other industries. It is also the biggest revenue generator of the telecommunications sector in Serbia. Due to such important role in the development of other industries, prices and quality of mobile telecommunications services have a significant impact on the efficiency of economy and social welfare. As well as in other industries, prices and quality of services in the market are determined by the intensity of competition between market participants, i.e. mobile network operators (MNOs) in this case. One of the most commonly used indicators of the intensity of competition is market concentration, which is also used in this paper.

The purpose of this research is to provide an adequate methodological framework which can be applied in measuring and analysing market concentration in the mobile telecommunications market in Serbia. Using annual data for the period from 2009 to 2014, the paper estimates the degree of market concentration as an indicator of the intensity of competition between MNOs in Serbia. The research findings are useful to Serbian competition authority and regulatory agency for telecommunications, but also represent a good basis for analysis of the behaviour of market participants.

The first section provides a theoretical background and literature review. Previous empirical research on the competition in mobile telecommunication markets is shown in section two. Section three presents a research methodology and hypothesis. Research results are discussed in section four. The final section provides conclusions.

1. THEORETICAL BACKGROUND AND LITERATURE REVIEW – MEASURING MARKET CONCENTRATION

Numerous theoretical and empirical studies have shown that market concentration is an important indicator of market performance, which is mainly used at the beginning of market analysis. Precisely, measuring market concentration is recognized as an appropriate starting point for valuation of competition intensity in the market.

The causal relationship between market concentration and market performance (market power) is based on the traditional approach in industrial organization known as the structure-conduct-performance (SCP) paradigm. Due to the fact that behaviour is difficult or even impossible to observe directly, the focus of the SCP paradigm is on identifying structure variables that are observable and measurable and that are related with market power (Church,

Ware, 2000). One of the most commonly used variables for this purpose is market share, which is applied for measuring market concentration. "The importance of market share has been recognized in the classical and neoclassical literatures, and market share is deeply established in business practice as a compelling focus for company motives and strategies" (Shepherd, 1997, p. 72).

Measuring market concentration is based on the calculation of the indicators of market concentration, which use market share as a variable. The importance of indicators of market concentration arises from their ability to describe structural performances of the market (Bikker, Haaf, 2002). There is a set of those indicators that are used in market analysis (see Marfels, 1971; Ferguson, Ferguson, 1994; Lipczynski, Wilson, Goddard, 2009; Pisanie, 2013). For the purposes of this paper, the following indicators of market concentration are theoretically elaborated below and applied in the empirical research: the N-firm concentration ratio, the Herfindahl-Hirschman index, the Entropy index, the Relative entropy index, the Hall-Tideman index, the Rosenbluth index, the Hannah-Kay index, the Comprehensive concentration index, the Gini coefficient and the Lorenz curve.

a) The N-firm concentration ratio

The degree of concentration measured over this indicator shows the cumulative market share of *n* leading companies in the relevant market. In other words, the concentration ratio represents the sum of market shares *n* leading enterprises, that shows what part of the entire sales revenue in the market realize selected group of *n* economic entities. As such, it is very easy to calculate and understand. Mathematically expressed as follows (Bikker, Haaf, 2002, p. 6):

$$CR_n = S_1 + S_2 + S_3 + ... + S_n = \sum_{i=1}^{n} S_i \tag{1}$$

where *Si* represents market share of the company *i* within the observed group of *n* companies.

The lower value of the concentration ratio indicates that the market share of *n* leading enterprises is small, because a large number of small firms operate in the observed market. On the contrary, the higher value of concentration ratio indicates a higher proportion of observed group in total sales in the relevant market. The boundaries between the higher forms of concentration are not strictly defined, but depend on the market that is analyzed.

b) The Herfindahl-Hirschman index

One of the most accurate and, consequently, the most commonly used indicators in the analysis of market concentration is the Herfindahl-Hirschman index. This is a summary indicator, which is defined as the sum of the squares of the market share of all firms in the relevant market.

The Herfindahl-Hirschman index (HHI) can be mathematically expressed by the following expression (Davis, Garcés, 2010, p. 288):

$$HHI = \sum_{i=1}^{n} (S_i)^2 \tag{2}$$

where *Si* is the market share of companies within the observed group of *n* companies.

This indicator has at least two advantages over the previously described concentration ratio. First, it belongs to a group of summary indicators, and, therefore, provides more precise information than concentration ratio, because it takes into account the market share of all firms in the market. Second, due to the procedure of squaring market shares, companies with larger values of market share have special importance (higher weight).

Antimonopoly legislation of the European Union (EU) and United States (US) use HHI to classify the market in one of the following three categories (European Commission, 2004; U.S. Department of Justice, Federal Trade Commission, 2010): (1) Unconcentrated (EU: HHI below 0.10; US: HHI below 0.15); (2) Moderately concentrated (EU: HHI between 0.10 and 0.20; US: HHI between 0.15 and 0.25) and (3) Highly concentrated (EU: HHI above 0.20; US: HHI above 0.25).

c) The Lorenz curve and the Gini coefficient

Lorenz curve is a tool for graphically displaying the degree of market concentration and detection of inequality in market share distribution. The essence is reflected in designing concentration curve (Lorenz curve) in the coordinate system with diagonal intersection (angle of 45°), which starts from the coordinate start point and ends in the upper right corner (Figure 1). The abscissa shows the number of companies lined by market share value from the smallest to the largest, and the ordinate shows the total (cumulative) market share.

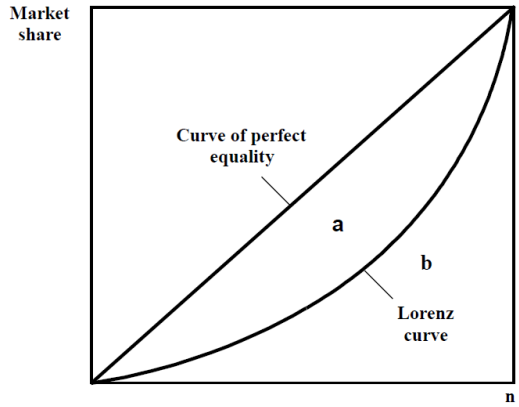


Fig. 1 Lorenz curve for market with *n* participants
Source: Lorenz, 1905

The diagonal intersection in the coordinate system represents perfect equality of market share distribution. On the other hand, the curve of perfect inequality, which corresponds to pure monopoly, would be identical in shape and size to the bottom horizontal (abscissa) and the right vertical line (a line that is parallel to the ordinate).

The Gini coefficient is a numerical indicator of market concentration, which is based on the Lorenz curve. Its value describes the position and the curvature of the Lorenz curve, by putting in ratio an area bounded by the curve of perfect equality and the Lorenz curve (area *a* in the Figure 1) with the entire area under the curve of perfect equality (area *a*+*b*). Due to difficulties of measurement surface of irregular geometric shapes which can be formed by Lorenz curve,

another ratio for the Gini coefficient calculation was developed (Lipczynski et al., 2009, p. 205):

$$GC = \left\{ \frac{\sum_{N=1}^{n} \sum_{i=1}^{N} q_i}{0,5(n+1)\sum_{i=1}^{n} q_i} \right\} - 1 \tag{3}$$

where N represents the rank of companies lined from the largest to the smallest, n is the total number of observed companies, and q_i is total sale of company i.

d) The Entropy index and the Relative entropy index

Unlike the HHI, which ignores companies whose market share is less than 1%, Entropy index gives relatively greater importance to small enterprises. It also belongs to a group of summary indicators. It is equal to the sum of the market share multiplied by the logarithm of their reciprocal values. It can be mathematically represented as follows (Lipczynski et al., 2009, p. 202):

$$EI = \sum_{i=1}^{n} S_i \log \frac{1}{S_i} \tag{4}$$

where Si is the market share of the company i expressed in decimal numbers.

The value of entropy index is not limited as most of other concentration indicators [0,1], but ranges from zero to $\log n$. A value of zero corresponds to the market with only one participant, and value of $\log n$ represents the market with companies of comparable size.

Since the maximum value of the entropy index depends on the number of companies in the relevant market, this indicator does not allow the comparison of degrees of concentration in markets with different number of participants. With the aim to eliminate this disadvantage, the Relative entropy index (REI) is introduced. It represents the quotient of the measured entropy index and its upper limit value (logarithm of the number of companies in the relevant market), which can be expressed as the following form (Lipczynski et al., 2009, p. 203):

$$REI = \frac{EI}{\log n} \tag{5}$$

The value of REI ranges from 0 to 1. Value of 0 corresponds to pure monopoly, while the value of 1 represents a market in which companies have identical market shares. This indicator allows comparison of markets with different number of participants.

e) The Hall-Tideman index and the Rosenbluth index

The Hall-Tideman index and the Rosenbluth index are almost identical indicators of market concentration, which emphasize the importance of the absolute number of companies in the relevant market. The main reason for this arises from the creators of the theory of these indicators that the entry of new competitors in a particular market is largely determined by the number of market participants. In other words, they assumed that market entry is relatively easy if it operates with a large number of small firms and it is relatively difficult if it operates with a

small number of large firms. The Hall-Tideman index is calculated using the formula (Bikker, Haaf, 2002, p. 10):

$$HTI = \frac{1}{(2\sum_{i=1}^{n} iS_i - 1)} \tag{6}$$

where *Si* is the market share of company *i*, and *i* represents the rank of that company, whereby the company with the largest market share has the rank $i = 1$, and company with the smallest market share has rank $i = n$.

The Rosenbluth index is calculated using the formula (Bikker, Haaf, 2002, p. 10):

$$HTI = \frac{1}{(2\sum_{i=1}^{n} jS_i - 1)} \tag{7}$$

where *Si* is the market share of company *i*, and *j* represents the rank of that company, whereby the company with the largest market share has the rank $j = n$, and company with the smallest market share has rank $j = 1$.

f) The Hannah-Kay index

The Hannah-Kay index is based on the HHI, so the characteristics of these two indicators are very similar. The Hannah-Kay index (HKI) is the sum of market shares of all companies in the market graded with exponent α. It is calculated by the following formula (Lipczynski et al., 2009, p. 201):

$$HKI(\alpha) = \sum_{i=1}^{n} (S_i)^{\alpha} \tag{8}$$

where *Si* is the market share of the company *i*, whereby $\alpha > 0$, $\alpha \neq 1$.

The value of the exponent α is arbitrarily determined and has great influence on the result. The low value of the exponent α ($\alpha < 2$) emphasizes the impact of small enterprises; and high values of this parameter ($\alpha > 2$) emphasize the impact of large enterprises on the market concentration degree.

g) The Comprehensive concentration index (the Horvath index)

The Comprehensive concentration index, which is also called the Horvath index, originates from the need to explore the problem of market concentration versus market share dispersion (Horvath, 1970). In other words, Horvat has developed a new indicator on the criticism of the indices that have been used, and which are mainly based on measuring equality in the dispersion of market share. In order to eliminate these deficiencies, Horvat has developed a Comprehensive concentration index, which is calculated using the formula (Horvath, 1970, p. 446):

$$CCI = S_1 + \sum_{i=2}^{n} (S_i)^2 (2 - S_i) \tag{9}$$

where S_1 is the market share of the largest company within the observed group of *n* companies.

The share of the largest company stands out from the sum of the squares of the market share of all other firms in the relevant market and multiplier which represents a proportionate share of these companies. The Horvath index value ranges from 0 to 1. In a market with a large number of approximately equal participants value of the index tends to 0, while the value of 1 corresponds to market of pure monopoly.

2. Empirical Research on the Competition in Mobile Telecommunications Markets

There are numerous empirical studies on the state of competition in the mobile telecommunications markets worldwide. From a large body of these studies, it is possible to identify a set of different variables through which the state of competition in the mobile telecommunications market could be evaluated. Dörrenbacher (2000) proposes turnover and operating income, Curwen and Whalley (2006) estimate internationalization according to the number of subscribers and countries in which the mobile operator is present, while Grzybowski (2008) compares the competitiveness of mobile industry across the EU through country-specific price elasticity and conjectural variations.

Early empirical studies on mobile telecommunications market have predominantly analyzed the state of competition in duopolistic market structures. Due to the fact that many countries such as the United States, the United Kingdom and Sweden had only two MNOs for a long time, researchers' attention onto duopolistic structures was expected. For instance, Parker and Röller (1997) analyze duopolistic competition in the US mobile telecommunications industry in the period 1984-1988 and show that the prices are significantly above competitive levels. Similar as Parker and Röller (1997), Busse (2000) finds that tacitly collude between two MNOs in the US market could increase prices in the range from 7% to 10%. Also, conclusions about stable, high prices in duopolistic market structure as a consequence of tacit collusion are reached by Stoetzer and Tewes (1996) in the German market and Valletti and Cave (1998) in the UK market.

Later studies pay close attention to the internationalization of the mobile telecommunications industry and the progress of market concentration. For example, Gerpott and Jakopin (2005) analyze internationalization data of 14 European MNOs in the period 1997-2003. They found that subscriber-based market share of these 14 operators amounted to 80.2% across 27 European countries in 2003. They also found that the average foreign revenue share increased from 11.4% in 1997 to 46.2% in 2003. Whalley and Curwen (2012) analyze incumbency and market share of MNOs in 49 European countries including Serbia. The analysis shows that in most European countries the incumbent remains to be the largest operator measured by subscribers-based market share. These authors also found that many European markets were highly concentrated in 2010, which was the main barrier to new entrants. Finally, Sung (2014) explores market concentration of mobile telecommunications market in 24 OECD member states in the period 1998-2011. The results of the study of the whole sample period indicate a positive relationship between market concentration, prices and profits: more concentrated market allows higher prices and profits. Such research results suggest market concentration as a useful indicator of market performance.

3. RESEARCH METHODOLOGY AND HYPOTHESIS

The purpose of this research is to measure and analyze the degree of market concentration of mobile telecommunications market in Serbia in the period 2009-2014. In accordance with the purpose of research, the authors tested the following hypotheses:

H1: *Mobile telecommunications market in Serbia is characterized by a high degree of concentration.*

H2: *The degree of market concentration has a downward trend in the observed period.*

H3: *The degree of market concentration in Serbia is higher than the average degree of market concentration in EU member states.*

Measuring market concentration is based on data retrieved from the official periodical publication of Regulatory Agency for Electronic Communications and Postal Services of the Republic of Serbia published in 2015 (Pregled tržišta telekomunikacija i poštanskih usluga u Republici Srbiji u 2014. godini, Regulatorna agencija za elektronske komunikacije i poštanske usluge R. Srbije – RATEL, 2015) for Serbian market and on data retrieved from Mariniello and Salemi (2015) for EU member states.

In order to test the basic hypothesis, following research methods are used in the paper: a set of statistical-mathematical methods for measuring market concentration, comparative analysis and descriptive statistics.

4. RESEARCH RESULTS AND DISCUSSION

Mobile telecommunications services in the Republic of Serbia in the period 2009-2014 were provided by three MNOs: *Telekom Srbija a.d. – Mobilna telefonija Srbije MTS*, *Telenor d.o.o.* and *Vip mobile d.o.o.* All three operators are licensed for public mobile telecommunications services in accordance with GSM/GSM1800 and UMTS/IMT-2000 standards.

Telekom Srbija a.d. – Mobilna telefonija Srbije MTS is majority owned by the Republic of Serbia. The company started to provide mobile telecommunications services in August 1998, through a network based on the GSM standards. *Mobilna telefonija Srbije* had 4,062 base stations in Serbia at the end of 2014. Beside Serbian market, *Mobilna telefonija Srbije* is through subsidiary companies present as a MNO in the Republic of Srpska and Montenegro.

Norwegian company *Telenor d.o.o.* is a part of the *Telenor Group*, which operates in 13 countries in Europe (including Hungary, Montenegro and Bulgaria) and Asia, and in another 17 countries around the world through ownership stake in *VimpelCom*. *Telenor* has operated in the Serbian market since July 2006, after it bought *Mobi63* company. There were 3,398 *Telenor's* base stations in Serbia in 2014.

Austrian *Vip mobile d.o.o.* is the owner of third license for mobile telecommunications network and services in Serbia since December 2006. *Vip mobile* is a member of *Telekom Austria Group*, which is present in eight countries in Europe, including Croatia, Bulgaria and Macedonia. *Vip mobile* had 2,966 base stations in Serbia at the end of 2014.

According to RATEL (2015), the total number of mobile phone users in Serbia has been growing steadily in recent years. The number of users in 2014 exceeds the total population and amounts to 9,344,977, i.e. the penetration in observed year is 130.76%. Postpaid users accounted for 47% and prepaid users 53% of the total number of subscribers in 2014.

Figure 2 shows the market share of MNOs in Serbia according to total number of subscribers in the period 2009-2014.

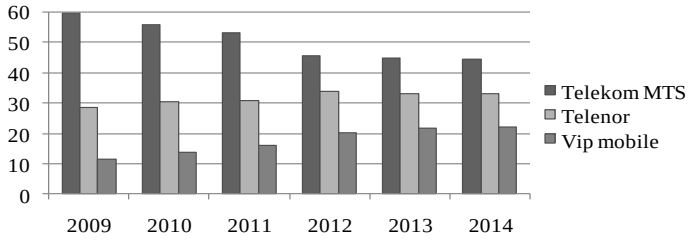


Fig. 2 Market share of MNOs in Serbia according to total number of subscribers; 2009-2014
Source: RATEL, 2015, p. 68

The relative positions of the operators in the observed period has not changed (Figure 2). According to total number of subscribers, *Mobilna telefonija Srbije* has the largest market share in the entire period. *Telenor* held second position, while *Vip mobile* has the lowest market share in every observed year. Nevertheless, data from Figure 2 show that the divergence between the market share of operators in the period 2009-2014 decreased continuously, i.e. that distribution of total number of subscribers was becoming more and more equable from year to year.

Measuring the concentration of mobile telecommunications market in this paper is based on market share indicator. Although it is possible to calculate market concentration according to the number of subscribers, the authors have chosen revenue as more appropriate indicator of market conditions. This indicator is computed as the quotient of the revenue earned by the participant and total revenue of all participants in the observed market. Total realized revenue (in millions of euros) and market share of MNOs in Serbia in the period 2009-2014 are presented in Table 1.

Table 1 Total realized revenue (in millions of euros) and market share of MNOs in Serbia; 2009-2014

Year	Indicator	Telekom Srbija a.d. (MTS)	Telenor d.o.o.	Vip mobile d.o.o.	Total
2009	Revenue	419.15	334.82	72.75	826.74
	Market share	0.507	0.405	0.088	1
2010	Revenue	336.14	326.14	106.92	769.2
	Market share	0.437	0.424	0.139	1
2011	Revenue	328.52	369.16	149.02	846.7
	Market share	0.388	0.436	0.176	1
2012	Revenue	323.85	360.4	165.75	850
	Market share	0.381	0.424	0.195	1
2013	Revenue	324.75	359.86	193.1	877.7
	Market share	0.37	0.41	0.22	1
2014	Revenue	311.67	341.32	193.95	846.94
	Market share	0.368	0.403	0.229	1

Source: Author's calculation based on data of RATEL, 2015, p. 63 and p. 68

Telekom Srbija MTS had the largest market share in 2009 and 2010, but *Telenor* has taken a leading position in 2011 (Table 1). As well as in the case of number of subscribers, *Vip mobile* has the lowest market share in the entire period. Nevertheless, market share should not be the only indicator of competitive conditions in the analysis of market concentration. Considering that fact, the authors use all indicators of market concentration elaborated in theoretical background in the analysis of mobile telecommunications market.

The values of concentration indicators of the mobile telecommunications market in Serbia in the period 2009-2014 are presented in Table 2 and Figure 3.

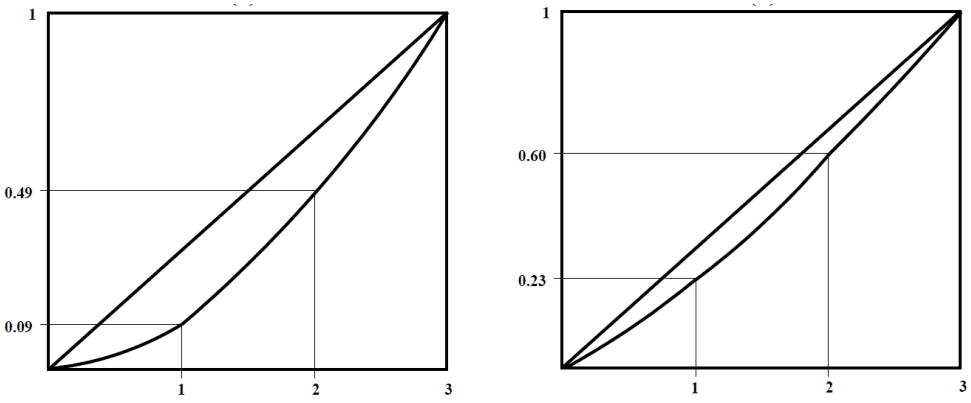
Table 2 The values of concentration indicators of the mobile telecommunications market in Serbia; 2009-2014

Concentration indicator	Range	2009	2010	2011	2012	2013	2014
Concentration ratio of two largest firms	$0 < CR_n \leq 1$	0.91	0.86	0.82	0.81	0.78	0.77
Herfindahl-Hirschman index	$1/n \leq HHI \leq 1$	0.43	0.39	0.37	0.36	0.35	0.35
Entropy index	$0 \leq EI \leq \log n$	0.92	1.00	1.04	1.05	1.07	1.07
Relative entropy index	$0 \leq REI \leq 1$	0.84	0.91	0.94	0.96	0.97	0.98
Hall-Tideman index	$0 < HTI \leq 1$	0.46	0.42	0.40	0.39	0.38	0.38
Rosenbluth index	$0 < RI \leq 1$	0.26	0.28	0.28	0.29	0.30	0.30
Hannah-Kay index ($\alpha = 2,5$)	$1/S_1 \leq HKI \leq n$	0.29	0.25	0.23	0.22	0.21	0.21
Comprehensive concentration index	$0 < CCI \leq 1$	0.78	0.76	0.74	0.73	0.72	0.72
Gini coefficient	$0 \leq GC \leq 1$	0.21	0.15	0.11	0.09	0.07	0.07
Concentration ratio of two largest firms	$0 < CR_n \leq 1$	0.91	0.86	0.82	0.81	0.78	0.77

Source: Author's calculation

The results of all indicators of market concentration presented in Table 2 confirm the existence of a relatively stable oligopolistic market structure in the mobile telecommunications market in Serbia in the period 2009-2014. According to the market classification system of EU and US which is based on the value of HHI (see theoretical background of this paper), the mobile telecommunications market in Serbia is classified in the group of highly concentrated markets. It is particularly important to note that the degree of market concentration significantly exceeds the lower limit of the high concentration zone (EU: HHI above 0.20; US: HHI above 0.25). The value of HHI of mobile telecommunications market is in the range from 0.35 to 0.43. The highest degree of market concentration is recorded in 2009, and the lowest in 2014. Trend of constant decline of market concentration degree from 2009 to 2014 indicates a permanent increase of competition intensity in the mobile telecommunications market in Serbia.

The values of the Concentration ratio of two largest firms, the Entropy index, the Relative entropy index, the Hall-Tideman index, the Rosenbluth index, the Hannah-Kay index, the Comprehensive concentration index and the Gini coefficient presented in Table 2 point out to the same conclusion as well as in the case of HHI. Analysis of these values shows that the highest degree of market concentration is recorded in 2009, and the lowest in 2014, but also that there is a trend of constant decline of market concentration degree from 2009 to 2014.



a) b)

Fig. 3 The Lorenz curve of the mobile telecommunications market in Serbia: (a) 2009; (b) 2014
Source: Author's presentation

Comparison of the Lorenz curve position in 2009 and in 2014 (Figure 3) also indicates significant decrease of market concentration degree from 2009 to 2014, i.e. significant approaching of the Lorenz curve to the diagonal intersection in the coordinate system which represents perfect equality of market share distribution.

Table 3 shows the results of descriptive statistics for values of concentration indicators of the mobile telecommunications market in Serbia in the period 2009-2014.

Table 3 Results of descriptive statistics for values of concentration indicators of the mobile telecommunications market in Serbia; 2009-2014

Concentration indicator	N	Minimum	Maximum	Mean	Standard deviation	Coefficient of variation
Concentration ratio of two largest firms	6	0.77	0.91	0.8250	0.0524	0.0636
Herfindahl-Hirschman index	6	0.35	0.43	0.3750	0.0308	0.0822
Entropy index	6	0.92	1.07	1.0250	0.0575	0.0561
Relative entropy index	6	0.84	0.98	0.9333	0.0520	0.0557
Hall-Tideman index	6	0.38	0.46	0.4050	0.0308	0.0761
Rosenbluth index	6	0.26	0.30	0.2850	0.0152	0.0532
Hannah-Kay index ($\alpha = 2,5$)	6	0.21	0.29	0.2350	0.0308	0.1312
Comprehensive concentration index	6	0.72	0.78	0.7417	0.0240	0.0324
Gini coefficient	6	0.07	0.21	0.1167	0.0547	0.4684
Concentration ratio of two largest firms	6	0.77	0.91	0.8250	0.0524	0.0636

Source: Author's calculation (SPSS 22)

The values of all indicators of market concentration except the Gini coefficient do not deviate from the mean a lot (Table 2 and Table 3). In such circumstances standard deviation and coefficient of variation is low. That points out that there is low heterogeneity and variability of values of concentration indicators. However, coefficient of variation of the Gini coefficient

amounts 0.4684. Such value of coefficient of variation indicates moderate variability of the Gini coefficient values in the observed period.

Results of descriptive statistics presented in Table 3 confirm that there was a relatively stable oligopolistic market structure in the mobile telecommunications market in Serbia in the period 2009-2014, with a moderate change of the Gini coefficient value and small changes of values of all other concentration indicators.

In order to examine the degree of market concentration of mobile telecommunications market in Serbia in comparative perspective, Table 4 presents subscriber-based HHI value of the mobile telecommunications market and the number of MNOs in Serbia and EU member states in 2014.

Table 4 Subscriber-based HHI value of mobile telecommunications market and the number of MNOs in Serbia and EU member states; 2014

Range	Subscriber-based HHI value and the number of MNOs
HHI $\leq$ 0.3000	Poland 0.2562 (4); United Kingdom 0.2771 (4); Italy: 0.2854 (4)
0.3000 $\leq$ HHI > 0.3500	France: 0.3122 (4); Romania: 0.3155 (4); Spain: 0.3179 (4); Sweden: 0.3213 (4); Germany: 0.3362 (3); Finland: 0.3449 (3); Lithuania: 0.3459 (3); Denmark: 0.3475 (4); Czech R.: 0.3482 (3)
0.3500 $\leq$ HHI > 0.4000	Netherlands: 0.3500 (3); Belgium: 0.3507 (3); Hungary: 0.3539 (3); Slovakia: 0.3540 (3); Austria: 0.3542 (3); Estonia: 0.3567 (3); Bulgaria: 0.3572 (3); Serbia: 0.3579 (3); Ireland: 0.3657 (3); Latvia: 0.3682 (3); Portugal: 0.3822 (3); Greece: 0.3749 (3); Croatia: 0.3954 (3)
HHI $\geq$ 0.4000	Luxembourg: 0.4155 (4); Slovenia: 0.4438 (3)

Note: the number of MNOs for every country is shown in the brackets next to HHI value. Countries are listed according to HHI value: from the lowest to the highest. Malta and Cyprus are not included.

Source: Author's calculation based on data of Mariniello, Salemi, 2015, p. 4 for EU member states and on data of RATEL, 2015, p. 68 for Serbia

Mobile telecommunications market in Serbia is positioned in a group of EU markets whose value of HHI is in the range between 0.3500 and 0.4000 (Table 4). Serbia is ranked at 20th place, i.e. Serbian HHI (0.3579) is higher than the HHI of 19 EU member states and lower than the HHI of 7 EU member states. Also, the HHI value of Serbian market is higher than the average HHI value of EU member states (0.3473).

All countries from Table 4 have 3 or 4 MNOs. There are 9 countries with 4 operators and 18 countries with 3 operators. Serbia is in a group of countries with 3 operators. Obviously, countries with 4 operators such as Poland, United Kingdom, Italy and others have a lower HHI compared to the countries with 3 operators such as Serbia. However, that is not a strict rule in this analysis. For example, Luxembourg with 4 operators has much higher HHI value (0.4155) than Serbia (0.3579) and all other countries excluding Slovenia which has the highest HHI value (0.4438).

CONCLUSION

Empirical research of the mobile telecommunications market in Serbia in the period 2009-2014 proposes verification of all hypotheses. The analysis finds a high degree of concentration of supply in the market, but also the existence of oligopolistic market structure

which is characterized by a replacement between two MNOs on the leading position by revenue-based market share in the observed period (confirmed H1). The values of all indicators of market concentration show that the highest degree of market concentration is reached in 2009, and the lowest in 2014, but also that there is a trend of constant decline of market concentration degree from 2009 to 2014 (confirmed H2). The downward trend of market concentration indicates a permanent increase of competition intensity in the mobile telecommunications market in Serbia. Results of descriptive statistics substantiate a relatively stable oligopoly with a moderate change of the Gini coefficient value and small changes of values of all other indicators of market concentration. It is also obtained that the degree of market concentration of the mobile telecommunications market in Serbia expressed in subscriber-based HHI value is higher than the average degree of market concentration in EU member states in 2014 (confirmed H3). According to HHI value, Serbia is ranked at 20th place among the 26 EU countries, and it belongs to the group of 18 countries with 3 MNOs.

The conclusions of the paper can contribute to better understanding of the application of indicators of market concentration in qualitative analysis of competitive conditions in the market. The limitations of the study arise from the shortcomings of indicators of market concentration, i.e. its properties such as referring only to certain companies (N-firm concentration ratio) or measuring only equality in the total market share distribution (Gini coefficient and Lorenz curve). Because of these shortcomings, but also because of the purpose of indicators of market concentration, the findings of this research must be seen as a first step in the qualitative analysis of competitive conditions in the mobile telecommunications market in Serbia. It is necessary to apply an additional set of methods and models to reach the final conclusions on the competition intensity between market participants and their behaviour.

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MERENJE TRŽIŠNE KONCENTRACIJE NA TRŽIŠTU MOBILNIH TELEKOMUNIKACIJA U SRBIJI

Tržišta mobilnih telekomunikacija širom sveta karakteriše skorman broj ponuđača i veliki broj pretplatnika. Ipak, stepen tržišne koncentracije varira od zemlje do zemlje. Svrha ovog rada jeste utvrđivanje metodološkog okvira za merenje i analiziranje tržišne koncentracije na tržištu mobilnih telekomunikacija u Srbiji. Stepen tržišne koncentracije je izračunat korišćenjem godišnjih podataka za period 2009-2014. godina. Istraživanje se vrši primenom skupa statističko-matematičkih metoda za merenje tržišne koncentracije, komparativne analize i deskriptivne statistike. Analiza otkriva da je tržište mobilnih telekomunikacija u Srbiji visoko koncentrisano i da stepen koncentracije premašuje prosek zemalja članica Evropske unije. Rad je koristan državnim organima Srbije, kao što su Komisija za zaštitu konkurencije i Regulatorna agencija za elektronske komunikacije i poštansku delatnost, jer pruža značajne rezultate strukturnih karakteristika mobilnog telekomunikacionog tržišta u Srbiji.

Ključne reči: *tržišna koncentracija, tržište mobilnih telekomunikacija, Srbija*

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Review paper

THE MECHANISMS OF COMPETITION PROTECTION – SIGNIFICANCE OF APPLYING "THE RULE OF REASON"

UDC 346.545/.546

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Abstract. *In the court practice of 21th century the doctrine of the rule of reason is getting more significant despite all the criticism on its behalf in theory. The rule of reason is the essence of this doctrine and one of the crucial elements in the verdicts in the USA and Europe. This rule makes legal restrictive agreements which are not by the law, but improve competition and social wellbeing. In this way, the problems of the law application in Antitrust law in the USA and the Competition law in Europe are overcome. The rule recognizes the specifications of the specific agreement and enables the analyses of the agreement effects. The analyses of court decisions in the USA and Europe law given in this essay, help us understand the way of applying the rule of reason in practice and what are the advantages of this rule compared to per se rule.*

Key words: *rule of reason, per se rule, Competition law, Antitrust law, restrictive agreements.*

INTRODUCTION

In recent time in the theoretical circles of American and European legal system, a great debate has been led about justification of the rule of reason legislation and if the application of this law is justified for the enterprises to break "legally" the regulations, or if the application of this rule protects the interests of the individuals who can make the arrangements and agreements with limited regulations to gain the wellbeing of consumers. And while some believe that applying the rule of reason is justified, there are some who believe that the rule has many defects and it is its own greatest enemy.

The origin of the rule of reason is from the American Antitrust law with whole doctrine of rule of reason and it is used for the interpretation of the first clause of Sherman's law, one of the

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most important legal acts in the area of the USA competition. In the American law the rule of reason has a specific meaning. Giving the consent whether restrictive practice should be forbidden as unreasonable limitation of competition is analysed from one case to another (Which & Bailey, 2015, pp. 143-144). The Sherman's law was adopted after the great debate in American congress in 1890, which was started by farmers unsatisfied by increasing power of trusts in the USA. The main goal of Sherman's law is providing the consumers protection and wellbeing by protecting the market competition. Later, by applying of the Sherman's law into the justice system of the USA, introducing the rule of reason was needed, so the first act of this law could be applied on agreements and contracts which contain restrictive regulations, but contribute the wellbeing of consumers, in products quality or bigger choice of products, and decreasing the price of products by using the production innovations or the economies of size advantages.

So in these cases, the courts were not sure what kind of decision to bring. On the onehand, these agreements were opposite to Sherman's law; on the other, they were increasing the wellbeing of the consumers, which was the purpose of the Sherman's law. The courts saw an overcoming of these limitations by applying the rule of reason, which means, in a specific case, the estimation of positive and negative effect on the restrictive agreement on the competition (and through the competition to the wellbeing of consumers), and depending on the overcoming effects, to bring the decision of the legality of the agreement. For example, in the case of the monopoly, cession of the right to selective sale, or the cession of rights to exclusive production, it is not that simple to determine if such a activity, or agreement, has positive or negative effects on the market competition. In the Antitrust American law, the courts have an attitude, before the certain business is "marked "as illegal, it is necessary to examine if that kind of business is hostile to the competition, to be announced as illegal (Hovenkamp, 2016, pp. 454-458). This practice of American courts is contrary to previous practice which applied per se rule, without estimation of the effect on consumer's wellbeing. Per se rule implies restrictive agreement with limited clauses, which is opposite to Sherman's law, and itself is illegal and there is no need for further effects analyses of this agreement to consumers competition and wellbeing. This rule is even today applied in American and European court practice, but only to the agreements which represent the hardest competition rights breaking, like fix prices agreements, markets dividing agreements, trade limitation agreements and others. The advantages of per se rule are in the simplicity of court procedure because the prosecutor has an obligation to prove the agreement contains the regulations which are illegal by law. But, the disadvantage of this rule is that the agreements with restrictive regulations marked by lawmaker as per se illegal, are declined as lawless, although they contribute to the wellbeing of consumers, competition or trade development.

European Competition law has borrowed the rule of reason from the American law. In European Competition law, the rule of reason is used for interpretation of the regulations of 101 act in Treaty on the Functioning of the European Union. The application of this rule in European law faced great resistance because of the differences between American Antitrust law and European Competition law. In spite of the boycott, the application of this rule was accepted by European courts (not officially) in the mid 80s of XX century, and the rule is very often used even today for the analyzing of the positive and negative effects of restrictive competition agreements.

The rule of reason can be observed as one of the ways of improving the consumer's wellbeing on the market, but also as an instrument for liberty protection of the individual to make contracts and agreements which inspire society progress. Allowance of the restrictive agreements under the rule of reason is interpretive from one case to another and it is a matter of specific analysis of its positive and negative effects. Very often, the makers of agreement are not familiar with the fact whether the agreement is legal from the aspect of the rule of reason and for that purpose, analysing the court decisions in concrete cases is needed. This analysis provides better understanding of this rule and the ways of its application in courts practice.

Besides introduction, conclusion and references, this work also contains two more parts. In the first part, rule of reason is presented from theoretical point of view in American and European law system, while in the other part the application of the rule of reason is presented as held in American and European courts.

1. THE RULE OF REASON IN AMERICAN LAW SYSTEM AND EU LAW SYSTEM

1.1. The rule of reason in the Antitrust law

In the justice system of the USA, the competition is regulated by Sherman's law as the most important act in this area. During the application of this law in practice, it became clear that it is not possible to determine in certain case that the competition has been violated, and is it necessary to recognize the other circumstances of the case when the final decision is made. This is the reason for developing the doctrine known in American theory as the doctrine of common sense. This doctrine implies, while estimating the violation of competition, the necessity of comparison of pro competitive and con competitive effect of the specific behavior, meaning whether it makes more damage or benefits (Vukadinovic, 2008, pp. 334-368). In American Antritrust law, the difference is made according to the fact whether the regulation of agreement opposite to Sherman's act is the main goal of the agreement or not. If it is not the main goal of the agreement, but it is necessary for goal making of the agreement, and at the same time there are more positive effects on the competition and society, under the wing of the reason doctrine, the court finds that agreement legal. The determination of the goal and intent of the agreement can sometimes be mixed up. For example, both sides can declare that they had a competitive goal in the agreement, based on the real or possible effects, but the court may find that the main goal is non-competitive. In some cases, like Standard Oil, the court had no doubts in applying the first act of the Sherman's law. However, in European law of competition, there was Pronuptia case, when the federal court in Germany, Bundesgerichtshof addressed the European court of justice for help in applying the act 85(1) of Treaty Establishing the European Community.

The regulations for the first and the second act of the Sherman's law determine the behavior which is found inappropriate and bad for the trade, and at the same time, for the wellbeing of the consumer, which is the main goal of this law.

The first act of the Sherman's law says: Every contract, combination in the form of trust or otherwise, or conspiracy, in restraint of trade or commerce among the several States, or with foreign nations, is declared to be illegal (Sherman Act,15 U.S.C. 1-11.). Actually, the first act of Sherman's law which prohibits unreasonable trade limitation, gives space for applying the doctrine of rule of reason.

The act two determines that every person who shall monopolize, or attempt to monopolize, or combine or conspire with any other person or persons, to monopolize any part of the trade or commerce among the several States, or with foreign nations, shall be deemed guilty of a felony, and, on conviction thereof, shall be punished by fine not exceeding $10,000,000 if a corporation, or, if any other person, $350,000, or by imprisonment not exceeding three years, or by both said punishments, in the discretion of the court (Sherman Act,15 U.S.C. 1-11.). For violation of the first and the second act of the Sherman's law, there are set fines and jail sentences determined by the Court.

The final goal of the Sherman law is the consumer's protection. The doctrine of the rule of reason is narrowly connected to the consumers' protection because during the applying the rule of reason on the certain case, "balances" whether the restrictions present "reasonable" or "unreasonable" trade limitations having in mind the effects of concrete agreement on the consumers. The application of the rule of reason in Antitrust law of America is set in three steps. First of all, the prosecutor has a burden of proving that the certain agreement contains restrictions which are "unreasonably" limiting the trade and it makes it opposite to the Sherman's law. After the prosecutor's declaration, the burden is placed upon the accused, who stands his defense with the arguments which prove that the certain agreement limits the trade "reasonably". If the accused stands up with strong evidence to support his statement, the burden of proving is transferred to the prosecutor who has to prove that there is alternative that limits the trade less, and which enables the final goal of the agreement. When the prosecutor fails to prove the more reasonable alternative of the agreement, the "balancing point" is reached. In that case, the balancing test is applied when the court estimates pro-competitive and con-competitive agreements' effects on trade. If pro-competitive effects overcome, the court finds the agreement legal, if con-competitive effects overcome, the court finds that the agreement "unreasonably" limits the trade and finds it illegal. In the practice of the American justice system, the balance point is reached very seldom and the balance test is applied very rarely. From 300 cases analysed in the courts in America in the last 15 years, only in 5% of the cases the balance test was used (Fundakowski, 2013, p.1).

There is a question if the rule of reason breaks the Antitrust law? In the last years, The Supreme Court of America made accusations of Antitrust law and marked it as "endlessly slow" and pointed out that because of its defects, court costs are increasing. The Congress made Antitrust Modernization Commission in 2002 to examine if the modernization of Antitrust law was necessary. This commission reported claims that it was not necessary to revise against monopoly laws and that the rule of reason analysis can successfully valuate pro-competitive effects of questionable behavior (Antitrust Modernization Commission, 2007, pp. 31-47). In the report of the Commission, the main goal is the wellbeing of the consumers.

1.2. The rule of reason in EU Competition law

The rule of reason is borrowed from the American Antitrust law and it is used in applying the act 101 of the Treaty on the Functioning of the European Union. During the 80s of 20th century, there was a great pressure on the European Commission to adopt this rule because many of participants on the market saw this rule as a getaway from the act 81 posture 1(today's act 101) as a way of avoiding due notification of Commission (Monti,

2007, pp. 29-31). EU lawyers warned if the Commission decides to use the rule of reason during the evaluation of breaking the competition right by agreements, the signatories of the agreement would be spared to declare the agreement to the Commission, they would do the economical analyses by themselves if the agreement has restrictive effects on the competition. The arguments for adopting the rule of reason in EU law were always weak (Monty, 2007. pp. 29-31).

Some theorists find that it is not possible to apply the rule of reason on interpretation of the act 101 because of the huge differences between the Sherman's law and the act 101 of the Treaty on the Functioning of the European Union (Weatherill&Beaumont, 1993 and Steiner, 1992). The EU law is materially different from the American law in many aspects and for that reason terminology should not be "imported" from the American legislation (Which&Surfin, 1987, pp. 1-37). In the USA, the national courts make the judgment if the agreement has anti-competitive effect or not, while in EU law the European commission makes the evaluation of anti-competitive effect of the agreement. Further on, by posture 3 of act 101 of the Treaty on the Functioning of the European Union, the exceptions are predicted. That problem can be solved by formal amendment upon the contract with withdrawal of the posture 3 Act 81 (act 101 now) or adding posture 3 to posture1 act 81 (Buttigieg, 2009, pp. 90-91).

The important difference between those two justice systems is that Antitrust law does not have de minimus rule. In the European Competition law, agreements with fixing price represent illegal activities and they are prohibited per se. In Antitrust law of the USA, suggestion of the prices does not involve per se prohibition (European Commission, 1997, pp.61-63).

1.3. Per se illegal agreements

If the restricted agreement contains the regulations marked by American Antitrust law as the hardest competition valuations, there is no need for inspecting those effects in such an agreement to competition or if the rule of reason can be applied. Such an agreement in the American Antitrust law is found to be per se illegal.

Every agreement that eliminates competition by fixing the prices is per se illegal, but the fact is that this kind of agreement is usually signed by more than one individual which coordinates their activities (silently maybe) and it eliminates the real or potential competition (Bork, 1966, pp. 377-415). The agreement which limits the production in Antitrust law represent the violation of the competition, but the difference is made between limiting the production (output) and restraining from the trade. Restraining from the trade in this legal system is not per se illegal activity. The horizontal agreements on price fixing, vertical agreements on territory or consumers division, the boycott agreements and the certain bonding arrangements also present in American justice system per se illegal activities (Starling, 1999). The definition of the activities which by themselves present illegal activities was one of the most important issues of Antitrust law of American justice system.

In the case of **Addyston Pipe and Steel Co.v. United States** William Howard Taft, the Chief Judge of Court of Appeals at that time, later 27th president of USA, tried to answer whether the fixing of the prices is reasonable limitation of the trade or not. In the mentioned case the pipes manufacturers united by an agreement so they could artificially rise the price of the pipes on the market. They defended on court that their price is reasonable and there is no unreasonable trade limitation. Taff had an opinion that the agreement whose goal is artificial price making breaks the Sherman's act. He pointed out that it did not matter if trust affected the

prices or they were formed in a fair way. What is important is that the main goal of the agreement artificially affects the market prices (Supreme Justia Court, 1899). In this case the rule per se is applied by which all agreements with the price fixing are illegal by themselves. The price fixing is the biggest violation of competition in the USA and the economy analyses are not necessary in this case because the agreement with the goal of prices fixing is per se illegal (Armentano, 2007, pp. 81-99). Bork (1993) thinks that Taft's opinion in this case is one of the greatest, if not the greatest antitrust opinion in the history of law (Bork, 1993, pp. 26-27).

There are some harsh critics on per se approach in court practice. The applying of this rule is especially criticized in the big mergers and in horizontal agreements on prices, but that criticism should not be understood like unconditional support to the rule of reason, because this rule approach itself is fatally flawed (Armentano, 2007, pp. 81-99).

In the case of **United States v. Realty Multy-List** the court has concluded that the rule per se is the main trump of the Antitrust law. When the prosecutor uses it properly all that is left is to pick up the gainings (Supreme Justia Court, 1896).

2. THE RULE OF REASON IN COURT PRACTICE

2.1. The use of the rule of reason in the court practice in USA

Very famous trust in the USA in the time of bringing the Sherman's law was the trust **Standard Oil,** under whose control over 40 corporations were functioning. Standard Oil Co was founded in 1870 and it dealt with production, processing and transport of oil. In 1872 this trust had a monopoly position on the oil market, large number of refineries of similar abilities and capital efficiency worked in the framework of South Improvement Company. By merging of companies, Standard Oil managed to overcome the depression which struck American economy while the other competitors on the oil market were heavily hit by situation in economy. During 1874 the capital of Standard Oil was increased to 3500 000$ (Montague, 2001, pp. 41-53).

Because of the doubt of unreasonable limited trade by Standard Oil, the procedure was started and on May 15th 1911 the Supreme Court made a decision that Standard Oil violates the antimonopoly law of the USA and in that case appled measure "the killing of power" and prohibited further actions that limited trade. In its decision, The Court said that the Sherman's act should be interpreted in "the light of reason" and with this act are forbidden all contracts and trusts that "unreasonably" or "exaggeratingly" limit international trade (Supreme Justia Court, 1911). The Court pointed out that doctrine that prohibited all the contracts and trusts that limit the trade is replaced by doctrine of common sense in "interest of individual freedom" which has the right to conclude the deal which is legal only if limitations in it limit the trade in "reasonable" way (Supreme Justia Court, 1911). In this way, The Court has shown its commitment to applying the rule of reason in solving the cases, and this case was very important in the history of Antitrust law of the USA.

In the court practice of the USA, there is the case known as **GTE Sylvania** from 1977, when the Supreme Court made a decision that unpriced limitations which were applied by this company may be interpreted in the frame of the doctrine of rule of reason and cannot present the violation of the first article of the Sherman's act, because those limitations made possible for the manufacturer to achieve certain efficiency in the distribution of his products and obtain the stable supplying of the consumers. Actually,

GTE Sylvania Company is TV manufacturer which sells its products through the distribution network Home Entertainment Products Division and it is the 8th largest manufacturer in the USA. After sale has fallen for 1-2% this company was determined to question its marketing strategy. As a result, in 1962 it adopted a new plan of franchise endorsement to enlarge the competition among franchisees. After applying the new plan of franchise, the sale of the company increased about 5% by 1965. At some point **Sylvania** gave the franchise to the new franchisee to sell on the location only a mile away from the existing location of one of its own franchisee Continental T.V. Inc. which sued for the same reason. The District Court found the giving of the franchise to another franchisee located next to Continental a violation of the first act of the Sherman's law which caused loses to Continental. The Supreme Court made a different verdict from the District Court. The Supreme Court thought it should be judged by the rule of reason, not to apply per se rule in this case. The limitation of the location by GTE Sylvania, Supreme Court evaluated as the behavior which can be interpreted among the common sense doctrine which makes it legal (Supreme Justia Court, 1977). In this case the Supreme Court gave an advantage to the rule of reason instead of per se rule because the agreement had positive effects on the competition and consumers.

In the case USA against **First Nat'l Bank of Lexington** (1964) there was a question if the division of the market presents per se illegal activity towards the Sherman's law. In this case, the USA thinks those consolidations of the first and the fourth by size (of the six) commercial banks in the USA represents the breaking of the first and the second act of the Sherman's law. Although the consolidation is approved by Comptroller of the Currency, The Federal Deposit Insurance Corporation and the Board of Governors of the Federal Reserve System found that this consolidation is not in terms with the Sherman's act. They claimed that uniting of two biggest competitors on the market of commercial banks limits the competition on that market. The Comptroller of the Currency got the report from the Federal Deposit Insurance Corporation and the Board of Governors which points out that such a consolidation would have negative effects on competition, but the consolidation is still approved. The District Court approved the consolidation based on proposal of The Comptroller of the Currency, but left the space to examine if that consolidation is against the Sherman's law. By the verdict of the Supreme Court the consolidation was an illegal activity and represents the violation of the competition according to the Sherman's law (Supreme Justia Court, 1964). The Supreme Court pointed out that the consolidation did not have the intention to ruin the competition, but it would lead to that. So, here we have a case where the goal of the restrictive agreement is not anti-competition, but still The Supreme Court decided to ban the agreement because of its bad influence on market.

2.2. Applying of the rule of reason in the court practice in EU

The rule of reason in the "European style" is "born" in famous Cassis de Dijon case (Schrauwen, 2005, pp. 5-11). The legislation of Germany prohibited the import of fruit liqueur which contains under 25% of alcohol. The court made a decision that such regulation is "unreasonable" (EUR-Lex, 1979). This case proves that the rule of reason adopted in EU law is a legitimate approach. First of all, the Court of Germany used this rule and concluded that the regulation which bans the import is "unreasonable". The limitation of quantity of import is against the article 30 in the Treaty establishing the European Economic Community, where is said that limitation of import is against the law

in the member states, and other measurements with such an effect (Consolidated versions of the Treaty on European Union and the Treaty establishing the European Community, 2002, pp. 1-184) .

In the present court practice of the EU three kinds of agreements with the rule of reason are:

1. The contracts of exclusive right of selling on the certain market;
2. The contracts of franchise;
3. The selective sale agreements and distribution (Dashwood et all. 2011, p.729).

The well known is **Pronuptia** case (1986), The Court stands for the contracts of franchisees which refers to the goods distribution and allows to the giver of franchise to gain the financial benefit and increase its reputational power in business without breaking the rule of competition, which is not against the act 101 (1) per se (EUR-Lex, 1986). In Pronuptia case, the giver of the franchise Pronuptia de Paris GmbH concluded a deal of franchising with the company Pronuptia de Paris Irmgard Schillgallis of selling the wedding dresses on the territory of Hamburg, Oldenburg and Hanover. The litigation between franchisor and franchisees was created because the franchisee Pronuptia de Paris Irmgard Schillgallis did not pay to franchisor Pronuptia de Paris GmbH royalty fees for the time between 1978 and 1980. When the case ended up in court, franchisee calls that the contract with franchisor was not valid, because it was against the act 85(1) The Treaty Establishing the European Community. The contract of founding the European economic community. Also, the franchisee pointed out that in the Commission Regulation number 67/67 the contract about the franchising was not named in the group of exceptions block, and because of that cannot be excused from the prohibitions predicted by the article 85(1).

The federal Court in Germany Bundesgerichtshof sent the case to the European Court of Justice, according to act 177 to make the preliminary decision. The European Court of Justice made a decision that provisions of Commission Regulations number 67/67 cannot be applied to franchising agreement because of its differences from the contract of exclusive sale which is regulated by this Regulation. Also it was determined that the contract is not against the article 85(1) because the regulations it contains are necessary to achieve the goal of the agreement which is not anti competitive (Hildebrand, 2005, pp. 42-46). The court has determined if the franchising agreement contains the restrictions about market division, this agreement is the violation of the competition according to the article 101(1). The violation of the competition will be concerted practice between giver and the receiver of the franchise about the prices, while the recommendations of the prices by the giver of the franchise do not present the violation of the competition per se. In this case, The European Court makes difference between the terms of fixing the prices and suggesting the prices by the franchisor and concludes that the strong fixing of the prices and adjustment of the obligation to the franchisee to sell on the certain price is illegal per se, while the adjustment of the prices, as giving the recommendations about prices that franchisee might, but does not have to hold, is not illegal.

This case is very important in the EU law because the Commission, relying on the decision of the Court, after this case, brought the Regulation number 4087/88 on the application of Article 85 (3) of the Treaty to categories of franchise agreements upon the franchise contracts. The Article 1 of this Regulation determines that the article 85(1) does not apply to franchise contracts (Commission Regulation ECC, 1988, pp. 46-52).

The Court of Justice of the EU in the case vs. **European Night Services** had a stand that the type of violation is crucial during the application the rule of reason (Sauter, 2016, pp.98-101). If the limitations of the agreement belong to the group of limitations to the actions, they can be solved by the article 101 paragraph 1: if the limitations are by the object, the solution is by the article 101 paragraph 3 of The Treaty on the Functioning of the European Union (EUR-Lex, 1998).

In the European law, a well-known case is **Societe Technique Miniere v. Maschinenbau Ulm GmbH** (1966) where the Court of justice concluded that there is an exclusive right of distribution and the contract is not opposite to Treaty establishing the European Economic Community (EUR-Lex, 1966). The French Court asked for the European Court of justice's opinion in this case, because it wasn't sure that the cession of the rights to exclusive sale automatically presents the violation of article 85 paragraph 1 Treaty establishing the European Economic Community.

Then the European Court started the analysis of the effects of agreement on the trade between the member states to check if there was agreement prevention, restriction or distortion of competition among member states. The agreement had certain anti-competitive effects on trade among the member states, but the parties of agreement said that the limitations are necessary for entering the new market. In this case, The European Court set out the new rule in applying the article 85(1) which is, the agreements with the clause of cession of the exclusive right of sale on the certain market are not per se opposite to Treaty establishing the European Economic Community. To determine if these agreements had negative effects on competition on the certain market, the conditions of agreements must be examined, as well as the effects of that agreement. Especially analysing the nature and quantity of the products in the agreement, as a position of the giver and receiver of the exclusive right of sale of these products on the certain territory.

CONCLUSION

The general conclusion is that the rule of reason is introduced into the court practice for two reasons. The first is imprecision of the law that regulates the competition in American and European justice system. In that way, the space is left for the participants to find the ways to bypass the law. The second reason is specificity and difference of the restrictive agreements which cannot be placed in the same form, so the analyses of each effect of agreements are needed.

And while the per se rule generalizes the restrictive agreements, by finding the certain restrictive regulations illegal without seeing trough the effects of the agreement on the competition, the rule of reason eases the rigidity of the law and regulations by accepting the specifications of the restrictive agreements and their effects on the consumers' wellbeing. It seems that the rule of reason is more successful in obtaining the final goal of legally regulated competition - the protection of the consumers because it allows restrictive agreements which positively affect the wellbeing of consumers, although they are not by the law because of their restrictive regulations. Still, the rule of reason keeps its strictness in law applying, because the agreements whose main goal is anti competitive, despite their positive effects, cannot be legal.

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MEHANIZMI ZAŠTITE KONKURENCIJE – ZNAČAJ PRIMENE „PRAVILA RAZUMA“

U sudskoj praksi XXI veka doktrina vladavine razuma sve više dobija na značaju i pored mnogih kritika na njen račun u teoriji. Pravilo razuma čini suštinu ove doktrine i jedan je od nezaobilaznih elemenata mnogih sudskih odluka kako u Americi tako i u Evropi. Ovo pravilo omogućuje legalnost restriktivnih sporazuma koji nisu u skladu sa zakonom a doprinose poboljšanju konkurencije i društvenog blagostanja. Time se prevazilaze problemi koji nastaju prilikom primene zakona u antitrusnom pravu u Americi i pravu konkurencije u Evropi. Pravilo uvažava specifičnosti konkretnog sporazuma i omogućava analizu efekata cilja sporazuma. Analiza sudskih odluka u američkom i evropskom zakonodavstvu predstavljena ovim radom pomaže da se shvati na koji način se pravilo razuma primenjuje u praksi i koje su prednosti ovog pravila u odnosu na pravilo per se.

Ključne reči: *pravilo razuma, pravilo per se, pravo konkurencije, antitrusno pravo, restriktivni sporazumi.*

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Review paper

VALUE STREAM PERFORMANCE MEASUREMENT AND THE LEAN BUSINESS CONCEPT

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Abstract. *Lean business concept is characterized by providing value required by customers, prompt delivery of products, eliminating all forms of waste from production process as well as from all business processes in the company, etc. In order to achieve and maintain competitive advantage, it is appropriate to carefully consider and apply the basic principles of lean business concept and establish a value stream. Value stream is a basis for creating value for the customers, on the one hand, and for the enterprise, on the other hand. In that context, it is necessary to choose a set of performance measures for assessment of the value stream success, which is named Box Score.*

Key words: *lean business concept, value stream, Box Score, performance measurement*

INTRODUCTION

In a business environment which requires speedy response to customer demands, a high level of product quality, a shortened wait time, and other similar aspects, existing business concepts show their inadequacy. In these contexts, contemporary enterprises which aim to deliver the demanded value to the customers while striving for excellence apply, among others, the lean business concept. The first emergence of this concept was in the production process, in order to extend to all other parts of enterprise and relationship with suppliers, after achieving many improvements. Conceptual basis for management and performance measurement with application of lean business concept is a value stream. Value stream includes all activities from the suppliers to the customers and is not only connected to the production process.

Performance measurement in the lean business concept is carried out at the value stream level. There are not any precisely defined set of measures which should be applied to the value steam level, but with the purpose of following its success and its compliance

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with the objective and the strategy of enterprise, the application of Box Score is suggested. Box Score is a three-dimensional display of key performance measures of the value stream, which includes operational performance measures, performance measures of capacity and financial performance measures as well as their mutual relations.

In that context, the first part of the paper is directed at lean business concept and its basic principles that represent the key point for the successful business. Establishing of the values stream as a conceptual basis of new business environment is shown in the second part of the paper. At the end, the paper concerns the three-dimensional system performance measurement Box Score. Through monitoring of operational performance measures, and measures of capacity and financial performance, it provides the insight to a way and effectiveness of available resources of the enterprise and to the overall efficiency of enterprise management.

1. LEAN BUSINESS CONCEPT

The roots of the lean business concept began after World War II, only to spread worldwide during the mid-1950s after the publication of the book, The Machine That Changed the World. The authors of the book presented a model that was led by Toyota company. This model helped Japan's industry experience economic and social rebirth and take a leading position in the production of automobiles. This model is named Lean and it implies more results with less use of human resources, equipment, time, and space that are needed for the production of products that meet the needs of demanding consumers.

Lean business concept raises the awareness of the need to create and increase value through a determination of factors that influence the value and control of performed activities and provides an undisturbed and continuous flow of process which at the same time achieves a given efficiency. In this manner, a higher value is achieved for the enterprise through increasing of profit of the value stream, reduction of inventories, and waste of resources. Also it brings greater value to the customers through increasing of the quality and functionality of the product, reduction of time of delivery and waiting for the product.

In the initial stages of development, lean business concept focused only on operation improvement. At that level, the tendency was with the implementation of certain lean techniques and tools to improve efficiency and reduce cost in the production process. The goal was to eliminate resource loss, deliver demanded value, achieve defined performance, ensure better understanding of process, and facilitate the improvement of business processes and performance (Salehi & Yaghtin, 2015). During the nineteen-nineties, the focus of lean business concept was extend from operating to strategic level. At the strategic level the tendency was towards understanding of value which is provided to the customers in terms of product quality, cost, speed of delivery, etc.

Lean business concept was first implemented in the production process. Its implementation enables a lot of positive improvement, and after that it is extended to all business processes and all activities. Extended application of lean business concept led to forming of a lean enterprise. Lean enterprise consists of a group of individuals which within legal norms perform their task or carry out functions in such a way that creates a synchronized company (Womack & Jones,1994).

Basic principles of lean business concept are (Hilker & Carsten, 2011):

- Specify value
- The Value Stream
- Flow
- Pull system
- Perfection

The value that is created within the enterprise is defined by the ultimate consumers. The ultimate customer defines the characteristics of the product that will meet their needs in the best way, and a manager of enterprise accepts that value as an objective which should be produced in order to meet the consumer demands and increase their loyalty. Value defined in such a way should be communicated to all the employees involved in the creation and delivery of it.

The second principle refers to the establishing of the value stream. Value stream includes all activities that are necessary for creating the value for the customers. In the value stream are joined all the activities that are necessary to be performed from the moment of creating of idea of the product, through its production to the moment of delivery to the ultimate final customers. As the value stream represents the conceptual basis for managing in the new business environment, it will be dedicated a special attention in the second part of the paper.

Once the value is identified and the value stream is established, it is necessary to put the attention on the real object, i.e. the specific design, order and the product itself. In that context, the efforts of the management and executives would be on eliminating all the obstacles to the continuous flow of product products. At the end, management should inspect once again the overall flow of product in order to avoid duplication of the activities and eliminate unnecessary activities in the business.

Introduction of pull system is the fourth principle of lean business concept which is implemented in a contemporary enterprise. As the purpose of lean enterprise is the reduction of waste and the elimination of non-value added activities, introducing pull system is of great importance for that process. Pull system is focused on the demands of customers and, in that context, it is tent to providing of the conditions to start with production of product at the time when the manager gains a signal from the market. The customers are those who determine when to begin with the production of required value.

With the application of lean business concept the transformation process into lean enterprise and the process of the continuous improvement does not end. When one enterprise gains the attention of the customers, it wants to keep it by anticipating future needs of the customers and creating products which will meet their needs, and in that way build an image of being sensitive to customers and create an image on the market as a quicker producer of products better than those of their competitor (Novićević et al., 2013).

2. VALUE STREAM – CONCEPTUAL BASIS OF MANAGING AND MEASURING OF PERFORMANCE

Value stream includes all the activities and tasks that are carried out in the enterprise with a purpose of creating the value for the customers (Baggaley & Maskell, 2003a). It is both the spot where the value is created for the customers and at the same time where waste and non- value activities occur.

Establishing the value streams implies previously identifying the resources and tasks that are performed in the enterprise. In one value stream, there are products with similar characteristics that pass through similar production process, machines and use the same resources. Production process is one part of the value stream, and it is necessary to distinguish between these two terms. If the value stream is identified with the production process, the managers will not be able to look at the overall flow of the product thought the enterprise and will not get a clear picture of the flow of the material, information and cash through the enterprise. Lack of the clear picture of the product flow will lead to the inability to detect where the resources are consumed unreasonably and the waste appears, and therefore it would be impossible to make an improvement of business.

The best way to identify all resources, works and tasks that are carried on in the enterprise is the physical inspection of the process. In that manner one can get an accurate picture of current functioning of the business process. The majority of the employees in the enterprise know only the activities and the tasks that they perform, so the development of the diagram of the entire process will be the key for establishing the overall process of the business. In addition to showing all the details of the process, the purpose of the all-encompassing diagram is to provide understanding of material flow, identity of waiting and delay, the level of inventory and the other relevant information (Maskell et al., 2012). For the enterprises that produce a small number of similar products, it is relatively easy to establish value stream. In some enterprises it is possible to establish a main value stream, and beside it, there exist some other products that cannot be included in the main value stream. In order to be an efficient enterprise and to successfully perform its activities it is desirable for there to exist three or four value streams. The most frequent value streams identified in the enterprise may be: the realization of orders, gaining new customers, new product development, process control, etc.

In addition to the number of value streams in the enterprises, their size should be defined in terms of the number of employees that are participating in it, and the number of machines that are used. The desired outcome is that all the employees would be connected to some value stream. It is suggested that in one value stream participate between 25 and 150 people. This is due to the fact that too many employees in one value stream may move the focus of value stream from the improvement of activities, and too few people would not be enough for effectively carrying out of the activities. In order to realistically assign a cost to each value stream it is desirable for each value stream to have its own machine that is used only in it. This is according to the need of overcoming the cost allocation and finding adequate allocation keys. However, some enterprises have used large and complex machines that are shared among more than one value stream. From a long-term perspective, managers of that enterprise should find a way to avoid cost allocation, because that may have multiple benefits for the operation of the enterprises.

Value stream manager controls the value stream. Value stream manager should have certain knowledge and skills, and should be attached to the enterprise and understand and establish a relationship between the objective of the value stream and strategic objective of the enterprise (Tapping et al., 2002). Furthermore, in order to improve the business process and achieve perfect quality it is preferred that value stream manager comprehends the essence of lean business concept and for that knowledge to be relayed to all employees. In addition to the value steam manager, and for the purpose of monitoring accomplished improvement, in each value stream there exist the continuous improvement team. The purpose of the continuous improvement team is the analysis of the performance of the

specific values stream every week and the recommendation of the project of the performance improvement.

The tool of the lean business concept which is very helpful for understanding the current processes in the enterprise and the establishing of the value stream is the value stream map. Mapping the value stream involves monitoring the occurrence of products from suppliers to consumers. This process begins with a careful analysis and presentation of the current state of the business process. The result of mapping the value stream in the graph that visually shows the entire process of creating value in the enterprise with the documentation of time, waste and cost. Value stream mapping helps managers of the enterprises to consider and better understand the functioning of the entire business process. Value stream map is important for the following reasons (Rother & Shook, 2003; Womack et al., 2003):

- Focus is on the customer,
- Allows timely presentation of the activities flow,
- Establishes a common language with a high level of standardization of symbols,
- Allows analysis of current values,
- The flow of information and their impact on the launch of other activities, and
- Shows where certain activities add value, and where in the course are value losses.

Creation of the value stream in the enterprise is important for several reasons. Establishing of the value stream allows enterprise to respond to the demand of the customer through the delivering of asked value and, thus, realize defined goals and achieve appropriate business result. Also, the non-value activities are eliminated, defects are reduced, waste is eliminated, etc. The correctly established value stream will expose any potential delays and bottlenecks that may occur in the process of creating the value. Based on that information, the managers may make the plan of correction activities for eliminating possible interruption in a timely manner. The correctly established value stream in the best way points to the flow of material, information, and cash throughout the enterprise.

3. Three- Dimensional Approach of Performance Measurement

Lean business concept is a kind of business philosophy that firstly had to be accepted from the top managers who will spread and implement it to the employees on the lower level of the organization. The implementation process of lean concept starts with a research and analysis of the existing way of working and based on that choosing of certain lean technique that may be applied in the specific business practice. In order to reach and maintain long term results, it is necessary that the lean business concept would be discreetly connected to the strategy of the enterprise, organization culture and the system of performance measurement. Multiple useful tool for the monitoring of the implementation of strategy and managing of the enterprise which allows following the events through all levels and in all process and activities is the Box Score. Box Score includes financial information about business, nonfinancial information about operation measure and information about utilization of the capacity (DeBusk & DeBusk, 2013). Performance measures that are entered in the Box Score are carefully selected and connected to the strategy of the enterprise in order to provide effective monitoring and maintaining the process of implementing of define business strategy. In that context, the Box Score represents an integrated system of performance measure of the value stream, and, as such, is an important source of the information for the employees in the enterprise (Maskell et al., 2012):

- Value stream managers use it to plan and evaluate the lean improvements,
- Members of the value stream use it for designing improvement programs that will have the biggest impact on the financial and operation result,
- Plant and division mangers use it to understand value stream improvement plans and to evaluate of the performance
- Other executive use it as a basis for simulating the potential impacts of the market trends and capital investment plans.

Through the monitoring of the performance measure that are contained in the Box Score, enterprises managers may obtain important information about the way of performing activities and operations in the value stream, the way of utilization of the recourses and the financial consequences. Monitoring is provided due to the fact that Box Score, in addition to the information about current state, contains a required short term and long term future state as well as the potential changes.

Box Score is a three-dimensional display of the value stream performance measure. Operation performance is found in the first dimension, performance of the capacity utilization is found in the second dimension, and in the third dimension the financial performance is found. Box Score of an enterprise is shown in the table 1.

Table 1 Box Score Report

Value stream performance measurement		Current state	Short term future state	Change	Long term future state
Operational performance measure	Dock-to-dock time	20.5 days	4.5 days	16 days	4.5 days
	First time through	48% FTT	96% FTT	48%	96% FTT
	On time shipment	90%	99%	9%	9%
	Sales per Person	24,389	25,346	957	35,906
	Average cost per unit	328.88	308.61	(20.27)	296.88
Capacity utilisation	Productive capacity	19%	16%	-3%	15%
	Nonproductive capacity	59%	31%	-28%	42%
	Available capacity	22%	53%	31%	43%
Financial performance measure	Inventory value	58,502	13,997	44,505	13,997
	Value stream revenue	1,292,640	1,292,640	0	1,292,640
	Material cost	512,160	477,160	(35,000)	477,160
	Conversation cost	189,868	181,416	(8,450)	153,373
	Value stream profit	590,612	634,064	43,450	662,107

(Adapted by: Katko, S. N. (2014) *The Lean CFO, Architect of the Lean Management System*. NY: CRC Press. p. 4.)

The positioning of capacity utilization performance measures between operational and financial performance measures in the Box Score is not accidental. This dimension of the Box Score is used for assessing the use of resources within the value stream and connecting the operational and financial performance measures. Namely, when the operational performance measures are achieved through the appropriate lean improvements, capacity utilization performance measures also improve. Capacity improvements are shown through the reduction of nonproductive capacity and through increasing the available capacity. In this way, value stream managers will be able to act proactively and to plan the use of available capacity to improve operations and increase profitability of the value stream.

The first dimension of the Box Score is the operational performance measurement. Operational performance measurement at the value stream level shows how successful value streams achieve their goals. Some of the goals of the value stream may be: increasing of the output with existing resources, accelerating the flow, reducing the inventory level, achieving perfect quality, increasing productivity etc. There is not a defining set of the operational performance measurement for all the enterprises; the already selected set of the measures directly depends on the characteristics of the business of the enterprises. The most frequent performance measurement in the practice can be (Stenzel, 2007):

- *Dock-to-dock time*,
- *First time through*,
- *On time shipment*,
- *Sales per Person and*
- *Average cost per unit*.

The first operational performance measure is ***Dock-to-dock time.*** Dock-to-dock time measures the speed of conversion of raw material into finished product within the value stream, specifically, the time of the flow of material through the value stream. This measure presents the time it takes form the moment in which material entered the warehouse, the time it takes when the material is in the production process and the time when the material is on the inventory of work in progress and finished products (Novićević et al., 2013). It is desirable for the Dock-to-dock time to be as short as possible because that is the way in which the speed of material processing will be increased, the inventory level within the value stream will decrease, which in turn will cause the increasing of the value stream profitability. The calculation of this measure first implies calculation of the total quantity of material both in the inventory of work in progress and finished products, reported through the number of units that may be produced from that material. After that is calculated the average speed of delivery of finished product per hour within one week, which is calculated by dividing the number of units shipped within a week and the hours in the week. By dividing the total quantity of the material contained in all types of the inventory with an average speed of delivery finished product, the *Dock-to-dock time* is gained.

Next performance measure within the Box Score is ***First time through (FTT*)**. First time through shows the percentage of the product manufactured in the value stream that do not need any rework, repair, i.e. the percentage of the product that is produced immediately according to the required quality. This shows the number of the correct products in the value stream. This measure is particularly used by teams working on the continuous improvement time, because it directly exposes any problems in the business process, the cause of the existing problems and the way to overcome and resolve those problems. The amount of the *First time through* is obtained by multiplying all FTT indexes of the production cells within the value stream. Individual FTT indexes are obtained by dividing the remainder of the total number of products with the number of produced products with no defects with the total number of produced products (Gunduz, 2015).

The third performance measure is ***On time shipment*** (McVay et al., 2013). This measure indicates the percentage of orders delivered on time to the consumer and the level of control established in the value stream. If the percentage of orders delivered on time to the consumers is on a high level, the specific value stream is considered to be under an adequate control. However, if the company does not deliver products on time, managers have to reassess the process and determine if there are any specific delivery issues. There are two methods

to calculate this index (Kennedy & Maskell, 2006). The first and the stricter method, requires relating the number of products delivered on time and the total number of products. The milder method to calculate this performance measure is dividing the number of products delivered on time with the promised date and the total number of products. It is suggested to start with the milder method and switch to the stricter method when the value of this index exceeds 90 %.

Sales per person is measuring the productivity of the value stream. The productivity of the value stream should be increasing, because in that case the company produces and sells more products with the same resources. Sales per person is calculated by dividing the income from selling products produced in one value stream with the number of employees in the same value stream (Maskell et al., 2012).

The last operative performance measure in Box Score is ***Average cost per unit***. Average cost per unit of product is quotient of the total value stream costs in the given period and the number of products delivered to the consumers (Stenzel, 2007). This performance measure supervises the functioning of the established stream value and valuates products in inventory. If the number of products in inventory is increasing and there is a bottleneck, the amount of this measure is high. However, if the number of products in inventory is decreasing, the amount of this measure is low.

The usage of capacity performance measure is the second dimension of Box Score. In a lean company the resources are used for productive and nonproductive activities. When estimating whether an activity is productive or nonproductive, it should be observed from the point of the final consumer. Productive activities are the activities that are necessary to produce and deliver the wanted value. These activities increase the value. And the consumers are willing to pay for them. Nonproductive capacities are used to perform activities which do not increase the value, which produce spoilage, demand corrections of the products, etc.

In order to obtain the amount of productive and nonproductive capacities, the present daily and monthly capacity of the company should be calculated. In order to obtain the daily capacity, the effective work hours should be divided with the duration of the longest operation in the process. The effective working hours mean the eight hours working time expressed in seconds. When the effective working hours are divided with the duration of the longest operation in process we get the number of products that can be produced daily in the value stream. The number of products multiplied with the number of days in the month gives us the monthly capacity, which is the number of products that can be produced monthly within the value stream. In order to obtain the productive time, monthly capacity of the value stream is multiplied with the time needed to perform productive tasks (Lopez et al., 2013; Maskell et al., 2007). Time needed to perform nonproductive tasks multiplied with the daily capacity is nonproductive capacity. Productive and nonproductive capacities are expressed in percentage in the relation with the total capacity.

There is another performance measure of capacity, called ***Free capacity*** (Baggaley & Maskell, 2003b; Maskell et al., 2007). Free capacity is the difference between the total capacity and the sum of productive and nonproductive capacity. One of the lean companies' main goals is forming free capacities, and later using them to perform activities that increase the value. Increasing productive capacities on account of nonproductive capacities is achieved by increasing the number of products produced in the value stream. In order to achieve that, time needed to perform the longest operation in the process should be reduced, and the existing bottlenecks should be removed. The managers of the value stream have tasks to reassess the capacity usage and, in cooperation with other executors, propose some corrective actions to shorten the longest operation in the process.

It is possible to calculate measuring the capacity performance for the machines as well as for the employees in the value stream. In that sense, in order to manage capacity successfully, it is necessary to precisely determine the time needed to perform productive and nonproductive activities. These information are easily accessible, because all the data needed are already collected and registered in the map of the value stream. Including data about value stream performance capacities into the management analyses will ensure the unhindered flow of the product, and the consequences of the continuous improvement will show their financial effects too.

The final dimension of the Box Score refers to the ***Financial performance measures***. Financial performance measures shown in the Box Score are: the value of the inventory, material costs, processing costs and the value stream profit.

Inventories in the lean company are at a low and stable level. Therefore, the lean companies' managers are exactly aware of the supplies amount needed in each production cell in the value stream. Stable and lower level of the inventory creates the opportunity for using simple and easy methods for the valuation of the inventory, semi-products, and final products. When choosing the method for the inventory valuation one should pay attention to (Maskell et al., 2012):

- Time of keeping the inventory
- Possibility for the visual control
- Possibility for the monitoring of inventory by computer and
- Difference between the mixture of the inventory and the selling mixture.

If the time of inventory holding is shorter than 30 days, it is recommended to apply the method of the number of the inventory holding days or the method based on the number of units (Stenzel, 2007). The application of the method of the number of days implies knowing the number of holding days of all kinds of the supplies. The total expense of the value stream is divided by the number of the days in the month, and then the obtained amount is multiplied with a number of the holding days of a particular kind of supplies. The number of the units method implies tracking the number of the units of a product that are produced in the values stream of one month. The value of the inventory in a lean business is small, so it is considered that it does not have a big effect on the value stream (DeBusk & DeBusk, 2012). In that sense, the value of the inventory is relocated from the traditional profit and loss report of a business and is used only for correcting the profit of the value stream. The value of the inventory shows the fair inventory value, i.e. the inventory value that is not burdened by the material expenses. It is important to state that this kind of presentation of the inventory value in the profit and loss report is in accordance with the Generally Accepted Accounting Principles (GAAP) and International Financial Reporting Standards (IFRS). This is due to the fact that the supplies are evaluated according to the real production costs of a product in a period in which the supplies are made, which are the prerequisites of the mentioned standards.

The revenue, the material expenses, the processing expenses and the value stream profit as the elements of the Box Score are taken from the profit and loss report of the value stream. The profit and loss report of the value stream is based on the information obtained from the value stream expenses calculation (Antić & Novićević, 2013, 2015). The value stream expenses calculation represents the adequate informational basis for a lean business and lean business conditions, and its basic characteristics are (Baggaley & Maskell, 2003):

- Focus on the value stream,
- Ease of use,
- Dedication to the performance measures of the value stream,
- Focus on the elimination of the calculation and allocation of the general expenses, and
- Clarity and intelligibility for all employees of the company.

The material expenses presented in the profit and loss report of the value stream, i.e. in the Box Score, represent the amount of the materials provided for the value stream and multiplied by the purchase price of the appropriate kind of materials.

The processing expenses of the value stream include: labor expenses, manufacturing support expenses, machine expenses, facility expenses and other value stream expenses. The labor costs represent the sum of the salaries of all employees who are included in the value stream itself. The labor costs of the lean businesses include the expenses that are traditionally considered direct and indirect labor costs. The manufacturing support expenses are the costs of the maintenance, the costs of the quality, the salary of the engineers and the supervisors, planning logistics, supply and the like. The amortization, spare parts costs and the repair costs are the machine expenses. Despite the tendency to avoid allocation of the general traditional costs during the value stream expenses calculation, still, all facility expenses must be allocated for every value stream. This comes from the fact that expenses added to the value stream are only the expenses resulting from the activity done in the value stream, and not all the expenses. The allocation of the facility expenses is done based on the number of square meters used by the employees in the value stream.

The value stream profit is calculated by deducting of the material expenses and the processing expenses from the earnings of the value stream. In this way, the value stream profit represents the real number that can be planned and controlled.

The application of the three-dimensional system of measuring performances as Box Score is of the utmost importance for the success of the business. This above all since the measures contained in the Box Score are connected to each other and as such they allow measuring of the advancement of the business towards the defined goals. Also, even though the financial results are not visible in the beginning, a long term measuring of the key aspects of business is possible to reach through a significant competition advantage. Since they are the starting point in advancement of the operational performance measures, it is important for them to be aligned with the basic principles of lean business concept. In the following table a review of the connection of the operational performance measures and the lean business principles is given.

Using the resources in the right way in a company, productive capacities will be employed in a most efficient way, and the effect of their advancement will be visible through the shortening of the product delivery time, increase in the number of the products that do not need additional processing and treatment, reduction of time of keeping the materials, etc. In that sense, we can say that the performance measures of the capacity use are indirectly connected to the basic principles of lean business concept. Presentation of the financial results through the profit and loss report of the value stream within the last dimension will provide the clarity and transparency of all presented data.

Table 2 Operative performance measures and principles of lean business concept

Operations performance measurement	What does it measure?	Lean principle
Dock-to-dock time	The efficiency of value stream expressed in terms of sales amount performed by employees. Sales amount is divided to the number of persons in value stream.	Increase value created by the same or less resources.
First time through	The sufficiency of value stream in delivering the product to the customer on the desired day or time. The sales by percentages delivered on the correct time	Control the whole process within value stream.
On time shipment	The amount of inventory s throughout value stream expressed in terms of required day or time. Total amount of inventory within value stream is divided into delivery rates of products.	Increase material flow rate throughout value stream.
Sales per Person	The sufficiency of value stream for always-perfect production and service. First time through products are calculated in every step of value stream process.	Always do standardized enterprise throughout flow stream process.
Average cost per unit	Total cost of value stream is divided into the number of manufactures delivered to the customer.	Always decrease resource amount necessary for producing and selling products

(Adjusted according to: Gunduz, M. (2015) Value Stream Performance Measurement in Lean Manufacturing Business.*International Business and Management* Vol.10, No. 3 pp. 40-47.)

CONCLUSION

After having been applied in Toyota company, lean business concept attracted the attention of many managers from the West, who implemented it in their own companies. Establishing the adequate value streams and assuring their continuity is just one of the ways to deliver the wanted value to the consumers. Optimal functioning of the business can be managed if, by using numerous techniques, all forms of losses and activities that do not add to the value are removed.

For lean business managers it is of high importance to follow the positive effects of the changes that are being made in the company. For tracking the achieved advancements the application of the Box Score is proposed. The Box Score is a three-dimensional approach to the performance measuring and as it is, it gives the insight into the movement of the key performances of the company, as well as the insight into their mutual causality.

The first dimension of the Box Score is related to the operational measures of performances such as: *Dock-to-dock time, First time through, On time shipment, Sales per Person and Average cost per unit.* These operational measures of performances show the success in reaching the given goals in the value stream. The next dimension is related to the use of capacity. The use of capacity represents a strategically important dimension in the way of using the resources. Financial performances are shown in the last dimension of the Box Score. The basis for showing the financial measures of performances is made of the cost calculations of the value stream. A clearer and more precise presentation of the data in the financial dimension is made easier by the way of tracking the changes and the achieved advancements.

The effects of the advancements such as the reduction of the inventory and the losses, the reduction of the waste, the lead time, reduction of the overproduction and the like, are visible very soon. The listed advancements are the primary goal of the lean business concept. The reduction of the losses and the activities that do not add value are an important part of the advancement since by eliminating the loss, the expenses are reduced and free capacities are made. When the company has free capacities, the key role goes to the managers of the company whose mission is to employ these capacities in a way which will bring the increase of the value. On the way and the success in the employing of these capacities will depend the long-term success of the company. If there are free capacities and the products' demand increases, the profit of the company can be increased by simply employing these capacities. In that case, the cost of materials will increase while the other expenses will stay at the same level. On the other hand, if the company does not have free capacities, and a big percentage goes to the non-productive capacities, the chances are that the company will lose a certain number of the consumers and will stay deprived of the profits. In that sense, the role of the Box Score does not refer to the following:

- it is connected to the lean business principles and it starts the advancement of the value stream results,
- it gives the review of the operational performances, which are the basis for the advancement of the business,
- it gives the review of the capacity performances, that are tightly connected to the operational and financial performances, which, till this moment, did not get the needed attention,
- it gives the review of the financial performances that are presented in the profit and loss report of the value stream,
- it gives an insight into the results that should be accomplished and it presents the basis for the evaluation of the advancement,
- it gives the basis for planning the strategic changes and capital investments.

Measuring of the performances is a constituent part for efficacy and success evaluation of the company. The business that works according to the lean principles must choose a set of measures within the Box Score which will present, in the best possible way, the key indicators and initiators of its activity. In that sense, the research of the authorwas , for the most part, oriented to the understanding of the theoretical aspect of the system of performance measures in the lean business. The research of this problem opened numerous questions and dilemmas related to the choice of the measures that would be presented in the Box Score, as well as a question of the possibilities of the practical application.

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MERENJE PERFORMANSI TOKOVA VREDNOSTI I LEAN KONCEPT POSLOVANJA

Lean koncept poslovanja karakteriše se obezbeđivanjem zahtevane vrednosti od strane potrošača, brzom isporukom proizvoda, eliminisanjem svih oblika gubitaka kako iz proizvodnog tako i iz svi poslovnih procesa u preduzeću i slično. Da bi se postigla i održala konkurentska prednost uputno je pažljivo razmotriti i primeniti osnovne principe lean koncepta poslovanja i uspostaviti tokove vrednosti. Tok vrednosti predstavlja osnov kreiranja vrednosti za potrošače, s jedne i preduzeće, s druge strane. U tom smislu, potrebno je odabrati set mera performansi za ocenu uspešnosti tokova vrednosti, koji se naziva Box Score.
Ključne reči: *lean koncept poslovanja, tok vrednosti, Box Score, merenje performansi*

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Review paper

FACTORS INFLUENCING E-COMMERCE DEVELOPMENT IN SERBIA

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Abstract. *In this paper, an overview of current state of e-commerce development in Serbia is presented. Also, some important factors influencing e-commerce diffusion are discussed. The factors are divided into four groups: technical factors, which cover e-commerce telecommunication and logistics infrastructure; legal factors, i.e. necessary laws and regulations on e-commerce; economic factors, and psychological factors and local culture. The study showed very strong correlation between broadband internet penetration and internet usage on the one hand and online shopping penetration on the other hand. Also, strong correlation was found between national economic wealth and online shopping penetration. The development of logistics systems in Serbia, national laws and regulations related to e-commerce, e-payment systems and cultural characteristics and habits of Serbian customers are discussed. The results show that despite the notable improvement in the last few years, the level of e-commerce development in Serbia is still far away from EU28 average. Finally, some recommendations for faster e-commerce diffusion are presented.*

Key words: *electronic commerce, e-commerce development, B2C, influencing factors, e-payment*

INTRODUCTION

Rapid growth of information-communication technologies (ICT) in the last few decades and broad penetration of the Internet opened possibilities for new forms of business. One of the most popular and widespread is electronic or e-commerce, usually defined as "the sale or purchase of goods or services conducted over computer networks by methods specifically designed for the purpose of receiving or placing of orders"

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(World Trade Organization, 2013), while the payment and the ultimate delivery of the goods or services do not have to be conducted online. Laudon and Traver (2015) define it as the use of the Internet, the Web and mobile applications to transact business.

E-commerce has had very high growth rates for more than a decade (Kalinic, 2014b). It is assumed that today our planet has approximately 7.4 billion inhabitants, out of which 1.2 billion are already shopping online (Ecommerce Europe, 2015a). As one of the fastest growing parts of commerce today, e-commerce provides significant potential for economic growth in every country, offering numerous benefits to both shoppers and sellers: no time and space constrains i.e. 24/7 availability; access to the global market; wider product offer, lower operating costs, etc. (Kalinić and Sternad Zabukovšek, 2015). E-commerce enables providers to manage customer demands quickly and efficiently. Moreover, in e-commerce it is much easier to monitor shopping activities of customers and to use collected data for demand prediction or marketing campaigns (Demirdogmez, 2015). E-commerce also brings a lot of benefits to the government, including new jobs and taxes, so some countries made significant efforts for the development of e-commerce in their rural areas, in order to reduce the gap between urban and rural parts of the country (European Commission, 2015). It is important to stress that e-commerce development also influences the development of all supportive services, like postal and courier services. Although developing countries have a strong potential for e-commerce development, they are still lagging behind developed countries to a significant extent (Alyoubi, 2015).

The development of e-commerce is also one of the priorities of the EU, and the development of Digital Single Market is one of the seven pillars of the Digital Agenda for Europe, by which two important targets were set: 50% of EU consumers buying online by 2015 and 20% buying online cross-border within the EU (European Commission, 2012).

Serbia signed the Stabilization and Association Agreement with the European Union, which entered into force on September 1st 2013. By this Agreement, Serbia committed itself to perform structural reforms and fulfill a number of objectives, including the development of the information society (Kalinić and Sternad Zabukovšek, 2015). In order to harmonize its path with EU guidelines given in the Digital Agenda and related documents, Serbian government has adopted Strategy for Information Society development in the Republic of Serbia by 2020 (GRS, 2010). This Strategy sets out actions needed to converge to the EU average level of development by 2020 and defines the key objectives, principles and priorities of the development of information society, including telecommunication infrastructure, e-commerce and governmental e-services, like e-health and e-justice. MASMI (2015) research shows that already almost half of Serbian consumers use Internet to inform themselves before shopping.

This paper presents the current state of development of B2C e-commerce in Serbia, and compares it with the EU countries. Also, it brings the analysis of the key factors influencing e-commerce deployment in a developing country like Serbia. Finally, the study gives some suggestions which could improve and accelerate the implementation of e-commerce in Serbia.

1. E-COMMERCE IN SERBIA – STATE OF DIFFUSION

Internet access, as a basis for e-commerce activities, is widely available in many countries and today people use the Internet for a wide range of activities, including buying goods and services online. In the EU28 in 2015, 76% of individuals aged 16 to 74 used the Internet almost every day, and nearly 53% of them shopped online (Eurostat, 2015).

Total turnover of B2C e-commerce worldwide in 2015 was estimated at 1,943 billion Euros, which is an increase of 24% compared to previous year, mainly due to the significant increase in Asia-Pacific region. Three main e-commerce markets are China, United States and United Kingdom, which together account for 61% of all B2C e-commerce sales in the world (Ecommerce Europe, 2015b). Concerning Europe, out of 818 million of its inhabitants, 564 million are using Internet, and 331 million are shopping online (Ecommerce Europe, 2015a). Total turnover of B2C e-commerce in Europe in 2015 was around 424 billion Euros, which is an increase of 14% to the previous year, and the main markets remain United Kingdom, Germany and France.

Although the share of online retail in Europe is still low (6%), it should be stressed that it has high growth rate, and that internet economy contributed to European GDP by 2.5% (Ecommerce Europe, 2015a).

As it can be seen from the Figure 1, e-commerce development in Serbia, represented by the percentage of individuals shopping online, with 33% still significantly lags behind EU average (53%) and Digital Agenda milestone (50%), but encouraging fact is that it is better than several EU members, like Greece, Lithuania, Croatia, Italy, etc., as it will be presented in Figure 2 (Eurostat, 2015; SORS, 2015a).

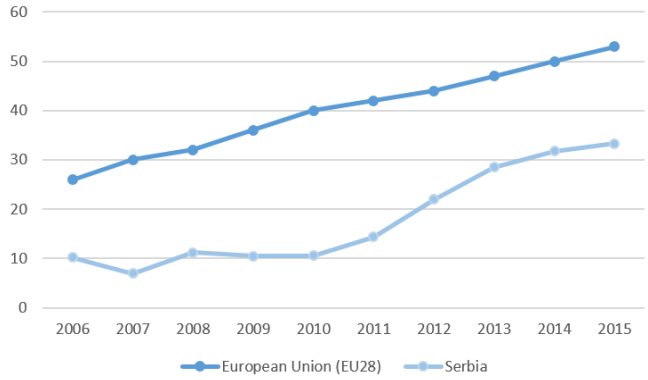

Fig. 1 Individuals who purchased something over the Internet in the last year (in %)

It is very interesting to demonstrate that global financial crisis, started 2008, did not have any negative influence on e-commerce diffusion (Kalinić and Sternad Zabukovšek, 2015). As it can been seen in Fig. 1, e-commerce in the EU was developing at high rates even during crisis years, while in Serbia it was stagnating. Younger Serbian consumers, more educated and with higher income, are buying online more frequently (MASMI, 2015). Almost half of Serbian online shoppers are buying clothes, footwear and jewelry, while about one third of them buy electronic equipment (MASMI, 2015; SORS, 2015b).

Also, as another measure of e-commerce development, we can analyze the percentage of total turnover coming from e-commerce. The data shows that in 2014, the EU28 average was 17%, but there were big differences between countries, from leading Ireland with 37% to the last one, Greece, with only 1% (Eurostat, 2015). Concerning this measure, Serbia is, with only 6%, again among the last ones.

To assess the readiness of countries for e-commerce, the UNCTAD developed composite B2C E-commerce Index, based on four indicators: Internet use, number of secure servers, credit card penetration and postal delivery services (UNCTAD, 2015), and the value of the index is positively correlated to the percentage of the online shoppers. By this research, Serbia is in the 44th place, out of 130 countries, but in front of some EU member states, like Romania and Bulgaria, and some other important markets like Russia and China. The lowest assessments for our country were for the percentage of Internet users and the relative number of secure servers, as the basis for e-commerce, and in the future period special emphasis should be put on these issues.

2. FACTORS INFLUENCING E-COMMERCE DEVELOPMENT

Factors affecting e-commerce diffusion may be classified as various aspects of economic structure, infrastructure, government policy, culture, etc. (Wang and Liu, 2015). The challenges for e-commerce diffusion in developing countries can be quite different from those experienced by developed countries (Alyoubi, 2015; Kapurubandara and Lawson, 2006), and they may include the lack of telecommunications infrastructure (including poor Internet connectivity) and qualified staff for e-commerce deployment, underdeveloped payment systems (e.g. low credit card penetration), lack of reliable transportation and delivery systems, but also the issues more related to the consumer side, like the lack of computer skills among consumers, low income, low computer and Internet penetration rates and high internet access costs (Alyoubi, 2015; Almousa, 2013; Kapurubandara and Lawson, 2006). Alyoubi (2015) also stresses the lack of effective branding and trust issues, the lack of robust logistic networks, including both delivery services and traffic infrastructure, which is very common in developing countries, and the absence of sound legal and regulatory environment for e-commerce. Also, e-commerce raises many issues such as trust, privacy, security, accessibility, awareness, familiarity, etc. (Kabango i Asa, 2015).

Wang and Liu (2015) discuss the influence factors of e-commerce development in China from various perspectives, such as information infrastructure, economic level, educational level, urbanization, technology deployment, living standards, human capital and price index. As the measures of these perspectives, they propose 12 indexes, as independent variables, such as Internet penetration; number of computers per hundred households; number of websites per ten thousand people; mobile phone penetration; real GDP per capita; knowledge index (calculated using the adult literacy rate and the average years of education); urbanization rate, research and development spending as a share of GDP; number of patented applications per ten thousand people; per capita disposable income; proportion-based employment in information industry; and communication price index, while as an output i.e. a measure of e-commerce development, they adopted the proportion of e-commerce turnover accounted for GDP. The results show that the most important factors affecting e-commerce development in China are mobile phone penetration, per capita disposable income, number of computers per hundred households, and urbanization rate, followed by real GDP per capita, knowledge index and Internet penetration.

Sridhar and Sridhar (2006) also proposed a model of e-commerce adoption in developing countries which included telecommunication infrastructure factors like Internet penetration and quality of Internet services, but also other important aspects like security infrastructure and legal framework, payment methods, cultural issues, etc. As key factors affecting e-

commerce volume in Turkey, Demirdogmez (2015) identifies gross domestic product per capita, number of Internet users and legal regulations.

In his study of the barriers to e-commerce adoption in Egypt, Zaied (2012) divided influencing factors into six categories: economical; legal and regulatory; organizational; political; social and cultural; and technical barriers. As the most important he reported technical issues (especially lack of internet security), followed by legal and regulatory and political barriers, while the least important were social and cultural factors.

Travica et al. (2007) analyzed complex model of e-commerce adoption in Serbia which included factors like traffic infrastructure, delivery services, telecommunications, software industry, e-payment/e-banking, legislation, education and customer e-commerce propensity, and concluded that, at the time of research, the influences are controversial i.e. some of the aspects, like software industry, e-payment/e-banking and legislation are in favor of e-commerce deployment, while some others are underdeveloped. As main barriers of faster e-commerce diffusion in Serbia they reported telecommunications infrastructure and ownership and customer beliefs and behavior.

In this paper, factors affecting e-commerce development in Serbia are divided into four main groups: technical factors, which cover e-commerce telecommunication and logistics infrastructure; legal factors, i.e. necessary laws and regulations on e-commerce; economic and financial factors and finally, psychological and cultural factors, all of which will be discussed in more detail in the following chapters.

2.1. Telecommunications infrastructure and logistics

The accessibility of technical and telecommunications infrastructure is of vital importance for e-commerce diffusion. Although some studies adopt computer penetration in households as an influencing factor, in our study the stress is on internet access, as the main prerequisite for e-commerce. One of the reasons is the rapid growth of mobile technologies, which enables consumers without PC computers to access the Internet and to shop using their mobile devices (mobile or m-commerce). Internet penetration and speed are very important factors in higher e-commerce diffusion. It is noticeable that the countries with high penetration of fast and affordable internet connection also have high percentages of e-shoppers. The percentage of households with internet access, percentage of individuals using Internet almost every day and the percentage of individuals who bought something online during last year in EU28 countries and Serbia in 2015 are presented in Figure 2 (Eurostat, 2015; SORS, 2015a).

It can be seen that our country lags behind almost all European countries, and that more effort should be put on the telecommunications infrastructure development. Also, there are high differences between urban and rural areas i.e. 70% of urban households in Serbia have internet access, while only 53% of rural households have the same (SORS, 2015b).

Today, it is especially important not to just have an internet connection, but to have a fast one, because of increasing demands for complex services and transfer of high amounts of data, like for video streaming (Kalinic, 2014b). Therefore, more relevant factor for e-commerce diffusion is high-speed broadband internet penetration rate, as many e-commerce services strongly depend on it. As it can be seen in Figure 3, there is a strong linear correlation between the broadband internet penetration rate and the percentage of online shoppers in the EU28 countries and Serbia (Pearson's r=0,856) (Eurostat, 2015; SORS, 2015a).

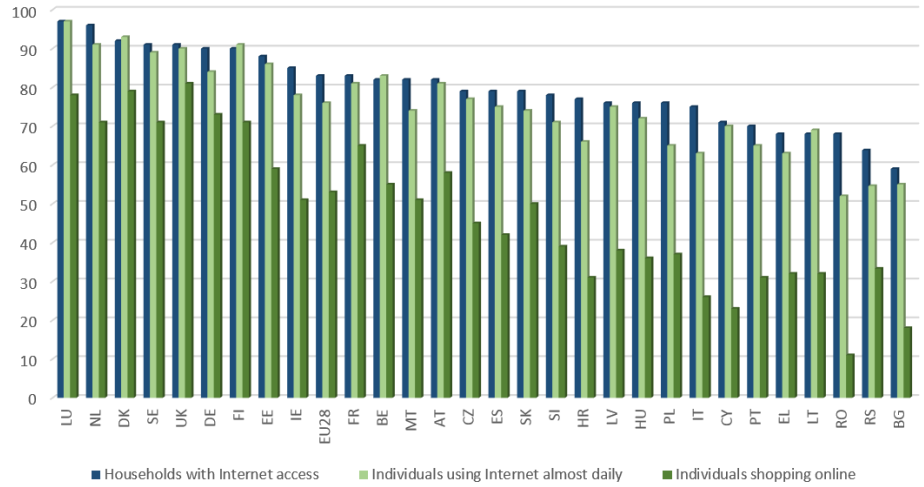

Fig. 2 Households with internet access, individuals using Internet almost every day and individuals shopping online

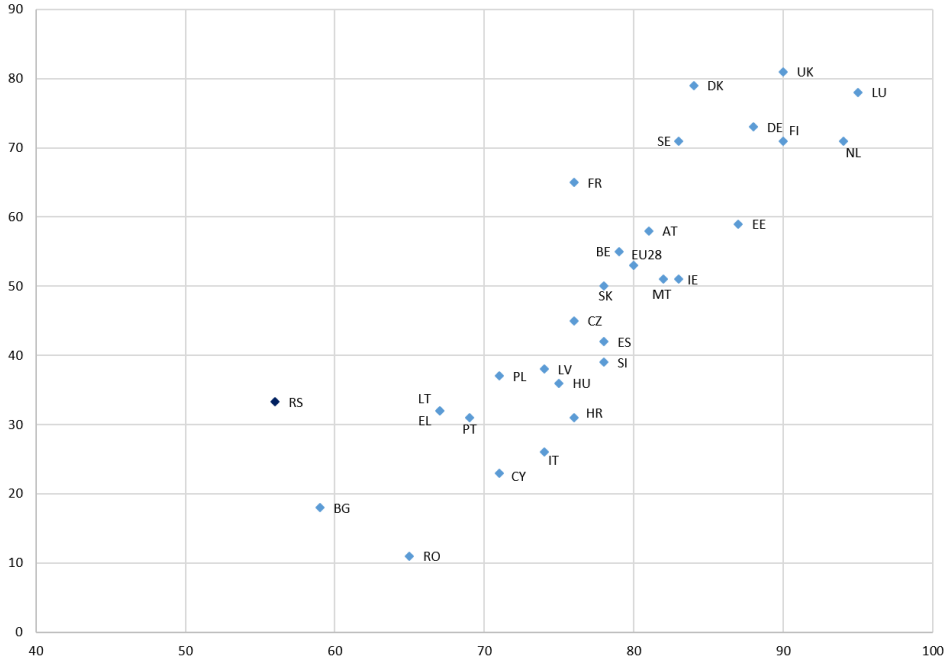

Fig. 3 Correlation between broadband internet penetration in households (in %) and individuals who bought something online in last 12 months (in %)

Another important factor is the actual usage of the Internet by the individuals. This factor is analyzed in many studies and it is also included in UNCTAD's B2C E-commerce Index (UNCTAD, 2015). Figure 4 presents strong linear correlation between the percentage of the individuals using the Internet almost every day and the percentage of online shoppers in the EU28 countries and Serbia (Pearson's r=0,937) (Eurostat, 2015; SORS, 2015a).

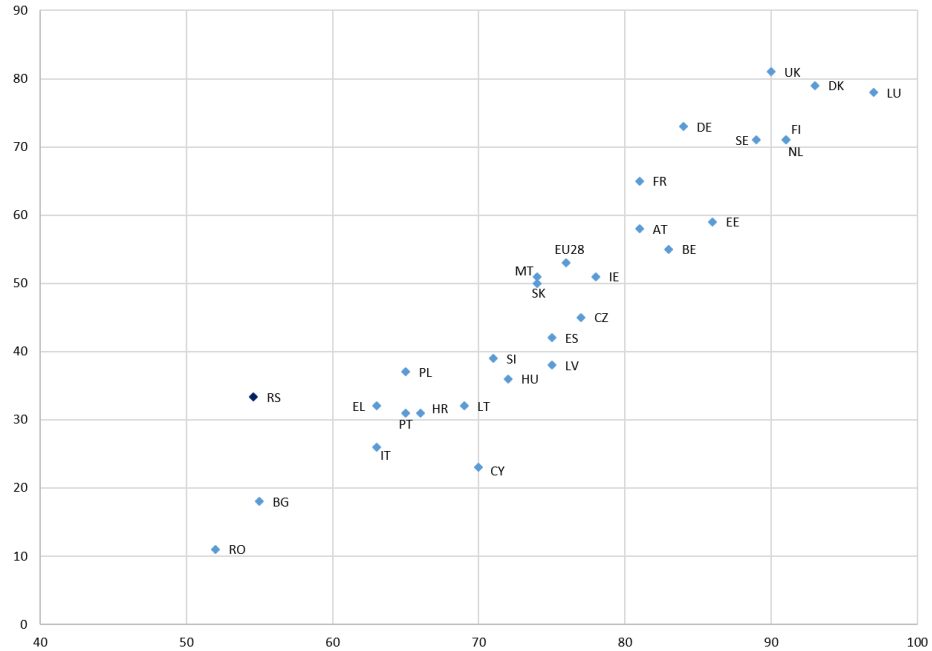

Fig. 4 Correlation between individuals who use the Internet on daily basis (in %) and individuals who bought something online in last 12 months (in %)

Although the actual usage of e-commerce in our country is still very low, from previous two Figures it can be concluded that Serbia is "above the line" i.e. it has more online shoppers than could be expected, based on broadband penetration and internet usage.

Mobile devices are becoming crucial for many commercial activities, and for several years m-commerce even had three-digit growth rates. The most important devices for commerce are mobile phones (especially smartphones) and tablets. In developed countries the number of mobile subscriptions is even higher that the number of inhabitants. For example, mobile penetration (the number of mobile subscriptions per a hundred inhabitants) in European Union is 132%, while in the leading Latvia it is 231% (Eurostat, 2015). The situation in Serbia is quite good on this issue, as mobile penetration is 131%, or around EU28 average (RATEL, 2015).

Taking in mind that e-commerce websites require security software, one of possible assessments of the quality of e-commerce infrastructure is the number of secure servers, which use encryption technology for Internet transactions (UNCTAD, 2015). The results show that, by this parameter, Serbia is well behind all EU28 member states, and even behind some other European countries like Macedonia.

Logistical problems represent one of the main barriers to the e-commerce development. Underdeveloped delivery systems may collapse during high demand peaks, like national holydays, when they have to process and deliver a huge number of items in a short time (Alyoubi, 2015). It is no wonder that UNCTAD (2015) included the share of population having mail delivered at home as one of the factors constituting B2C E-commerce Index, as the lack of reliable address and postal systems, like in same underdeveloped countries in Africa and Asia, may hinder e-commerce development. Delivery problems are particularly hard in cross-border e-commerce, where they may include custom delays, changes in shipping costs, lost goods, lengthy delays in shipping to customers, etc.

For many years e-commerce has been seen as a main growth driver of postal services (IPC, 2015). International postal deliveries of small parcels have experienced a very rapid growth in the past decade, mainly as a result of cross-border e-commerce (UNCTAD, 2015). The survey of Oxford Economics (2015) showed that 30% of e-commerce sales in Europe are dependent on express delivery services (In Netherlands and Italy it is more than 45%). Another study of Copenhagen Economics (2013) confirmed that the improvement of delivery services is an important driver to enhance e-commerce. This study included 3,000 e-shoppers in six EU countries and revealed that problems related to delivery services are a key reason for customers for not buying online. Study shows that delivery-related problems are responsible for 68% of the situations where e-shoppers abandoned the shopping cart before finalizing the order, although they have already started shopping i.e. they have added items to their shopping cart. The primary reasons are high delivery costs and long delivery times.

The main players in this area are national postal operators, international courier services like DHL, UPS and FedEx and a number of regional and national courier service providers. It is found that e-commerce related shipment volumes are fairly evenly distributed between national postal operators (approx. 40%), multinational integrators (40%) and local or regional carriers (20%) (Copenhagen Economics, 2013). Here it should be stressed, due to the barriers to the cross-border e-commerce sales (Kalinic, 2014b), on average, 85 per cent of all e-commerce shipments are domestic (Copenhagen Economics, 2013).

The situation in Serbia is not so bad on this issue, as address and postal systems are well developed and 99% of the population have their mail of packages delivered at home (UNCTAD, 2015), using services of national postal operator Post of Serbia, all important international courier service providers as well as several regional and national ones.

2.2. Legal framework

The role of the government is extremely important in the area of legislation and the creation of positive ambient for e-commerce development i.e. supportive legal and regulatory environment (Alyoubi, 2015). Generally speaking, developing countries are lagging behind developed counties in this area, and very often development is delayed because of slow law adoption process, despite the fact that technology and the market are already there. In most countries, e-commerce is usually covered by complex legal frameworks including general consumer protection and contracts laws, specific e-commerce and e-business laws, legislation related to privacy, copyright and data protection and telecommunications laws and regulations, etc. (Kalinic, 2014b).

In the case of Serbia, e-commerce is regulated primarily by the Law on E-Commerce, the Law on Electronic Document and the Law on Electronic Signature. The Law on E-

Commerce, adopted in 2009 and revised in 2013, is the main national legal document in e-commerce implementation. The Law on Digital Signature is also one of the basic legal requirements of e-business and e-commerce. In our country it was adopted in 2004, and it is in line with common practices and regulations of the EU and United States (Travica et al., 2007). Newly adopted, the Law on Consumer Protection and the Law on Payment Services (both adopted in 2014, in power since October 1st, 2015), brought some important novelties for the e-commerce, which should increase the consumer trust and enable new payment methods. For example, the Law on Payment Services enables the easier operation of new e-payment providers and e-money institutions.

Generally speaking, a lot has been done in Serbia in the last several years and the legal framework in the area of ecommerce development may be assessed as well developed, with all important laws in the areas of e-transactions, consumer protection, privacy and data protection and cybercrime already in power (UNCTAD, 2015). What may still be an issue is legal framework's efficiency and the implementation of adopted regulations. Also, there is often the lack of compliance among some of the regulations. For example, the parents in Serbia have the right on tax refund for baby equipment, accomplished by presenting fiscal receipt from the shop. As, by the law, online shops of baby equipment do not have an obligation to give fiscal receipt, online buyers are in unfair position compared to offline buyers, because they cannot get tax refund (Kalinic, 2014b).

2.3. Economic and financial factors

Some of the factors which are not easy to improve are the national economy and people's living standards. In countries with higher living standards, consumer's demands for high quality and differentiated goods are higher, which represents a very good environment for e-commerce development. The positive effects go in both ways, i.e. positive moves in national economy promote growth of e-commerce, and in turn the e-commerce development promotes further development of national economy (Wang and Lin, 2015). Travica et al. (2007) also identified low living standards and high interest rates for credit cards as limiting factors in the use of e-commerce. There could be found a strong correlation (Pearson's r=0,782) between economic wealth of the nation, represented by the GDP per capita and the percentage of online shoppers, as presented in Figure 5 (Eurostat, 2015; SORS, 2015a).

Another economic factor that may influence e-commerce development is the offer on the national e-market, since it was already presented that more that 80% of e-sales are performed on the national markets. The percentage of companies selling their products and services via the Internet for EU28 countries and Serbia in 2015 in presented in Figure 6 (Eurostat, 2015; SORS, 2015a).

Surprisingly, Serbia has a very good results on this measure, as, according to national statistics data, 23% of enterprises in Serbia were selling via the Internet, which is better than EU28 average (18%) and better than most of EU countries.

In order to successfully implement e-commerce strategy, the state and its financial system should provide various e-payment systems and mechanisms (Alyoubi, 2015). Well-developed and reliable payment systems and mechanisms are essential for the successful development of e-commerce. The existing solutions include a wide selection of online payment mechanisms such as payment cards, mobile payments, e-cash, but in many countries, especially developing ones, conventional offline systems such as cash-on-delivery (CoD) are still the most popular.

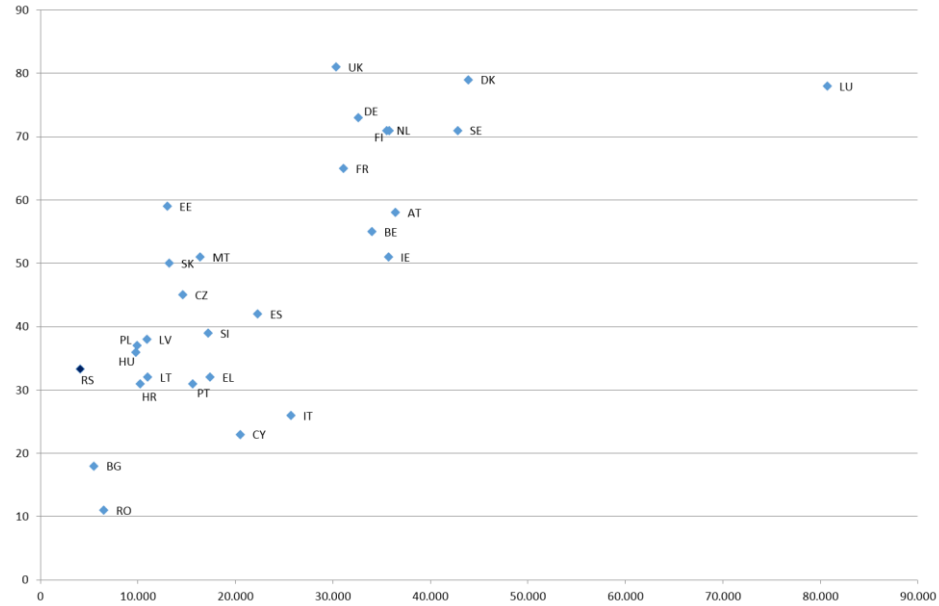

Fig. 5 Correlation between GDP per capita (in Euros) and individuals who bought something online in the last 12 months (in %)

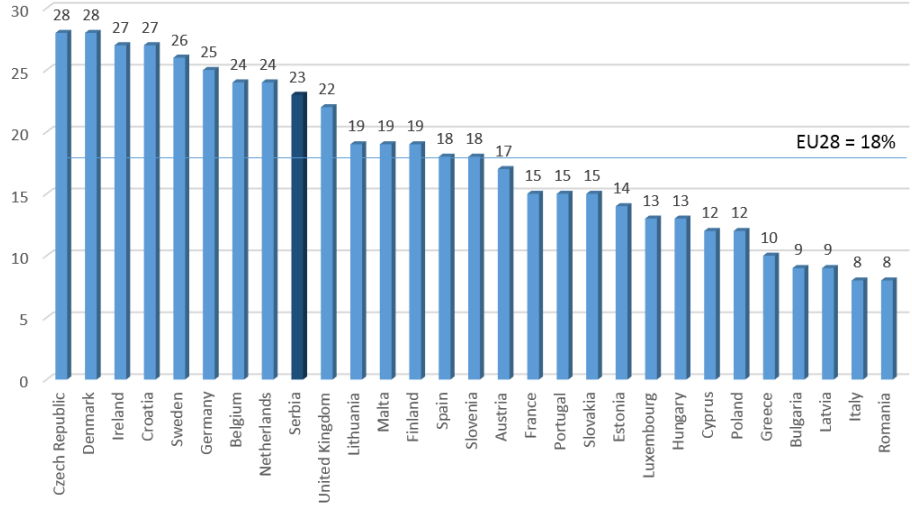

Fig. 6 The percentage of enterprises selling via the Internet

The most popular payment method in Serbia is still cash-on-delivery, which is used by 80% of customers (MASMI, 2015), while other options like payment cards (19%) and off-line pre-payment (10%), are much less popular. Only 5% of Serbian consumers use

PayPal, and the same percentage uses e-banking. This is completely different from the situation in e.g. United States, where payment cards (both credit and debit) account for 78% of all online payments, while the most popular alternative is PayPal (Laudon and Traver, 2015). The same stands for the general world statistics (Birovljev, 2015). It is expected that in the near future this trend in Serbia will be changed, also taking in mind new Law on Payment Services and its possibilities. As already stated, the credit card penetration is one of key factors included in UNCTAD's E-commerce Index. In 2015, there was about 6.4 million payment cards issued in Serbia, out of which approximately one half is active i.e. with at least one transaction quarterly (NBS, 2016). Based on the statistical data of National Bank of Serbia (NBS, 2016), in 2015 Serbian customers spent more than 110 million Euros using payment cards in internet shopping, out of which they spent approximately three quarters on foreign websites, and the remaining quarter at domestic online shops.

2.4. Consumer psychology and habit

National culture and habits may have significant influence on e-commerce acceptance. In some cultures, like in Latin America and southern Europe, shopping is a social event, and people prefer face-to-face contact in the markets or shops than shopping via Internet, and this also stands for Serbia. Kapurubandara and Lawson (2006) also reported that in countries like Sri Lanka and India, face-to-face contact with seller is very important for overall shopping experience.

Customer readiness for e-commerce is one of the key conditions for successful e-commerce development (Alyoubi, 2015). One of the key psychological factors influencing intention to adopt e-commerce is perceived usefulness, because, like any other new technology, consumers would start using e-commerce only if they find it useful and more convenient that its alternatives like shopping in regular shops or using tele-shops. Many research models of technology adoption like TAM (Technology Adoption Model) or UTAUT (Unified Theory of Acceptance and Use of Technology) are based on the concept of technology usefulness. Closely related to usefulness is awareness i.e. the consumer perception and knowledge on e-commerce, which is usually raised by social influence or education (Kabango i Asa, 2015).

Awareness is also closely related to trust; i.e. usually the more consumers are aware of all the benefits but also the threats, the more they are trustful to it (Kabango i Asa, 2015). Some of the main consumer concerns are security and confidentiality issues (Demirdogmez, 2015). Many consumers are still unsure about the security and privacy of their personal and financial information during online shopping (Kabango i Asa, 2015; Kalinic, 2014b). Therefore, trust is a very important factor in e-commerce adoption. It gives the consumers faith to purchase services or products even if the e-seller is unknown (Kabango i Asa, 2015). Also, trust should be analyzed as a two-way street i.e. the trust of sellers in customers is equally important to the opposite one (Travica et al., 2007). Kool et al. (2011) found that trust plays more important role in e-commerce acceptance than in traditional commerce because, compared to buying in traditional shops, consumers perceive more uncertainty or risk when buying online. Other important predictors of intention to adopt e-commerce are social influence, perceived ease of use, cost, perceived enjoyment, etc.

Travica et al. (2007) report that typical Serbian consumer is mistrustful, more oriented to traditional ways of commerce. Concerning national culture and group psychology, it appears that trust is a major driver of e-commerce in Serbia (Travica et al., 2007). When buying

online, about 74% of Serbian consumers prefer domestic online shops, 11% of them usually buy on foreign ones, while the remaining 15% is buying on both of them (MASMI, 2015). The customers prefer domestic online shops because they believe that they are safer, and because they understand the language and prices are reasonable, while the advantage of foreign websites is that they offer products and services that cannot be purchased in Serbia. Serbian consumers also, because of perceived security and trust, prefer cash-on-delivery or some other classical method of pre-payment.

Training and education are some of the most critical factors for successful e-commerce development (Alyoubi, 2015). Developing countries face digital divide i.e. a significant part of inhabitants has a low level literacy in computer usage and English language, which are fundamental for e-commerce. So, more efforts are needed in the area of education, including areas specific to e-commerce, which in turn will increase perceived trust and customer readiness to adopt e-commerce. The government should provide more educational programs in order to build up the awareness of consumers and companies using different means like mass media and educational institutions (Kabango i Asa, 2015). Today in Serbia, a lot of consumers are still not aware of all the benefits of e-commerce, and therefore additional efforts in marketing and education are needed. One of the main objectives of on-going EU-funded IPA project E-business development, with the budget of 2.5 mil. Euros, is to raise the awareness of the Serbian citizens and companies on the benefits of e-commerce and to educate them in safe e-commerce use.

CONCLUSION

E-commerce has been one of the main engines of the retail sector growth for the last several years. Despite the fact that it accounts for only 6% of the total retail sector globally, e-commerce has a double-digit growth, and this trend will continue. It should not be forgotten that also a lot of purchases in traditional shops are influenced by e-commerce and the Internet, as many consumers research on the Internet before they make offline purchases. The results presented in this paper show that e-commerce in Serbia is on a good track and has a good perspective, but a lot of still remain to be done in order to reach its full potential.

Good e-commerce infrastructure is the foundation of successful e-commerce development, capable to support increasingly complex transaction process (Wang and Lin, 2015), so in order to accelerate future development of e-commerce in Serbia, further investments in telecommunications network are needed. Some improvements in logistics and delivery systems would be welcome. Also, special attention should be given to mobile commerce, as an e-commerce segment with the highest growth rate.

In the legal area, further harmonization of e-commerce regulations with the relevant EU directives and rules, synchronization among national regulations and more efficient implementation of legal framework is needed. The support of the government in creation of positive environment is also a must.

Serbian e-market does not have well developed e-payment systems, and this should be improved in the future period. Full access to all PayPal services is just one of possible steps. Also, in many countries with underdeveloped payment system (e.g. some African countries) the focus is on the development and implementation of alternative payment methods, like mobile payment systems, and these projects give very good results.

Finally, further raise of awareness and education of the customers and companies through campaigns, educational programs and public workshops is necessary. This will spread the importance and benefits of e-commerce, and raise the trust, as one of the main barriers to e-commerce diffusion.

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FAKTORI KOJI UTIČU NA RAZVOJ ELEKTRONSKE TRGOVINE U SRBIJI

U ovom radu je prikazan pregled trenutnog stanja razvoja elektronske trgovine u Srbiji. Takođe, analizirani su neki značajniji faktori koji utiču na rasprostranjenost e-trgovine. Faktori su podeljeni u četiri grupe: tehničke faktore, koji pokrivaju telekomunikacionu i logističku infrastrukturu e-trgovine; pravne faktore odnosno neophodne zakone i propise koji se odnose na e-trgovinu; ekonomske faktore i psihološke faktore i nacionalnu kulturu. Studija pokazuje veoma jaku korelaciju između penetracije širokopojasnog Interneta i upotrebe Interneta sa jedne strane i penetracije kupovine na Internetu sa druge strane. Takođe, jaka korelacija je utvrđena između nacionalnog ekonomskog bogatstva i penetracije kupovine na Internetu. U radu su razmatrani i razvijenost logističkog sistema u Srbiji, nacionalni zakoni i propisi u oblasti e-trgovine, elektronski sistemi plaćanja kao i kulturne karakteristike i navike potrošača u Srbiji. Rezultati pokazuju da uprkos značajnom napretku poslednjih godina, nivo razvijenosti e-trgovine u Srbiji je još uvek značajno ispod proseka Evropske Unije. Konačno, date su neke preporuke za brže proširenje e-trgovine u Srbiji.

Ključne reči: elektronska trgovina, razvoj e-trgovine, B2C, uticajni faktori, e-sistemi plaćanja

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THE NEW JOB POSITIONS FOR WORKING WITH BIG DATA TECHNOLOGIES AND THEIR PLACEMENT IN COMPANIES WORLDWIDE: EVIDENCE FROM EMPIRICAL RESEARCH

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Abstract. *The question regarding the impact of modern technologies on organizational design has become an important and attractive issue in the theory and practice of management and organization again with the development of Big Data technologies. Those technologies represent new technologies, techniques, tools, knowledge, skills and methods for collecting, processing and analyzing data with new attributes (quantity, structure, speed). On the one hand, Big Data technologies are the factor from environment that confronts the companies with large quantities of data from variety of sources, while on the other hand those technologies represent the resource of organization which allows the companies that use them to make value on the basis of collected data. One of the first changes that comes with the implementation of Big Data technologies in company is establishment of new job positions because companies must have employees with new knowledge and skills. The aim of this paper is to identify, through empirical research, the new job positions for working with Big Data technologies, required knowledge and skills of those employees and how they are placed in the company.*

Key words: *Big Data, organizational design, T shaped professionals, hard and soft knowledge and skills*

INTRODUCTION

The quantity of data which are generated with modern technologies is constantly growing. Everyday, people create about 2.5 quintillion bytes of data while estimation is that by 2020 the amount of data will reach 45 zettabytes (Philips, 2013; Heisterberg & Verma, 2014). Those large quantities of data from variety of sources available in real time are named as Big Data and they stimulated development of new technologies and techniques

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which can handle them. Big Data, as currently the most attractive development form of information and communication technologies, represents new technologies, techniques and tools for working with data which have new attributes (quantity, structure, speed) (Berman, 2013), but also and even more importantly, new knowledge, skills and methods for collecting, processing, analyzing and transforming raw data into valuable information and decisions (El-Darwiche et al., 2014).

Many theorists and practitioners point out that large quantities of data, variety of data sources and possibilities for their collection and processing in real time represent new development phase in digital era so-called Big Data era (Brown, Chui & Manyika, 2011; Kudyba & Kwatinetz, 2014; Berner, Graupner & Maedche, 2014), while Big Data technologies are named to be disruptive technologies that lead to fundamental transformation of how companies gain and sustain competitive advantage (Nerney, 2013). On the one hand, Big Data technologies are the factor from environment that confronts the companies with large quantities of data from variety of sources, while on the other hand those technologies represent the resource of organization which allows the companies that use them to make value on the basis of collected data. Observed through history, managers have been finding the greatest support for changing organizational design in technology (Huber, 1990). Even in the context of contigency approach it was point out that besides the size and environment of organization, technology is very important determinant of organizational structure (Woodward, 1965; Thompson, 1967; Perrow, 1967). Information and communication technology (ICT) and its impact on organizations have been the subject of many researches and their findings show that ICT has impact on each parameter of organizational structure (specialization of work, formalization, coordination, grouping of units, chain of command, decentralization) (Daft & Lengel, 1986; DeSanctis & Jackson 1994; Dewett & Jones, 2001; Daft, 2009). Furthermore, ICT is named to be the major catalyst for creation of novel organizational forms (meta-organization, network, virtual, cellular, innovative form organization, ambidextrous, hypertext, inverted organization) whose main characteristics are speed and flexibility (Petković & Lukić, 2014).

The question regarding the impact of modern technologies on organizational design is raised one more time with the development of Big Data technologies. Jay Galbraith believed that those technologies will be a „*capability that is designed into all of our organizations*" (Galbraith, 2014, p. 2). The key question is not whether companies need to implement Big Data technologies, but rather what is the right way to implement them, which consequently opens numerous questions regarding organizational design. One of the first changes that comes with the implementation of new technologies in company is change in job positions because companies must have the employees with new knowledge and skills (Clegg, 2003). Each company which implements new technologies must have employees who are competent for their use (Harreld, 1998). For that reason, the aim of this paper is to answer on the following questions: (1) What are the new job positions in companies that use Big Data technologies? (2) What knowledge and skills must employees who work with Big Data technologies have? and (3) In which way are those employees placed in a company?

1. IMPLICATIONS OF BIG DATA TECHNOLOGIES ON EMPLOYEES

Organizations are open social systems that process information in order to interpret the external environment and accomplish internal tasks (Daft & Lengel, 1986). Ever since

the appearance of organization, decision makers have striven to get regular and reliable information for variety of purposes – control and coordination of activities, planning future moves, innovating (Khandwalla, 1977). At the beginning of the 21st century, technology progress leads to possibilities to collect and analyze large quantities of data from variety of sources in real time. Those data stimulated development of new technologies and techniques which can handle them, so-called Big Data. As companies are operating in a highly competitive environment and must be able to quickly adapt to the constantly changing conditions (Janaćković, Milovanović & Milovanović, 2016), Big Data technologies can be of great importance to them. Those technologies enable companies to uncover new insights about customers, products, operations and to improve their overall activities. But, organizations must prepare themselves for using Big Data technologies in the right way. Many definitions about Big Data are focused only on new technologies and tools for working with data with new attributes, leaving organizational components in shadow (Lukić, 2015). Implementation of Big Data technologies is just one, the first step which is needed in order to make value on the basis of the collected data. There is a need for much broader purview about other components which are necessary for effective use of Big Data. Having in mind that technology encompasses the combination of skills, knowledge, abilities, techniques, computers, tools, and other equipment that employees use to convert or change raw materials into valuable goods and services (Jones, 2012), the aim of this paper is to point out to the employees which are needed for the effective use of Big Data technologies. Employees must be competent to use Big Data technologies in a way that will create value for the company on the basis of collected data. They must know what questions to ask, how to handle colected data, how to analyze them and how to use them as a basis for decision making (Lukić, 2015). The article „Data Scientist: The Sexiest Job of the 21st Century" pointed out to the need for professionals who will have a high level of knowledge and skills about how to create value of all available data (Davenport & Patil, 2012). Certain authors stress that technology was never a scarce resource but rather employees who will create value by applying that technology (Gurbaxani, 2003). A recent study of McKinsey Global Institute forecasts a significant shortfall in the big data skills in the United States: of 140.000 to 190.000 people with deep analytical skills and about 1,5 million of managers and analyst for Big Data (Manyika et al., 2011).

2. Research Design and Sample Description

The the aim of this research was to identify the new job positions for working with Big Data technologies which are established in companies, required knowledge and skills of those employees and how those employees are placed in the company. In that sense, three hypotheses should be tested:

- **Hypothesis 1**: Companies that use Big Data technologies have established new job positions.
- **Hypothesis 2**: Employees who work with Big Data tehnologies have multidisciplinary knowledge and skills.
- **Hypothesis 3**: There are changes in organizational structure in companies that use Big Data technologies.

The empirical research was conducted by using specially designed online questionnaire which consists of questions about:

- general information about companies (size, age, industry, location) and respondents (age, gender, education, experience with Big Data, managerial level);
- the new job positions which are established in companies for working with Big Data technologies;
- necessary knowledge and skills of employees who work with Big Data technologies;
- how those employees are placed in company.

The companies that use Big Data technologies in their work were the target population for empirical research, while the target respondents were employees who work with Big Data technologies and are in some of the managerial positions (top, middle or operational level). Accompanying letter and link to the questionnaire were sent to the e-mail addresses of the companies for which there exist public available information that they use Big Data technologies. Beside that, kind request was sent to companies which are engaged in the implemenation of Big Data technology to forward the questionnaire to their clients (companies in which they implemented Big Data technologies). Also, the sample was formed by using the Snowball technique whose key characteristic is that the process of

Table 1 General information about companies: age, size, industry and location

Variable	Answer	Frequency	Percentage
Age of the companies	To 5 years	41	19,2
	From 6 to 15 years	43	20,1
	Above 15 years	**126**	**58,9**
	Total valid responses	210	98,1
	Missing responses	4	1,9
	Total	214	100,0
Size (regarding the number of employees)	Micro and small companies	41	19,2
	Middle companies	43	20,1
	Large companies	**126**	**58,9**
	Total valid responses	210	98,1
	Missing responses	4	1,9
	Total	214	100,0
Industry	Banking and Finance; Insurance	59	27,6
	Production; Transport and Logistics; Whosesale and Retail	39	18,2
	ICT; Telecommunications	80	37,4
	Consulting	35	16,4
	Total valid responses	213	99,5
	Missing responses	1	0,5
	Total	214	100,0
Location	Europe	**74**	**34,6**
	Asia	24	11,2
	North and South America	33	15,4
	Australia and Oceania	7	3,3
	Africa	3	1,4
	More continents	**69**	**32,2**
	Total valid responses	210	98,1
	Missing responses	4	1,9
	Total	214	100,0

collecting answers begins with a pre-defined list of subjects that meet the necessary criteria, and then each of the participants gave the proposal of other subjects which also meet the required criteria (Black, 1999).

The process of collecting answers from the questionnaire lasted from the 3rd of March until the 03rd of May 2016. After two months, the relevant answers were collected from 214 companies. General information about companies that participated in research is presented in Table 1.

The largest number of companies exist for more than 15 years (126), while among them there are 29 companies which exist for more than one century. The average age of companies which participated in research is 44 years. Measured with the number of employees, the largest number of companies (126) belong to category of large companies, while among them 74 companies have above 10000 of employees. The results show that Big Data technologies are used in companies from different industries. The largest number of companies are working in

Table 2 General information about respondents: age, gender, education, experience with Big Data technologies and managerial level

Variable	Answer	Frequency	Percentage
Age	Less than 26 years	18	8,4
	From 26 to 35 years	**93**	**43,5**
	From 36 to 45 years	60	28,0
	From 46 to 55 years	21	9,8
	Above 55 years	6	2,8
	Total valid responses	198	92,5
	Missing responses	16	7,5
	Total	214	100,0
Gender	Male	**187**	**87,4**
	Female	24	11,2
	Total valid responses	211	98,6
	Missing responses	3	1,4
	Total	214	100,0
Education	Primary School	0	0,0
	Secondary School	5	2,4
	Bachelor or master degree	**166**	**77,6**
	PhD degree	43	20,1
	Total valid responses	214	100,0
	Missing responses	0	0,0
	Total	214	100,0
Experience with Big Data technologies	To 3 years	**107**	**50,0**
	From 4 to 6 years	66	30,8
	Above 6 years	39	18,2
	Total valid responses	212	99.1
	Missing responses	2	0,9
	Total	214	100,0
Managerial level	Top level	29	13,6
	Middle level	51	23,8
	Operational level	**132**	**61,7**
	Total valid responses	212	99,1
	Missing responses	2	0,9
	Total	214	100,0

ICT and telecommunication industry (80) and after that in banking, finance and insurance (59). Companies are from almost all continents, but the largest number of companies are from Europe (74) or they operate on more than one continent (69). General information about respondents is presented in Table 2.

The average age of respondents is 36 years, while the oldest respondent is 64 years and the youngest 23. The largest number of respondents are those who are between 26 and 35 years old (43,5%), and after them the respondents who are from 36 to 45 years (28%). Regarding the gender, the most respondents are male (87,4%) which is not surprising having in mind the research topic and the fact that males are still dominant in the field of Big Data. Also, it is not surprising that regarding education, the largest number of respondents have bachelor or master degrees (77,6%) while 20,1% of respondents have PhD degrees. Only 2,4% of respondents have secondary school.

Average working experience with Big Data technologies is almost 5 years, 50% of respondents have less than 4 years of experience, 30,8% of respondents have between 4 and 6 years of experience, while the smallest number of respondents have more than 6 years of experience with Big Data (18,2%). The largest number of respondents are on operational managerial positions (61,7%).

3. RESEARCH FINDINGS AND DISCUSSION

The new job positions for working with Big Data technologies. Respondents were asked to select all the new job positions which are established in their companies due to the implementation of Big Data technologies. They also had the possibility to write positions which are not considered in the questionnaire but are established due to the implementation of Big Data technologies. The results are shown in Table 3.

Table 3 The new job positions established in companies for working with Big Data technologies

Job Positions for Big Data Technologies	Number of responses
Data Scientist	154
Data Engineer	146
Big Data Architect	132
Predictive Analytics Developer	98
Head of Big Data and Analytics	97
Hadoop Developer	93
Data Strategist	69
Digital Marketing Expert	58
Chief Data Officer	57
Social Media Expert	50
Chief Analytics Officer	48
Data Explorer	43
Data Governance and Ethics Professional	38
Data Steward	35
Chief Digital Officer	33
Company uses the services of external consultants for Big Data technologies	33
Data Hygienist	17

The results show that three most frequent job positions established in companies for working with Big Data technologies are: Data Scientist, Data Engineer and Big Data Architect. Data Scientists are employees who must have the abilities to identify all hidden patterns in any given dataset by asking the right questions, while Data Engineers are those employees who enable Data Scientists to do their jobs in the most effective way. Data Engineers collect, process and serve data to Data Scientists for further analysis. Big Data Architects are the connection between Data Scientist and Data Engineer and their main responsibility is to build the overall big data environment in organization. There are also new job positions on top managerial level (new C-level roles): Chief Digital Officer, Chief Data Officer, Chief Analytics Officer. Those positions are focused on collection, processing and management of data in order to create value for the company. Results show that some of the companies use the services of external consultants for Big Data technologies in order to apply those technologies in the most effective way. Engagement of external consultants is very important for companies, especially for those which are on the beggining of implementation of Big Data technologies and do not have enough knowledge and experience how to best use them.

Results from empirical research confirm ***hypothesis 1*** that companies that use Big Data technologies have established new job positions.

The importance of hard and soft knowledge and skills for working with Big Data technologies. After we have identified the new job positions established in companies that use Big Data technologies, the goal was to analyze the key knowledge and skills which employees must have in order to succesfully work with Big Data. By reviewing the literature, we point out that those employees must have both – hard and soft knowledge and skills (Lukić, 2013) and we prepare a list of the most frequently stated knowledge and skills in both groups. The respondents were asked to select the knowledge and skills they consider important for working with Big Data technologies. Results are presented in Table 4.

Table 4 Knowledge and skills which are important for working with Big Data

	Knowledge and skills	Number of responses
Hard knowledge and skills	Mathematics	156
	Statistics	188
	Analytics	188
	Programming	195
	Information systems and technologies	151
Soft knowledge and skills	Business acumen	140
	Communication skills	139
	Teamwork	135
	Creativity	157

Results show that respondents consider both important - hard and soft knowledge and skills for working with Big Data technologies. Regarding hard knowledge and skills the most frequently answered options are programming, statistics and analytics, while the most frequently answered options regarding soft knowledge and skills are creativity, business acumen and communication skills. In 1991 Guest stated that for future work with ICT, employees must be „T shaped professionals" who have large (expert) knowledge from one field (vertical line of letter T) while at the same time must have the knowledge and skills from other

disciplines and fields (horizontal line of letter T) (Guest, 1991). In Big Data era this is becoming reality because, as results show, the respondents truly believe that hard but also soft knowledge and skills are very important for working with Big Data technologies. In that sense, ***hypothesis 2*** that employees who work with Big Data tehnologies have multidisciplinary knowledge and skills is confirmed.

The placement of employees who work with Big Data technologies in company. Regarding empirical results about the new job positions established in companies that use Big Data technologies, it is clear that there is a need for new organizational structure. By reviewing the existing literature, it was discovered that Big Data technologies have impacted on grouping of organizational units in companies. The goal of empirical research was to identify how companies place those employees who work with Big Data technologies. Grossman and Siegel identified three most frequent models for allocation of employees who work with Big Data technologies – centralized, decentralized and hybrid (combination of centralized and decentralized model) (Grossman & Siegel, 2014). But in the pilot research, through interviews with experts who work in companies that use Big Data technologies, we identified that besides those three models there are situations when new employees are placed in existing organizational department responsible for ICT. Therefore, the respondents were asked to select one of the following options which is true for their company regarding the placement of employees that work with Big Data:

- A specific organizational unit with employees who work with Big Data technologies has been established in our company (centralized).
- Employees who work with Big Data technologies are located in each business function which has the need for their support (decentralized).
- Some employees who work with Big Data technologies are located in specifically established organizational unit, and the other employees are in different organizational units (hybrid).
- Employees who work with Big Data technologies are placed in an existing part of the company which is responsible for information technologies and systems (existing ICT department – no change).

Results regarding the placement of employees who work with Big Data technologies are presented in Table 5 and Fig. 1.

Table 5 The model of placement of employees who work with Big Data technologies

Variable	Answer	Frequency	Percentage
The allocation of employees who work with Big Data in companies	Centralized	**93**	**43,5**
	Decentralized	25	11,7
	Hybrid	43	20,1
	Existing ICT department	46	21,5
	Total valid responses	207	96,7
	Missing responses	7	3,3
	Total	214	100,0

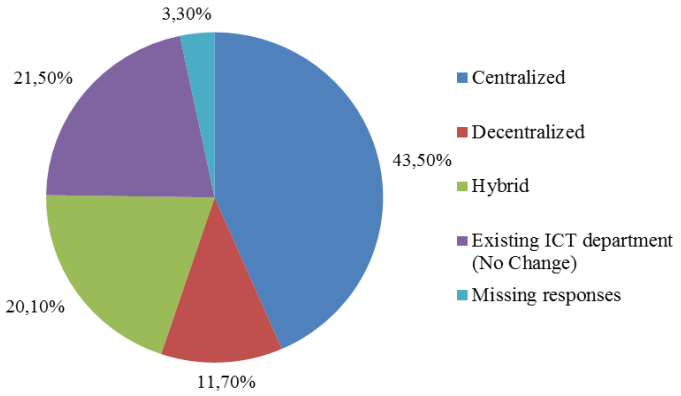

Fig. 1 The model of placement of employees who work with Big Data technologies

According to results, in the largest number of companies, the employees who work with Big Data technologies are placed in specific organizational unit which has been established for that purpose – centralized (43,50%), while the smalest number of companies place those employees in each organizational part which has the need for their knowledge and skills – decentralized (11,70%). Almost equal number of companies place employees who work with Big Data technologies using the hybrid model - some of the employees are centralized and others decentralized (20,10%), or place them in existing part of the organization responsible for ICT (21,50%). Results from empirical research confirm ***hypothesis 3*** that there are changes in organizational structure in companies that use Big Data technologies.

In order to further determine and analyze the impact of Big Data technologies on placement of employees who work with Big Data, the respondents who answered that in their company is established specific organizational unit for employees who work with Big Data, were kindly asked to write the name of it. Collected answers were analyzed using the free online word cloud generator and tag cloud generator http://www.wordclouds.com/ [accessed 01 June 2016] which, among other things, creates a picture with the most frequent words (Fig. 2).

Fig. 2 Word Cloud with the most frequent words that respondents wrote regarding the name of new organizational unit established for employees who work with Big Data

The most frequent names for new organizational units in which are placed employees who work with Big Data technologies are: Big Data, Big Data Center, Big Data Office, Big Data and Analytics, Big Data Team, Business Intelligence and Big Data, and Data Analytics.

CONCLUSION

The question regarding the impact of modern technologies on organizational design is raised one more time due to the development of Big Data technologies. One of the first changes that comes with the implementation of Big Data technologies is establishment of new job positions because companies must have employees who are competent for their use. For that reason, the aim of this paper was to identify the new job positions for working with Big Data technologies, required knowledge and skills of those employees and how they are placed in the company.

Empirical research was conducted by using the specially designed online questionnaire for that purpose. After two months, relevant answers were collected from 214 companies worldwide that use Big Data technologies. Analysis of collected answers confirmed all imposed hypotheses. Firstly, the research results showed that there are new job positions in companies that use Big Data technologies. The most frequent job positions for working with Big Data technologies are Data Scientist, Data Engineer and Big Data Architect, but there are also new positions in top managerial level (new C-level roles): Chief Digital Officer, Chief Data Officer and Chief Analytics Officer. Secondly, results showed that employees who work with Big Data technologies must be T shaped professionals with both hard and soft knowledge and skills. It is not enough for those employees to have only hard knowledge and skills like programming, statistics, analytics, they also must have soft knowledge and skills like creativity, business acumen and communication skills. Thirdly, analysis of research results showed that companies in the most frequent cases establish new organizational unit and place there employees who work with Big Data technologies.

The importance of this research lies in the fact that any modern company which implements new technologies must be focused on its most important resources – employees, because the destiny of implemented technologies is in their hands. The results of empirical research may be of value to companies which want to implement Big Data technologies but also to new candidates who want to work with Big Data, because thay can see what are the most frequent job positions in companies and what knowledge and skills are considered valuable.

Empirical research was accompanied by some limitations that should be considered. The first limitation of the research is that the population was not known in advance - there is no list of all companies that use Big Data technologies. Therefore, the question of representativeness of the sample is opened, and consequently the possibility of generalization of conclusions. Also, the possibility to conduct a longitudinal study on the level of the whole sample in order to examine the impact of Big Data technologies on job positions, knowledge and skills of employees over time is limited.

During analysis of results from conducted empirical research, some proposals for future research appeared. One of the directions for future research might be to investigate the impact of Big Data technologies on new job positions, necessary knowledge and skills through the verification of the hypotheses on a sample of different structure of employees – those wo are not in managerial positions. Also, it would be very interesting to explore the impact of these technologies on establishment and functioning of multidisciplinary teams that

include employees who work with Big Data technologies and other employees from different organizational units.

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NOVE RADNE POZICIJE ZA RAD SA VELIKIM OBIMOM PODATAKA I NJIHOVO MESTO U KOMPANIJAMA ŠIROM SVETA: REZULTATI EMPIRIJSKOG ISTRAŽIVANJA

Zahvaljujući razvoju tehnologija za rad sa velikim obimom podataka, uticaj tehnologije na organizacioni dizajn je ponovo postalo važno i aktuelno pitanje u teoriji i praksi menadžmenta i organizacije. Tehnologije za rad sa velikim obimom podataka predstavljaju nove tehnologije, tehnike, alate, znanja, veštine i metode za prikupljanje, obradu i analiziranje podataka koji imaju nove osobine (količinu, strukturu, brzinu). Sa jedne strane, ove tehnologije predstavljaju faktor okruženja i suočavaju kompanije sa podacima koji imaju nove osobine, dok sa druge strane predstavljaju resurs organizacije koji omogućava kompanijama koje ih primenjuju da kreiraju vrednost na osnovu raspoloživih podataka. Jedna od prvih promena koja se dešava u kompanijama koje implementiraju tehnologije za rad sa velikim obimom podataka jeste pojava novih radnih pozicija jer su kompanijama potrebni zaposleni sa novim znanjima i veštinama. Cilj rada jeste da kroz empirijsko istraživanje identifikuje nove radne pozicije u kompanijama koje primenjuju tehnologije za rad sa velikim obimom podataka, potrebna znanja i veštine koje ti zaposleni moraju imati, kao i način njihovog raspoređivanja u kompanijama.

Ključne reči: *veliki podaci, organizacioni dizajn, T oblikovani stručnjaci, čvrsta i meka znanja i veštine*

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Preliminary communication

CORRELATION BETWEEN OIL AND U.S. STOCK PRICES, WHAT COMPANIES ARE RESILIENT THE MOST IN ENERGY SECTOR

UDC 622.323:338.5

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Abstract. *As OPEC could not recently find an agreement to contain the dramatic oil prices drop, the US, but also worldwide, stock markets have experienced a new decline, limited not only to energy sectors.*
In this paper we examine the statistical correlation of oil prices (Brent) and US energy sector stocks for the past five years (2011-2015). The analysis is carried out on public available data, such as FRED database (Federal Reserve Bank of St. Louis), with a weekly granularity. The output highlights which companies have the highest degree of resistance to oil price volatility. It puts then in comparison those resilient companies with their degree of integration along the energy operations.
As falling oil prices may have impact in different manner on the sub-sectors, some companies may eventually benefit from their positioning along the value chain (downstream vs. upstream segments).

Key words: *Oil Prices, Stock Markets, Statistical Analysis, Data Series Correlation*

1. LITERATURE REVIEW

This paper examines the statistical correlation of oil prices (Brent) and the US energy sector stocks in the past five years. An understanding of interactions between commodity and equity markets can be useful in portfolio diversification strategies for investors. This relation is of particular relevance in a period of great instability in stock and bond markets on the one hand and great price drop in oil prices on the other.

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There was some research in literature on the relations between oil prices and stock market returns. Usual assumption is that this relation is negative: increases in oil prices raises costs in many industries, depressing stock prices by lowering expectations about future earnings and dividends. According to this logic, current situation in which the oil price is falling, should lead to rising expectations about future earnings and dividends.

There are very few studies that examine the relationship between oil price and stock prices of the oil industries. In the article from 1993 Al-Mudhaf and Goodwin examined the returns from 29 oil companies listed on the New York Stock Exchange. Their findings suggest positive impact of oil price shocks on ex post returns for firms with significant assets in domestic oil production. Huang, Masulis and Stoll (1996) used regression analysis and examined the link between daily oil future returns and daily United States stock returns. Their results provide some evidence that oil future prices have a direct impact on oil sector stock prices. Shaharudin, Samad and Bhat (2009) examined the effect of oil prices movements on the stock price of Oil and Gas companies in three different markets, the US, India and the UK. The results suggest that there are significant short- and long run relationships between oil price and the oil stocks, including the effect of the other variables such as interest rate and the stock index. The oil price volatility transmission has a persistent effect on the volatility of the stocks of the oil companies in all the countries that were studied. Limitation of this study is the fact that stocks of the two major companies in each country in the field of oil and gas industry are analyzed, which makes total of six stocks. Finally, Gilmore, Mc Manus, Sharma and Tezel (2016) investigated dynamic relationships between WTI crude oil prices, two oil sector stock price indices and three stock market price indices representing large, mid and small capitalization stocks. A vector error-correction (VEC) model reveals that the stock prices of companies in the integrated oil and gas sector have a long run negative relationship with oil prices, while those in the oil and gas exploration and production sector have a long-run positive relationship with oil prices.

2. INTRODUCTION

As any other commodity, oil price is regulated by rules of supply and demand. The expectations have significant impact on oil price. Price of a barrel of oil has fallen more than 70 percent since June 2014, when the barrel cost USD 110. Prices recovered a few times last year, but a barrel of oil has already sunk this year to its lowest level since 2004. In the beginning of February, the main international benchmark, Brent crude, was trading at around USD 35 per barrel.

Many economist and analysts emphasize several main reasons for a fall in oil prices. Demand is low due to weak economic activities in China and all over the world in general. The economies of Europe and developing countries are weak and vehicles are becoming more energy efficient, so demand for fuel is dropping. Also, mild winter temperatures have not boosted demand.

The United States domestic production has nearly doubled over the last several years, pushing out oil imports that need to be sold elsewhere. Saudi, Nigerian and Algerian oil that was once sold in the United States is suddenly competing for Asian markets and the producers are forced to drop prices. Canadian and Iraqi oil production and exports are rising year after year. Even the Russians, with all their economic problems, manage to raise their production.

However, the Saudis have decided not to sacrifice their own market share to curb the falling prices of oil, since this process is most beneficial for Russia and Iran. Their costs of getting oil from the ground are very low USD 5-6 per barrel, much cheaper than other oil producing countries. Thus, they started new strategy, letting the price fall and putting high costs producers out of business.

Previously stipulated circumstances have some specific effects. American frackers who have borrowed heavily on expectation of continuing high prices and who have already constructed more than 20,000 oil wells in the expectations of high oil prices are now in trouble. In trouble are also other Western oil companies with high cost projections involving drilling in deep water or in the Arctic.

Hard hit fell on the regimes and nations who are dependent on a high oil price to pay for costly foreign adventures and social programmes, such as Russia and Iran. Russia is already hit by the Western sanctions, following its meddling in Ukraine and Iran which is paying to keep the Assad regime afloat in Syria. Nigeria has been forced to raise interest rates and devalue the naira. Venezuela is closer than ever to defaulting on its debt.

Big importing countries in the Euro zone, Japan and India, are enjoying especially big windfalls. Since these savings are more likely to be spent than stashed in a sovereign wealth fund, global GDP should rise. The falling oil price will reduce already low inflation still further, and so may encourage central bankers towards looser monetary policy.

Central factor in the sharp price drop, analysts claim, is the continuing unwillingness of OPEC, a cartel of oil producers, to intervene to stabilize the markets that are widely viewed as oversupplied. Iran, Venezuela, Ecuador and Algeria have been pressing the cartel to cut the production to firm up prices, but Saudi Arabia, the United Arab Emirates and other Gulf allies are refusing to do so. At the same time, Iraq is pumping more and Iran is expected to become a major exporter again. Saudi officials have said that if they cut production and price goes up they will lose the market share and merely benefit their competitors. If prices remain low, for another year or longer, the newly crowned King Salaman may find it difficult to persuade other OPEC members to keep steady against the financial strains. The International Monetary Fund estimates that the revenues of Saudi Arabia and its Persian Gulf Allies will fall for approximately USD 300 billion this year. Some oil executives are quietly noting that the Saudis want to hurt Russia and Iran, and so does the United States, so the two oil producing nations are trying to force down the prices. If we analyze the history, one of the important factors in bringing down the Soviet Union was dropping the oil prices in 1980s.

While market surplus is expected to continue in 2016, some analysts predict an increasing drop in oil prices for the months to come.

On the demand side, 2015 has seen oil consumption slightly increasing to 93.8 Mb/d (million barrels per day) according to EIA - Energy Information Administration. This trend should continue in 2016, where developed economies appear to be modestly recovering and the Chinese economy, the world's second largest oil consumer, is slowing down.

On the supply side, oil supply reached 95,7 Mb/d in 2015, and forecasts provide a slight increase in 2016 to 95.9 Mb/d over 2016. More specifically OPEC crude oil production is expected to increase by almost 1 Mb/d as Iran sanctions are suspended. Moreover, inventories are at a high level, which also explains the oversupply, and stocks are equivalent to 66 days consumption.

At the same time, the US production is already falling as the drop in oil price has weakened the US producers with high impacts on their margins. The US crude oil production is forecast to fall from 9.4 Mb/d in 2015 to 8.7 Mb/d in 2016, according to EIA estimates.

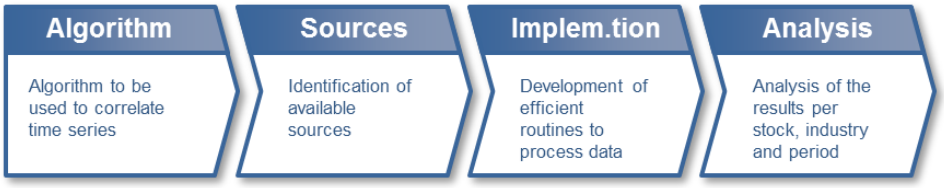
The low oil price situation is affecting oil producers already weakened in 2015 by the sudden price decreases. This trend is progressively impacting the whole value chain in the oil-energy sector.

As a consequence, global stock markets, traditionally resilient to oil prices fluctuations, have started to decline, showing a growing interconnection with oil prices volatility. This paper explores the statistical correlation of oil prices (Brent) and the US energy sector stocks for the past five years and tries to identify what companies/sub-segments of the value chain are more resilient to the oil price volatility.

3. METHODOLOGY

This paper investigates the statistical correlation of oil prices (Brent) and US energy sector stocks for the past five years (2011-2015).

As a first step we have defined the approach used in this paper, described as follows:



Phase	Key criteria
Algorithm selection	▪ efficient enough to process large series data in short time; ▪ providing a degree of correlation together with a level of significance.
Sources Identification	▪ official and auditable; ▪ retrievable on-line; ▪ covering the chosen observation period.
System Implementation	▪ able to retrieve data on-line, process data and present results; ▪ quick enough to run the exercise several times in a short period.
Results Analysis	▪ Output data including correlation metrics; ▪ 3 analysis dimensions: stock, industry and period.

In order to highlight which companies and industries have the highest correlation with oil price trends, we had to analyze the problem by looking at hundreds of time series, and comparing them against a given one. This system is called 'Market Price Trends Analyzer' (MPTA).

MPTA relies on a batch process to find stocks that correlate to the given price time series. It searches thousands of candidate series in under 900ms in order to find the best matches for a target time series.

The input series of MTPA consist of weekly average end-of-the-day price points. Initially we investigated the use of brute force search for the correlated series, but it resulted immediately too expensive. So we have opted for a statistical algorithms that may result much more performing in terms of speed.

The developed approach has then been applied to series of the stock prices within the energy sector, provided by Nasdaq and NYSE, comparing them against the time series of Oil price (Brent price).

All data are represented as vectors of prices. Each vector represents a stock, each element of the vector the average weekly end-of-the-day price of that stock in a given week.

We chose to compare vectors using the standard definition for Pearson correlation between two time series, specifically:

$$r(u,v) = \frac{\sum_{i=1}^{n}[(u_i - \mu(u))(v_i - \mu(v))]}{\sqrt{\sum_{i=1}^{n}(u_i - \mu(u))^2}\sqrt{\sum_{i=1}^{n}(v_i - \mu(v))^2}}$$

If two vectors u and v are perfectly correlated, then r(u, v) = 1. The distance in this case is equal to zero, so we use the standard definition of Pearson correlation distance.

$$d_p = 1 - r(u,v)$$

Stocks prices series may have some 'holes' in their data. This may happen when a stock is listed during the observation period, when stock trade is temporary suspended for whatever reason, or in a number of other cases. For this reason we needed support for 'holed' periods.

When a vector has missing values (i.e. not real or negatives) we exclude that value for both vectors.

$$(u;i) and\ (v;i)\ where\ v\ \in\ Q^+, u \in\ Q^+, i \in \{1,2,\dots n\}$$

As reported in (4), we considered then only positive values (i.e. belonging to Q^+) within the observation period. When a value is 'missing' in one of the series, then the corresponding week data are not computed by the algorithm.

The correlation level has been evaluated on the basis of the following table.

R-Value	Correlation	Relationship
0.00-0.20	none	none
0.20-0.40	very low	not appreciable
0.40-0.60	low	slightly visible
0.60-0.80	high	visible
0.80-1.00	very high	intense

As a significance test we used the t-Student distribution with n-2 degrees of freedom (minimum value - critical R), a=0,05.

As described, sources must be:

- Official
- Auditable
- Retrievable on-line
- Able to cover the chosen observation period

There are a number of sources (paid and free) that correspond to some of the previous criteria, but only few that fit to all of them.

For the purpose of this paper we have chosen the following sources:

- Crude Oil Prices
  - Data: Brent Europe price
  - Description: end of the day price expressed in USD
  - Source: Federal Reserve Bank of St. Louis, US (FRED database)
  - Frequency: weekly
  - https://research.stlouisfed.org/fred2/series/DCOILBRENTEU# (free)
- Oil-Energy
  - Data: Stock ticker
  - Description: set of 630 tickers (including sector, industry and Exchange) related to energy companies listed in NYSE and Nasdaq
  - Source: Zacks Investment Research
  - Frequency: none, sample taken in January 2016, active companies
  - http://www.zacks.com/screening/stock-screener (paid)
- Stocks
  - Data: Stock Prices
  - Description: end of the day price expressed in USD
  - Source: Yahoo Finance (source: Nasdaq and NYSE)
  - Frequency: weekly
  - http://real-chart.finance.yahoo.com/table.csv?s=[TICKER]&a=00&b=01&c=2011&d=11&e=31&f=2015&g=w (free)

In the observed period, oil price showed different dynamics moments. So we split the observation period into different temporal segments that we wanted to investigate in terms of correlation with stocks. The resulting 4 temporal periods are described here below (and graphically in (Figure 1.)):

(1) 2011-2015: last 5 years, a trend with ups and downs
(2) Jan15-May15: 5 months, sharp drop
(3) May15-Jul15: 3 months, sharp increase
(4) Aug15-Dec-15 : 5 months, sharp drop

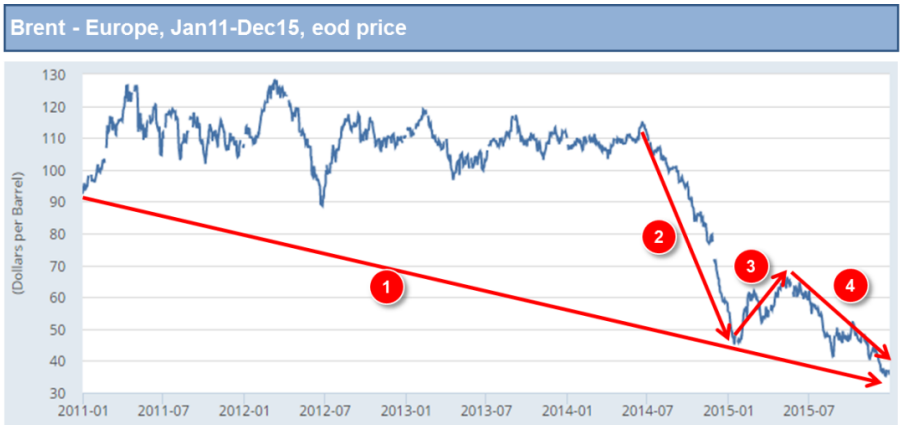


Fig. 1 Temporal periods chosen for the analysis

The resulting data set is large, but still storable in a single database memory: a sample of more than 68,000 data representing the weekly end-of-the-day average price in the last 5 years of 303 companies listed in NYSE and Nasdaq, under the sector 'Oil-Energy'. Each stock is represented by a vector that consists of 260 weeks of data retrieved on-line.

The process provides the following steps:

One-off activities

(1) Storage of the list of tickers representing the stocks listed at Nasdaq and NYSE under the chosen sector

Recurring activities

(2) On-line data retrieval per each ticker
(3) Data series storage into vectors
(4) Vectors cleaning (the system checks validity of data and discards non-valid points)
(5) Comparison with the Brent price equivalent vector: calculation of r coefficient (Pearson correlation) and the R_c threshold (critical value for two-tailed test, a=0,05)
(6) Representation of resulting data together with the following dimensions: stock, industry and period.

Points 5 and 6 are processed 4 times, according to the 4 different temporal segments (Jan11-Dec15, Jan15-May15, May15-Jul15, Aug15-Dec-15), that represent different moments of oil price trends.

Processing efficiently such an amount of data required the development of software that could replicate the process previously described. So we have chosen to develop the MTPA software as follows:

- Developed in Dot Net (Microsoft Visual Studio 2012 Development Platform)
- Hosted on web server machine that can run faster all process phases
- Performances sent via FTP to localhost

It took 3 minutes for the server to complete the data gathering phase, and another 5 minutes to calculate correlation and significance, for a total processing time of 8 minutes. The algorithm is on-line and can be run at:

http://www.marchitelli.net/BBA-correlate-oil-stocks.aspx

4. Empirical Results

As shown in Figure 2, the sample is largely represented by Oil & Gas Production industry companies (54%), followed by Integrated Oil companies (9%), Oilfield Services/Equipment (8%) and Natural Gas Distribution (8%). Less important in the sample are the other industries: Industrial Machinery/Components (6%), Oil Refining/Marketing (5%) and Coal Mining (4%) and Metal Fabrications (4%). A marginal presence of Consumer Electronics/Appliances (1%) and Electric Utilities (1%) completes the sample.

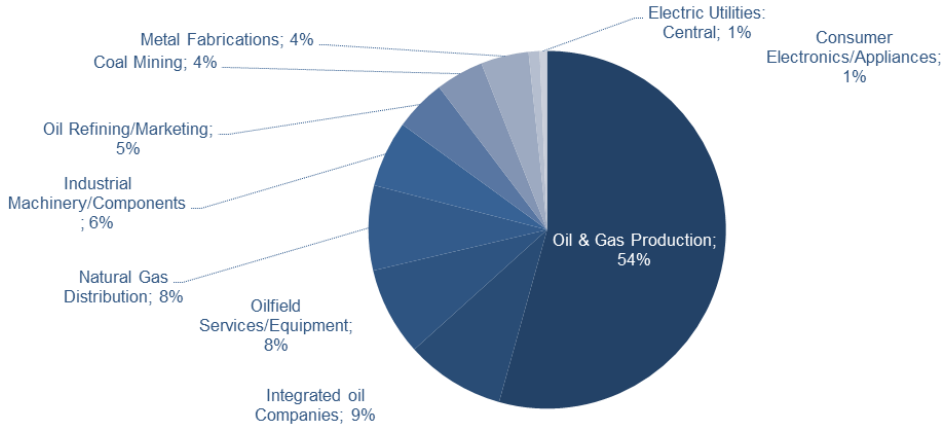


Fig. 2 Sample composition

We have considered significant only those stocks that present very high correlation (i.e. R>=0.8) with oil price series and that passed the significance test (R>= Rc).

If we consider the whole period (5 years), there are only few industries that show a high number of stocks correlated. These industries belong to the upstream segment of the value chain: Oil&Gas Production is impacted for 2/3 of its companies, Metal/Coal and Utilities for more than a half.

On the other hand, downstream segments show a small number of stocks with high correlation. Consumer Electronics and Industrial machinery appear to be highly resilient to oil price fluctuations.

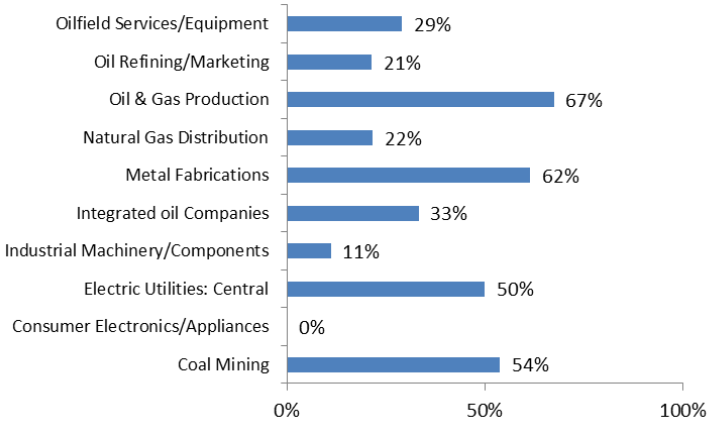


Fig. 3 Percentage of companies with high correlation, split by industry, in period 2011-2015

When it comes to the first semester of 2015 (January to May), the behavior of stocks changes significantly. In this temporal period oil prices were cut by 2 in only a few months. The impact on the sector is expected then to be quite significant.

In fact, for both upstream and downstream segments, the correlation is growing and almost all industries are correlated for more than half of their companies. But the most impacted industries are linked to production, mining and metals. Oil refining and distribution appears to be less impacted and utilities show no correlation at all.

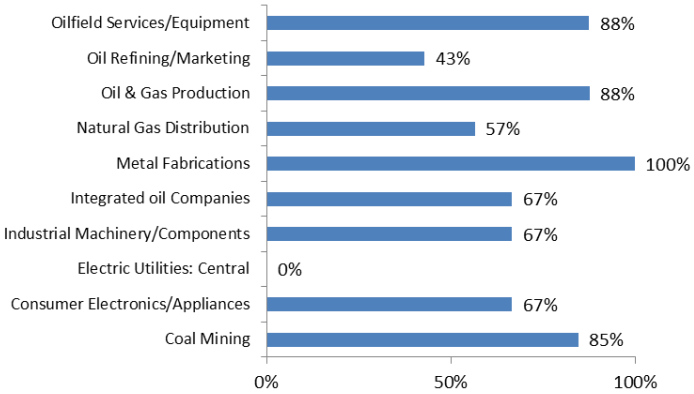


Fig. 4 Percentage of companies with high correlation, split by industry in period January 2015-May 2015

From May to June 2015 oil price had a sudden increase, in the order of 40%. As the volatility increases, the correlation shows a higher impact for all industries. The vast majority of companies of the sample show a high correlation with oil prices. Only Coal Mining industry shows a better resilience.

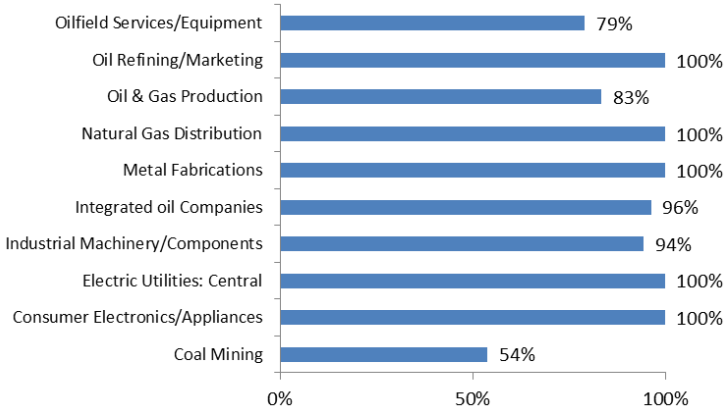


Fig. 5 Percentage of companies with high correlation, split by industry, in period May 2015-July 2015

In the last part of 2015 oil price had again a sudden drop, moving from almost USD 70 to approximately USD 35.The almost totality of the sample shows a full correlation for this last observation period. Even the most resilient industries are now basically following the sharp Brent drop. Only Coal Mining shows a slightly lower level of correlated stocks.

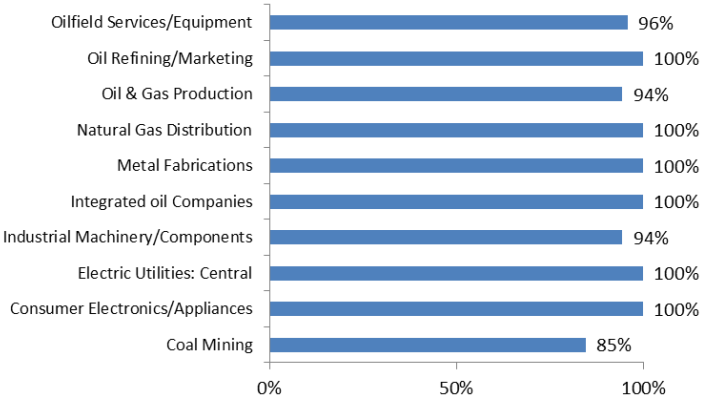


Fig. 6 Percentage of companies with high correlation, split by industry, in period August 2015-December 2015

CONCLUSION

In this paper we analyzed statistical correlation between oil prices (Brent) and US energy sector for the past five years and tried to identify what companies/sub-segments of the value chain are more resilient to the oil price volatility.

We analyzed 4 periods. In period Jan 2011-Dec 2105, some sectors belonging to the downstream segment of the value chain show a little number of stocks with high correlation, and upstream segments show higher correlation. In period Jan 2015-May 2015, for both upstream and downstream segments the correlation is growing, almost all industries are correlated for more than half of their companies. In period May 2015- Jul 2015 the correlation is growing for all industries, the vast majority of companies of the sample show a high correlation with oil prices. Finally, in the last five months of 2015 almost all companies are highly correlated to Brent trend. Even the most resilient industries are basically following the sharp Brent drop. Interesting finding is that for the whole period from January 2011 to December 2015 about 51% of companies show high correlation with Brent, but in the sub-periods this correlation is stronger, 80% in the first, 87% in the second and 96% in the third sub-period. In short periods oil prices have strong impact on stock prices, but in relatively longer time period, changes in stock prices are less related to changes in oil prices, which could be result of many factors influencing the stock prices, such as structural factors.

These findings should be useful to investors in their attempts to appropriately structure their overall portfolios. Analysis of oil price changes can be used as indicator of stock prices, especially stock prices from oil industry. Investors that want to buy stocks, especially stocks from oil industry should be well informed about the oil prices. If they want to invest in something highly correlated, they have to pay attention to oil prices.

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KORELACIJA IZMEĐU CENA NAFTE I CENA AMERIČKIH AKCIJA, KOJE KOMPANIJE U ENERGETSKOM SEKTORU SU NAJOTPORNIJE

S obzirom da zemlje OPEK-a nisu postigle dogovor u cilju zaustavljanja dramatičnog pada cene nafte, cene akcija na američkoj berzi, ali i cene akcija na berzama širom sveta su ponovo pale. Taj pad cena akcija nije bio ograničen isključivo na energetski sektor.

U ovom radu se analizirala statistička korelacija cene nafte (Brent) i akcije američkih kompanija koje pripadaju sektoru energetike u prethodnih 5 godina (2011-2015). U analizi su korišćeni javno dostupni podaci , poput FRED baze podataka, sa nedeljnom frekvencijom.

Rezultati analize izdvajaju kompanije koje pokazuju najviši stepen otpornosti na volatilnost cene nafte, a zatim se najotpornije kompanije stavljaju u odnos sa njihovim stepenom integracije duž proizvodnog procesa energetskog sektora.

Kako pad cene nafte može na različit način uticati na podsektore, neke kompanije mogu imati određene koristi od pozicioniranja duž lanca vrednosti (uzvodni i nizvodni segmenti).

Ključne reči: *Cena nafte, berze, statistička analiza, korelacija serije podataka*

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Preliminary communication

SELLING OF ENTERPRISES IN SERBIA AS A FORM OF FOREIGN INVESTMENT

UDC 330.342(497.11)

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Abstract. *In a global economy, foreign direct investments are the most important form of international business activities. Statistical analysis based on bilateral flows of foreign direct investments as well as the specific features of the countries, confirmed the importance of the "gravity" variables in attracting foreign investments. Therefore, the author of this article attempts to further elaborate on what determines the interdependence of business decisions on investment location and incentives for investment. The fact is that many post-communist countries have decided to embark on a radical journey to transform the economy, often with very rapid and bad privatizations of companies. This "economic shock therapy" has largely resulted in the reduction of GDP, a significant reduction in living standards and many other categories. In other words, the concept of development of the countries in transition is focused on the establishment of an attractive environment for capital imports, although the scope and structure of these investments in most cases leads to deindustrialization, which, along with privatization of banks has contributed to the process of excessive consumption of the population, with the highest spending oriented towards imports, increasing foreign trade deficit.*

Key words: *transition, privatization, foreign direct investments, multinational corporations, gravitational variables*

INTRODUCTION

Generally accepted attitude in developing countries is that foreign investments are the only "right path" leading to the "promised" prosperity only if the "structural adjustment of the economy" has been enforced. The research conducted in Slovenia after the year 2000 on the impact of foreign investments on the national economy has shown that (Rojec, 2002, 31):

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- the arrival of foreign investors changes the quality of production,
- the changes in the organizational structure are necessary,
- that a permanent education of personnel is mandatory, especially management structures at all levels,
- IT application is logical, as well as applying international standards of financial and accounting reporting,
- for solving redundancy problems "soft" methods are commonly used (early retirement, training to start their own business and so on)
- product development programs and programs for developing environmental procedures are necessary but are now rare in countries in transition.

Today, when all countries have more or less liberalized their national policies, attracting foreign investments is not an easy task. Especially since we know that only targeting can determine the type of investment that the country specifically needs, and then the circle of those who can use certain incentives for investment in the particular country. Nevertheless, it is evident by all indications that the most of the foreign direct investments are realized in developed countries, which is logical given that multinational companies originate from these countries. According to available data, in 2007 the United States had regained the position of the largest single host country for foreign direct investments in the world. Japan has, for the first time since 1989, recorded a negative net inflow in 2007, while China and Hong Kong remain the leading destinations among Asian countries (Begović et al., 2008). In 2014, however, global foreign direct investment inflows decreased compared to the previous year, due to the instability of the world economy, geopolitical uncertainty, a major disinvestment in the US, and are estimated at 1.260 billion dollars. In developed countries, they were reduced by 14% and are estimated at about 511 billion dollars, in the EU they had reached 267 billion dollars, which is only a third of the level they have been at in 2007.

As the countries in transition, on the one hand, with more or less success finalized the privatization process of state and socially-owned enterprises, and on the other there has been a decrease of global flows of foreign direct investments, there is a concern in these countries about how to get out of the vicious circle of poverty since they do not possess their own start-up capital. In the Republic of Serbia, as a country in transition, the bulk of FDI inflows came exactly from privatization-acquisition of existing companies. In many cases it turned out that privatization has not yielded the expected results. In particular, customer-investors did not realize their contractual obligations, primarily in respect of investment and social programs, and additional investments in the expansion of their own businesses were rare. Some justified the failure by too ambitiously set plans of the new owners, the wrong assessment of the current situation in the acquired firms, as well as their position in the market. It has also been argued that foreign direct investments are "subtle forms of occupation" (Chives, 2013) because:

- they exploit low-wage workforce,
- they intake a part of the social accumulation,
- outflow of funds is realized from payments of dividends by multinational companies, as well as from use of royalty payments, management fees and transfer prices,
- growth and development of the domestic economy is prevented by the strong foreign competition,
- key segments of the economy are taken over from foreign investors who thus become more important and more powerful factor in society.

To support these views, the Germidis research realized on a sample of 65 multinational companies in 12 developing countries is cited, and has shown that there is almost no transfer of new technology to local firms (Findly, 1978, 1-16), while Aitken and Harrison have demonstrated in the case of firms from Venezuela that foreign direct investments lead to a decline in labor productivity (Lui, 2004; 177). Therefore, it is difficult to find a foreign investment for which it can be said that it is a useful and developmental investment. As opposed to these claims others state the facts that although the inflow of foreign capital in countries such as Poland, Hungary, Czech Republic, Slovenia, the Baltic states, has led to a significant foreign trade and balance of payments deficit, the strategy of attracting foreign investment proved to be successful after all, because these countries have reduced their deficits over time, and exports have finally started to grow faster than imports. Also, with the use of foreign investments, South Korea, Taiwan and Singapore have built a strong national economy. In Fundly's opinion, the capital that a foreign company invests in the recipient country has a capital role of promoter of advancing technology and allows local companies to improve their business, work more efficiently, and the level of its technical equipment is growing. Therefore, all foreign investment should not be generalized and classified only in "exploitative investment corpus", or the best options for growth and development.

This article deals with the influence of investment funds generated from the sale of state and socially-owned companies in Serbia on the development of the national economy of Serbia and with factors for stimulating investment environment. The basic hypothesis is that foreign direct investments in Serbia after 2000 have not yielded adequate results because the inflow of those investments came mainly through the privatization process. There is also an elaboration on the elements that determine the link between business decisions on investment location and tax incentives. It is emphasized that a tax incentive in itself does not determine investment decisions even though such claims are often found in practice. On the contrary, this article attempts to demonstrate that often, if not always, tax incentives are inefficient and insufficient reason for the arrival of investors.

1. Interdependence between Revenues from Privatization and Efficiency of Foreign Investments in Serbia

The history of foreign investments is not something new because their origins are linked to the beginning of the development of international cooperation. Throughout history, foreign investments have only changed shapes (greenfield, cross-border acquisitions, cross-border mergers, brownfield investment, joint venture investments) and goals. The existence of numerous definitions points out that the approach to their definition and essence was different. Thus, in the early works, international capital flows are explained as a process of interest rates arbitration. Works that are based on the neoclassical paradigm interpret foreign direct investments as a consequence of the existence of differences in the marginal returns of capital flows between countries (Frenkel et al., 2004 and Hosseini, 2005). The first major contribution to the understanding of foreign direct investment as a result of cross-border business activity of multinational corporations was given by Helpman (1984). Further improvements of this conception were made by both Krugman and Helpman (1986), who concluded that the foreign direct investments, as a form of vertical business connections, are the result of differences in relative factor proportions between countries.

Starting from the fact that the institutional holders of investment and financial activities in the global market are multinational companies, whose revenue is measured by trillions of dollars, which employ between ten and one hundred thousand workers. The International Monetary Fund defines foreign direct investments as a form of foreign investments that reflects the goal of an entity from one national economy to realize an abiding interest (long-term relationship and a significant degree of influence on the management) at the company whose headquarters are in another national economy (Lipsey, 2001, 94). There is no doubt that an increase in profits in the long term is declared to be the primary motive for the foreign investor, depending on the profitability of each branch and its interaction within the system. Today, in addition to profits other motives stand out. Thus the motive of acquiring resources and market share gains steps down to make room for increasing the efficiency and the acquisition of strategic assets. The motif problem is further complicated if we take into account the attractiveness of countries for receiving foreign investment, which is in functional dependence on the orientation of investors towards the market, resources, or efficiency increase. The orientation on the search for a market puts the focus on market size and gross domestic product per capita, market growth, access to regional and global markets, consumer preferences and the like.

The resource attractiveness, in turn, is determined by the availability of raw materials, qualified workforce and its low prices, innovation and infrastructure. If the increase in efficiency is required, most valued are the cost price of material and human resources, the country's membership in regional integration, various benefits offered by some governments (investment allowances, social benefits) and the like. As the underdeveloped countries are largely unequal partners as importers of capital and foreign investors, their interests are divergent. Specifically, underdeveloped countries are economically inferior and insufficiently strong to resist the various demands and blackmails from the investors, and therefore have a subordinate role, without a significant impact in international relations, with a lack of vision and development programs, with a weak economy and a lack of domestic capital accumulation. In pursuit of change and ambition to improve the state of the economy and society in general, managements of these countries often make mistakes and introduce foreign investors indiscriminately. Thus the investors with programs of low technological intensity, and often with bad references enter the country.

The more significant inflow of foreign investments in Serbia begins after 2000, while the highest net inflow of these funds (EUR 4,499 million) was achieved in 2006. After that there is a gradual decrease (in 2014 only 1.500 million EUR or almost three times less than the maximum amount achieved). According to UNCTAD's report on investments in the world for 2014, if 1995 is taken as the base, to Serbia from then until 2014 poured 29.27 billion of foreign direct investment, while the total outflow from Serbia was 2.56 billion.

As noted above, however, inflows of foreign investments in Serbia are primarily a result of privatization. In the period 2002-2015 2,372 companies in Serbia were sold and a total revenue of 2,580.20 million was achieved (Table 1). On average, 169 companies per year were sold during this period, and the average value per sales amounted to EUR 1.09 million. The largest number of companies were sold on auction (63.91%) and then on the capital markets (32.67%). The average value of a single auction sales totaled 0.5643 million. The average number of employees per firm sold was 140, and the value of the investments per firm sold 0.4399 million. The largest number of employees was in companies that were sold on the capital market, 42.73% of the total employees in these companies, and the biggest part of investments (81.14%) was realized in companies that were sold by tender.

Table 1 Number of sales companies and income earned on that basis in Serbia

Year	Number of sales companies				Revenue from sales of enterprise mil. EUR			
	tenders	auction	cap mar	total	tenders	auction	cap mar	total
2002	11	151	48	210	200.7	34.90	83.00	318.60
2003	17	515	107	639	595.7	177.30	67.80	840.80
2004	6	181	45	232	11.20	88.30	52.20	151.70
2005	9	156	147	312	67.20	139.00	125.20	331.40
2006	13	155	102	270	50.20	97.20	70.10	217.50
2007	7	164	119	290	27.30	178.20	162.10	367.60
2008	12	131	103	246	33.50	98.00	84.80	216.30
2009	3	44	40	87	3.40	33.70	10.50	47.60
2010	2	16	13	31	0.50	6.60	11.60	18.70
2011	1	1	12	14	0.90	0.10	17.00	18.00
2012	-	2	11	13	-	2.20	13.30	15.50
2013	-	-	7	7	-	-	14.90	14.90
2014	-	-	6	6	-	-	6.80	6.80
2015	-	-	15	15	-	-	14.80	14.80
Total	81	1.516	775	2.372	990.6	855.50	734.10	2,580.20

Source: Public Finance Bulletin No. 138/2016, Ministry of Finance of the Republic of Serbia

Although Serbia has allocated the generous direct subsidies since 2006, FDI inflow was not satisfactory. In fact, until 2008, a total of EUR 289.9 million was granted in incentives, of which three-quarters were allocated to foreign investors. According to the size of subsidies Serbia has for some time been at the top of the CEE. Total subsidies in Serbia in 2014 reached 3 to 3.54% of GDP, while in EU countries they are under the 1.5% of GDP (Belgrade Chamber of Commerce, 2015). As the value of these incentives is fiscally unsustainable - it cannot be a model for attracting foreign investments to Serbia in the future.

Given the observed trend of investments using the methods of correlation analysis, we examined the interdependence of the variations of the number of enterprises sold, number of employees, revenues from the sale of investments and tax revenues. The degree of linear quantitative agreement between the analyzed variables was evaluated by Pearson coefficient of linear correlation, which can be calculated using the following formula:

$$r = \frac{n\sum xy - \sum x \sum y}{\sqrt{n\sum x^2 - (\sum x)^2}\sqrt{n\sum y^2 - (\sum y)^2}} \tag{1}$$

The results show that the correlation between the observed variables is direct, or positive (Table 2). The high value of the correlation coefficient, which in most cases is close to one, indicates a strong linear relationship between all quantities. However, based on the correlation it cannot be concluded whether there is a causal relationship between the observed variables.

Despite significant correlation implied by the high value of the Pearson coefficient, Granger co-integration test has not shown that there is a causal relationship between the observed time series.

Table 2 The value of the correlation coefficient and determination between variables

Indices	Value
Pearson correlation coefficient tax revenues	0,9637
Pearson correlation coefficient customs tax revenues	0,5394
The coefficient of determination tax revenues	0,0275
The coefficient of determination of customs tax revenues	0,2910
Pearson correlation coefficient number of companies sold workers	0,9674
Pearson's correlation coefficient of income from the sale of investment companies	0,8153

Source: Author's calculation using statistical data of the Ministry of Finance of the Republic of Serbia

Given the fact that the observed correlation between the analyzed variables cannot be used to explain the causal connection, but it is a clearly visible linear trend of values of specified quantities in the observed period, for the regression model, which can be summarized as follows:

$$Y_i = \beta_0 + \beta_1 x_i \tag{2}$$

we will use time as an explanatory variable in order to model and then predict the movement of the same quantities in the future (2016 and 2017). The equation of the straight line described by the formula 2 is completely determined by two coefficients: β_0 showing segment on the Y axis, and β_1, which shows the tangent of the angle formed by a line and a positive end of X axis. The value of the coefficient is determined using the method of least squares.

The linear regression models described above, despite the lack of long time series show remarkable degree of accuracy. In the case of regression model for predicting tax revenues, customs duties and corporate income tax determination, coefficient takes values of less than 0.8, which means that the model explains from 2.75% to 29.10% of the variability of the dependent variable. The average absolute percentage error of the values obtained by the model and real values, indicates an error that is greater than 30%, which is why in the future research it will be necessary to consider the modification of the proposed model or the use of non-linear models.

2. FACTORS THAT DETERMINE THE ATTRACTIVENESS OF THE LOCATION FOR INVESTMENT

When observing the geographical structure of foreign investments or participation of major investors according to their country of origin, the largest foreign investors in Serbia are from EU countries, around 72%, and Asia around 8% in 2014, except in year 2009, when Russia invested the most by purchasing 51% of NIS shares (Table 3). Serbia is not characterized only by fluctuations in the volume of foreign investments but also by their oscillations in the branch structure. The foreign investments mainly came to the so-called non-tradable goods sector, and it is known that economic growth is more sustainable as sector of tradable goods is more powerful. For instance, during the entire period from 2000 to 2014, the share of the secondary sector in total realized foreign investments in Serbia was higher than 50%. In 2014, 48% of the investments was channeled into the energy sector, 20% to the production and 7% to trade.

Table 3 The structure of FDI in Serbia to the countries investors come from

No	Country	2005	2007	2009	2011	2012	2013
1	Austria	13.51%	46.61%	17.06%	8.47%	22.85%	5.29%
2	Norway	0.002%	0.13%	-0.04%	0.05%	1.43%	0.46%
3	Greece	14.65%	13.02%	3.40%	0.55%	122.40%	3.78%
4	Germany	12.39%	2.77%	2.92%	4.19%	17.96%	6.30%
5	Italy	1.18%	6.12%	12.20%	7.01%	33.78%	5.71%
6	Netherlands	6.43%	-1.33%	12.55%	13.18%	0.57%	17.06%
7	Slovenia	11.99%	3.52%	2.50%	-5.93%	21.73%	3.19%
8	Russian Federation	0.94%	0.09%	30.58%	4.06%	7.65%	5.89%
9	Luxembourg	7.06%	10.17%	0.44%	44.49%	26.64%	2.94%
10	Switzerland	3.67%	3.87%	4.58%	2.61%	32.41%	6.38%
11	Hungary	1.97%	1.26%	1.30%	3.70%	0.21%	5.94%
12	France	2.78%	3.38%	0.52%	6.22%	5.91%	-0.14%
13	Croatia	2.43%	1.47%	1.45%	0.27%	49.18%	-0.72%
14	United Kingdom	4.11%	-1.16%	3.78%	-0.34%	16.35%	4.27%
15	Montenegro	0.00%	8.38%	-0.26%	0.31%	-3.62%	0.01%
16	SAD	1.29%	1.29%	0.92%	1.40%	11.60%	2.18%
17	Bulgaria	0.05%	1.89%	0.09%	0.04%	12.26%	0.99%
18	Slovakia	1.73%	0.13%	1.79%	-0.26%	-5.56%	0.35%
19	Belgium	0.82%	0.95%	0.17%	0.27%	0.69%	5.68%
20	Israel	0.93%	1.07%	0.00%	0.01%	0.43%	0.27%
21	Latvia	0.42%	0.15%	0.08%	0.09%	1.28%	0.96%
22	Liechtenstein	-2.63%	-0.11%	0.01%	0.54%	-0.18%	0.11%
23	Cyprus	4.53%	5.49%	1.92%	2.33%	16.45%	1.13%
24	B&H	0.29%	-34.19%	0.02%	-0.54%	0.06%	0.72%
25	Other	9.46%	25.03%	2.01%	7.26%	-47.69%	21.25%
	Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

In Serbia, as in other countries, there are developed areas (City of Belgrade and the area of AP Vojvodina) which attract much more foreign investments. The rule is that regions that have a larger population, higher value of GDP per capita, higher economic growth, and a higher concentration of enterprises have greater success in the inflow of foreign investments. Lorentowicz (2006) proved in her research that the geographical position of regions in Poland has an important role in selecting the location for foreign investments. It has been established that the central position of the regions in Poland is suitable for horizontal foreign direct investments, and areas close to national borders for vertical foreign investments, and that the western border is more suitable for vertical foreign direct investments than the eastern border. She highlighted the fact that European integration has made the eastern Polish regions more promising in attracting export-oriented foreign direct investment because it is the EU "gateway to the East" for foreign companies.

Study done by Guimaraes, Figueiredo & Woodward (2000) investigates the determinants of FDI location in urban areas of Portugal (Guimaraes et al., 2000, 115-135). Researchers are of the opinion that the higher cost of labor will attract foreign investors instead of discouraging them, because, according to them, higher wages mean more skilled and qualified workforce. In contrast to this, the research done by Hilber & Voic (2007) states

the opposite, that there is no evidence that any difference in wages has any influence on the location decisions of FDI. Barrios, Gorg & Strobl (2003) found that the choice of location of SDI is affected by the proximity to other firms in the same industry and urban diversity of other manufacturing activities. Unfavourable infrastructure has a negative influence on the choice of location.

Crozet, Mayer & Mucchielli in their research on the location choice of FDI in France (period from 1985 to 1995) have dealt with investment incentives for investing in certain regions (Crozet et al., 2004, 27-57). They proved that investment incentives in the least developed and underdeveloped regions, as well as various grants related to EU regional policy have an insignificant positive impact. The location selection of FDI is positively correlated with domestic demand, while the big distance from home country has a negative impact on the attractiveness of certain regions for foreign investors. This statement is confirmed by the Procher's (2009) research.

The following data supports previous research on the attractiveness of Belgrade for foreign direct investments in Serbia. With an area of 3,234 km², and the estimated number of 1.669.552 inhabitants in 2013, the Belgrade region produces 39.9% of Serbia's GDP, or 926.000 RSD per capita. In 2013 the average number of employees in Belgrade was 562.992, and in 2014 559.231. The number of unemployed was 108.706 on average in 2013, while in 2014 this number decreased to 107.041. According to available data, in 2015 the average number of unemployed amounted to 111.584 people. In the structure of unemployed people the majority has secondary and university education. In 2014, the average net salary in Belgrade amounted to 55,429 dinars. In 2013, in the Belgrade Region there were 41.772 companies with 418.110 employees, which achieved 3.907 billion dinars of operating income, or 22.502 undertakings generated 194 billion dinars of net income. On the other hand, 15.356 commercial companies suffered a 210 billion dinars net loss. The cumulated loss amounted to 1.426 billion dinars. 18.847 companies had a loss up to the amount of the capital, while 12.937 enterprises had a loss above the capital. In the Belgrade Region in 2013 there were 3.318 entrepreneurs with 7.577 employees, who generated 31 billion dinars operating income, or 2.442 entrepreneurs have achieved 1.073 billion dinars of net income. On the other hand, 757 entrepreneurs suffered 331 million dinars net loss. The cumulated loss amounted to 1.1 billion dinars. 655 companies had a loss up to the amount of the capital, while 774 companies had a loss above the capital. In 2015, in the Belgrade Region 52.646 companies and 56.353 entrepreneurs were active. According to data from IPO, in 2012, total payments for investments in Belgrade amounted to 2.37 billion euros, of which investors gave 1.56 billion euros from their own funds, 12.2 million euros came from joint funds of domestic and foreign co-investors, 555 million euros came from credit sources and 287 million euros from other 15 sources. According to the criteria of sources of funds, 20% of funds came from foreign and 11% from domestic sources. From the total amount of funds for investment in fixed assets in 2012 in the Belgrade Region, 90% was for realized works and purchases in 2012 and 10% was for the settlement of liabilities from previous years and the advances made in 2012. Of total investments, majority was related to construction works (40%), the domestic equipment with the installation (28%), and to imported equipment with the installation (22%). 516,8 million euros were invested in the construction of new capacities, which makes 22.46% of new investments, 1.278 million euros were invested in the reconstruction, modernization, upgrading and expansion, which accounts for 65.29% of total new investments, and 505.2 million euros were

invested in the maintenance of existing facilities, which makes 22,25%. When we look at the structure of investments in new fixed assets by the type of construction and by municipalities, we can notice that Novi Beograd is in the lead, and participates in the amount of total new capacity with 10%, while in the value of the reconstruction the largest single share have: Novi Beograd (13%), Zvezdara (11.24%) and Palilula (9.17%). Of the total funds, the relatively smallest amount was invested in maintenance, which corresponds to the long-term trend of devastation of fixed capital economy. Tax incentives to maximize profit: a) Corporate income tax - Ten-year exemption from corporate income tax for investments over a billion dinars and 100 newly employed workers, b) Reduced amount of taxes and contributions to net earnings of new employees until June 30, 2016.

CONCLUSION

Raising the overall level of investment in production-oriented sectors of the economy is a challenge for Serbia. As the investments have mainly entered the sector of non-tradables, it is necessary to focus on attracting investments which would, by encouraging production, consequently lead to the substitution of imports, increased exports, and have the final impact on correcting the situation in foreign trade balance. In other words, for sustainable and stable economic growth and development, Serbia requires a healthy economy. With respect to the criteria of usefulness, we also need acceptable foreign direct investments to the extent that our economy can deliver to other countries.

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PRODAJA PREDUZEĆA U SRBIJI KAO OBLIK STRANIH ULAGANJA

U globalnoj ekonomiji strane direktne investicije predstavljaju najznačajniji oblik međunarodnih poslovnih aktivnosti. Statistička analiza zasnovana na bilateralnim tokovima stranih direktnih investicija kao i specifičnim obeležjima zemalja, potvrdila je važnost „gravitacionih“ varijabli za privlačenje stranih ulaganja. Zato autor u članku pokušava da detaljnije elaborira šta određuje međuzavisnost poslovne odluke o lociranju investicionog poduhvata i podsticaja za ulaganje. Činjenica je i da su mnoge postsocijalističke države odlučile da krenu na radikalan način u transformaciju privrede, često uz veoma brze i loše privatizacije preduzeća. Ovakva, „šok terapija privrede“ je većinom rezultirala u smanjenju GDP, značajnom smanjenju životnog standarda građana i mnogih drugih kategorija. Drugim rečima, koncepcija razvoja zemalja u tranziciji je usmerena na formiranje atraktivne klime za uvoz kapitala, iako obim i struktura ovih investicija u većini slučajeva vodi ka deindustrijalizaciji, koja je uz privatizaciju banaka pomogla procesu prekomerne potrošnje stanovništva, pri čemu se trošenje najviše orijentiše ka uvozu, povećavajući spoljnotrgovinski deficit.

Ključne reči: *tranzicija, privatizacija, strane direktne strane investicije, multinacionalne korporacije, gravitacione varijable*

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