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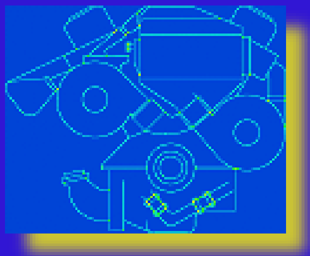

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Editorial on MEST Journal 2016-1

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Belgrade
January 15th, 2016

(Without Abstract)

Welcome to the sixth issue of the MEST Journal, an international peer-refereed academic journal, official journal of the non-profit organization MESTE, and the Faculty of Business and Industrial Management of the "Union – Nikola Tesla" University in Belgrade, and the SZ & Associates - Toronto. This issue is published online and in print The MEST Journal is registered in DOI system by CrossRef with DOI 10.12709/issn.2334-7058. All articles published in this issue, as well as in the previous issues of the MEST Journal, have their own DOIs. The MEST Journal is registered in **doiSerbia** of the **National Library of Serbia**, **COBOB.SR**, **Matica Srpska Library**, **COBISS.SR**, and **EleCas** base of **KoBSON**.
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The focal point of the journal remained at international level, with the view on matters from a global perspective. However, due to their importance, in this issue have been published some papers relating to some specific local events.
In this issue thirteen of submitted papers were published, of which six were classified in the group of research scientific papers, six in the group of scientific review papers, and one in the group "scientific discussion". Most of the articles is multidisciplinary. However, three of papers could be classified to the area of finance and fraud, and three to the field of management. Other articles belong to groups of logistics, economics, sociology, education and ecology.
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Zoran Čekerevac

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- Management in transport
- Technologies and quality tools in management
- Marketing management of research
- Application of IT in management
- Management in ecology
- Business management in agribusiness
- Legal aspects of management
- Taxation

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- Higher education system
- Educational research
- Education technology
- Education management
- Educational leadership
- Education for business
- Distance learning
- Lifelong learning

Society & Science

- Politics and society
- Political science
- Political theories
- Public management
- Public administration
- Physical sciences
- Environmental science
- Energy and use of energy
- Scientific explorations

Information and industrial technologies

- Information technology
- Computers and new technologies
- Application of IT in management
- Application of IT in higher education
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- Data protection
- New services
- Information security
- Information system security
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- Industrial research
- Technology forecasting
- Instrumentation and analytical techniques
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These are basic, but not exclusive themed areas.

Article No.	Category Name(s) of the author(s) TITLE OF THE ARTICLE DOI	Page No.
#1	**Scientific discussion** Walter E. Block **CONTRA HOPPE AND BRAT ON IMMIGRATION** DOI 10.12709/mest.04.04.01.01	1
#2	**Research paper** Andrey Borisov, Violina Velyova **LOGISTICS MANAGEMENT OF PROCESSES ENSURING THE OPERATIONS OF OIL DERIVATIVES CHAIN** DOI 10.12709/mest.04.04.01.02	11
#3	**Review article** Jelena Ivanovic, Marko Teslic **CORRUPTION IN SERBIA AND IN SURROUNDINGS** DOI 10.12709/mest.04.04.01.03	19
#4	**Review article** Sergey Kirsanov, Eugene Safonov, Olga Starineca **ENHANCEMENT OF ADMINISTRATIVE REFORM IN RUSSIA: CASE OF ST. PETERSBURG** DOI 10.12709/mest.04.04.01.04	31
#5	**Review article** Jezdimir Knezevic **MIRCE MECHANICS ANALYSIS OF IN-SERVICE RELIABILITY OF NASA-CONTRACTED COMMERCIAL RE-SUPPLY SERVICES** DOI 10.12709/mest.04.04.01.05	41
#6	**Research paper** Krzysztof Drachal **ANALYSIS OF A TIME-VARYING RISK PREMIUM IN THE VISEGRAD GROUP** DOI 10.12709/mest.04.04.01.06	53
#7	**Research paper** Borislav Lazarov, Daniella Severinova **INTRODUCING BUSINESS EDUCATION IN EARLY MIDDLE SCHOOL – MATH PERSPECTIVE** DOI 10.12709/mest.04.04.01.07	65
#8	**Research paper** Snezana Mihajlov, Nenad Mihajlov **COMPARING PUBLIC AND PRIVATE EMPLOYEES' JOB SATISFACTION AND TURNOVER INTENTION** DOI 10.12709/mest.04.04.01.08	75

Article No.	Category Name(s) of the author(s) TITLE OF THE ARTICLE DOI	Page No.
#9	**Research paper** Ozrislava Milinkovic, Snezana Trmcic **ECOLOGICAL CRITERIA IN THE FUNCTION OF CONSTRUCTION METHODS AND APPLICATION OF DIFFERENT MATERIALS** DOI 10.12709/mest.04.04.01.09	**87**
#10	**Research paper** Ilija Popjanev **MANAGING CUSTOMER LOYALTY IN THE AUTOMOTIVE INDUSTRY USING SIX SIGMA AND “THE TOYOTA WAY” METHODOLOGY** DOI 10.12709/mest.04.04.01.10	**99**
#11	**Review article** Ana A. Sidelnikova, Marina A. Laktionova **RESEARCH VECTORS IN GENDER COMPONENT OF CORRUPTION** DOI 10.12709/mest.04.04.01.11	**111**
#12	**Review article** Dusan Soltes, Alexandra Jencova **SMART TECHNOLOGIES FOR E-SURVEILLANCE IN FIGHT AGAINST FRAUD AND CRIME** DOI 10.12709/mest.04.04.01.12	**118**
#13	**Review article** Marek Stych **SELECTED ISSUES ASSOCIATED WITH POLAND’S COMMUNE ORGANIZATIONAL UNITS AND THEIR MANAGEMENT** DOI 10.12709/mest.04.04.01.13	**127**
A1	Reviewers	**133**
A2	Instructions for authors	**136**
A3	Submission instructions	**140**
A4	Reviewer’s report	**141**
A5	Templates for MEST Journal papers	**143**

MEST Journal
DOI 10.12709/mest.04.04.01.01

CONTRA HOPPE AND BRAT ON IMMIGRATION

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Abstract

What is the proper libertarian position on immigration? Some libertarians favor open borders. An immigrant, merely by showing up at a country's borders, and attempting to cross them, is not committing a per se crime of initiatory violence. Others such as Hoppe and Brat maintain this is indeed a rights violation: trespass. The present paper undertakes a critical analysis of the latter position.

Keywords: *Libertarianism, immigration, trespass, property rights*

1 INTRODUCTION

Han-Herman Hoppe and Walter E. Block have been having a long-running debate concerning the proper libertarian analysis of immigration.[1] The present paper is devoted to a defense of the open borders position of Block against the critique of this view offered by Hoppe (2014). That is the burden of section II of this paper. In section III we consider, and reject, the views of Congressman David Brat (R, Virginia), which are congruent with those of Professor Hoppe's.

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2 HOPPE

In this otherwise excellent, no, magnificent essay Hoppe (2014) states:

"But on what grounds should there be a right to unrestricted, 'free' immigration? No one has a right to move to a place already occupied by someone else, unless he has been invited by the present occupant. And if all places are already occupied, all migration is migration by invitation only. A right to 'free' immigration exists only for virgin country, for the open frontier.

"There are only two ways of trying to get around this conclusion and still rescue the notion of 'free' immigration. The first is to …"[2]

[1] For Block's side of this debate, see Block (1998, 2004A, 2011A, 2011B, 2013); Block & Callahan (2003); Gregory & Block (2007). Hoppe's contributions include his publications of 1989, 1993, 1995, 1998, 1999, 2001, 2002, 2003, 2014.

[2] I enthusiastically agree with Hoppe on his demolition of this first alternative, and thus ignore it.

"The second possible way out is to claim that all so-called public property – the property controlled by local, regional or central government – is akin to open frontier, with free and unrestricted access. Yet this is certainly erroneous. From the fact that government property is illegitimate because it is based on prior expropriations, it does not follow that it is un-owned and free-for-all. It has been funded through local, regional, national or federal tax payments, and it is the payers of these taxes, then, and no one else, who are the legitimate owners of all public property. They cannot exercise their right – that right has been arrogated by the State – but *they* are the legitimate owners."

Before offering my criticism of this viewpoint, let me very briefly summarize this debate. Block, along with Rothbard I (1993) take the open immigration position. There should be no barriers to migration imposed by the state at all. Period. Hoppe, to say the least, along with Rothbard II (1998), demur. One more preliminary point; it is a general comment about the rest of Hoppe (2014), apart from the one point in it on which we disagree: this is a brilliant essay, and courageous too, particularly in this era of political correctness which infests social science and philosophy. As we have come to expect from the pen or computer of this leading libertarian theoretician, the logic is compelling; he does not suffer fools gladly and he takes on crucially important issues. It is a vast understatement to mention that his writing is crystal clear and that he rejects political correctness in all of its malevolent forms. Rather, he devastates the viewpoints stemming from this quarter. With regard to the entirely of this splendid and insightful essay,[3] I am in total and enthusiastic support of every jot and tittle of it, with every word. I am in great admiration of its spirit, its unwillingness to compromise with evil and illogic.

Now for the criticisms. There are two errors in this essay of Hoppe's as I see it. First, a relatively minor one. My fellow libertarian does not appear to realize what a big concession he makes to the open borders position when he talks of "already occupied," "virgin country" and "open frontier." Take the case of the U.S. for example. There are truly *vast* tracts of land that are completely unoccupied. Virtually all of Alaska is empty of human habitation. There are millions of acres of land in the Rocky Mountains that have not been homesteaded, in Montana, Colorado, Wyoming. The Bureau of Land Management (BLM) controls, without ever having homesteaded as much as a square inch of this land, many more swatches of territory. *None* of these hectares have been "funded through local, regional, national or federal tax payments," a requirement of Hoppe's. Suppose an immigrant from Africa or Asia or Mars for that matter were to parachute or helicopter into some of these areas; become the first human (or Martian) to mix his labor with the land; bring in a crop, etc. Would he have per se violated any right a libertarian is obligated to respect? It is difficult to see how he would have done so.[4]

It may be objected that some of this land is sub-marginal, unfit for human occupation. And, yes, there is something to be said in behalf of this view, particularly for the middle of Alaska. But "sub-marginal" is a subjective[5] term. One man's sub-marginal is another's fertile valley. It might be the case that much of this land is sub-marginal for virtually all of the present U.S. population, but this would not apply to those children running away from gangs in South America through Mexico to

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[3] Apart from the small part of it with which I disagree, see below on this.

[4] Not all of the land controlled by the BLM of course, would be up for grabs, e.g., homesteading, by outsiders. For example, Cliven Bundy (http://www.gq.com/news-politics/newsmakers/201407/cliven-bundy; http://abcnews.go.com/US/cliven-bundy-controversial/story?id=23468481; http://www.huffingtonpost.com/news/cliven-bundy/) is the proper owner of a small amount of it, since he and his family homesteaded, used, this land for generations. But there is plenty of virgin terrain, illicitly claimed by government, which is unowned in terms of libertarian homesteading theory.

[5] States Hayek (1979, 52): "And it is probably no exaggeration to say that every important advance in economic theory during the last hundred years was a further step in the consistent application of subjectivism." Also, see the following on this issue: Barnett (1989), Block (1988), Buchanan and Thirlby (1981), Buchanan (1969, 1979), Butos and Koppl (1997), Cordato (1989), DiLorenzo (1990), Kirzner (1986), Mises (1998), Rothbard (1979, 1997), Stringham (2008).

the southern U.S. border.[6] It would scarcely be true of a starving North Korean. Nor are most of those BLM territories sub-marginal by any stretch of the imagination. No, free immigration to those lands cannot properly be construed as trespass, Hoppe to the contrary notwithstanding. There is no proper understanding of the libertarian philosophy is compatible with that conclusion.

Let us now consider the more serious flaw in this Hoppean analysis: the word "abandonment" nowhere appears in his exegesis.[7] He does not even contemplate such an occurrence. And yet, I argue, this concept is crucial to the matter under discussion.

Block (2009) calls for the streets, roads and highways to be privatized. They should not be auctioned off by government, for then this illegal institution would receive the receipts of the sale, and what did it do, pray tell, to receive such largesse? Certainly nothing, compatible with libertarianism. Rather, given a God's eye view, different properties should be divided up in accordance with the amount of taxation forcibly taken from each person to build these facilities, and/or the degree to which they mixed their labor with them. If and only if we cannot determine who are the rightful owners should we resort to anything like syndicalism, where the bakers receive shares in the newly established private bakeries, the farmers the collectivized farms, the steel makers the steel mills, etc. And even here there is a rough approximation to justice, in that these were the people who were long "mixing their labor"[8] with the relevant properties.

But, is this likely to occur? To ask this is to answer it: of course not. Hoppe (2014) attributes this to the fact that "They cannot exercise their right – that right has been arrogated by the State." True enough. This cannot be denied. But is this the only reason? Is this even the most basic explanation? No. There is another one that eludes our author: the vast majority of the supposed owners of this "public property" *agree* with the status quo. Ask the next 100 people who walk by on the street if they support the notion that government roads, streets, parks, museums, schools, libraries, BLM land, etc., should be given to their rightful owners, the people from whom taxes were mulcted to pay for these facilities and/or who most used them. And this is to say nothing of distributing ownership shares in the nation's lakes, rivers, streams, aquifers, etc.[9] Namely, people just like them should become the owners of these amenities. All you will get is blanks stares from 99% of these passersby.[10] These propositions might not even garner disagreement; just incredulity that they would even be asked. Do not these people deserve to lose their property? Can we not say that they have in effect long ago abandoned it, if ever they deserved to own it? Is there nothing that anyone can ever do to abandon any property? It would appear not, in Prof. Hoppe's philosophy. And yet, in this case, where people will specifically disavow anything like ownership in what is supposed to be their property, it would appear there lies a good argument for just that: these people, the overwhelming majority of the populace, have long ago abandoned any rights they have in acreage, buildings, roads, rivers, etc., claimed by the government. If an immigrant steps up and confronts the state over these properties, their supposed owners are in no position to object. In Kinsellian terms (1992, 1996), these people would be "estopped" from objecting to such an occurrence.

Many Orientals live in houseboats in their countries of origin. Suppose they were to set up shop in Lake Superior, or along the Mississippi River. Which property rights a libertarian must respect would they be violating? I suggest none whatsoever. Hence, Hoppe's closed border policy

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[6] This of course is due to U.S. drug policy, but that is entirely a different matter.

[7] For libertarian theories on this concept, see Block, unpublished, 2004B; Block and Nelson, unpublished; Kinsella, (2003, 2009A, 2009B, 2009C, 2011)

[8] On homesteading, see Block (1990, 2002); Block & Edelstein (2012); Block & Yeatts (1999-2000); Bylund (2005, 2012); Hoppe (1993, 2011); Kinsella (2003, 2006); Locke (1948); Rothbard (1973); Rozeff (2005); Watner (1982).

[9] These facilities are a particular weakness for the Hoppe hypothesis since they were not "funded through local, regional, national or federal tax payments."

[10] At best, that is. Far more likely, you will be accused of being an extremist, or a terrorist or a communist; don't ask about the latter.

is plainly erroneous, at least from the libertarian point of view.

Why is it that 99%+ of the American electorate would spurn such a return of property rights they supposedly own, were these but offered to them? Libertarian ruling class theory[11] provides the best answer to this conundrum. It does not pay for the richest 90% of the people to prey on the poorest 10%. Pickings will be very slim. No, things are entirely the other way around: it is the most wealthy 10% of the populace that tends to exploit the weakest 90%. But this sets up a problem at least for the minority in charge. The victims vastly outnumber the criminal class; were they to realize the reality of the situation, they would have little difficulty in overthrowing their masters.[12] Enter the intellectual classes: the professors, experts, scientists, doctors, clergymen, lawyers, journalists and others of Hayek's (1990) second hand dealers in ideas. They are paid, and paid well, to weave apologetics about the system: it is necessary, it is beneficial, etc. The idea that the people themselves could own shares in all government properties after privatization is just plain silly, from their point of view. Hence, the conclusions of my imaginary public opinion survey. But the point is, for whatever the reason, the masses have swallowed whole the idea that government control of property is legitimate, necessary, beneficial for the public weal. This strongly suggests an abandonment of rights, I contend. If so, then it is not trespass when our foreigner, or Martian, immigrates to the U.S. without anyone's by-your-leave and starts homesteading some of this property improperly claimed by the state apparatus.

Consider this statement of Hoppe (2014): "In a world where all places are privately owned, the immigration problem vanishes. There exists no right to immigration. There only exists the right to trade, buy or rent various places."

Here, I suggest, are the seeds of a possible reconciliation between our two seemingly very different positions. We libertarians do not have to be "realistic." We are not in charge of U.S. immigration policy. Hoppe and Block can both, hopefully, unite behind this view: the proper libertarian position is full, free and open immigration. If people are afraid of hordes of unruly immigrants flooding our shores, let us privatize every single square inch of U.S. lands and waterways, without exception: roads, parks, rivers, lakes, sub-marginal land, BLM holdings, museums, libraries, the entire shooting match.[13] Then and only then will we be protected from this inundation scourge. Then and only then will Hoppe's analysis make sense: any uninvited "immigration" would indeed constitute trespass against private property.[14] We libertarians can utter a "threat" to the powers that be: privatize everything, without exception, or be swallowed up by immigrant hordes. And keep those borders completely open.

3 BRAT

Hans Hoppe is and has been a leading libertarian theoretician for decades. Obviously, his views on immigration are not only germane to this philosophy, but crucial to it. Why not conclude the present paper at this point, and entirely ignore the views on immigration of Congressman David Brat (R, Virginia) who might be seen by some as a bit of a Johnny come lately to the libertarian scene? There are several reasons. First of all, Mr. Brat is not at all a recent entrant to libertarianism. He lists on his c.v. (http://faculty.rmc.edu/dbrat/BRAT2012-CV.pdf) the following articles, which are certainly part and parcel of this philosophy: Brat (2011), and Brat and Holland (2010). Further, he has given lectures on the ethics of Adam Smith and has attended several Cato Institute events. Among his listed lectures are: "Moral Foundations of Capitalism

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[11] See on this Block (2006); Domhoff (1967, 1971, 1998); Donaldson & Poynting (2007); Hoppe (1990); Hughes (1977); Kolko (1963); Mises (1978); Oppenheimer (1975); Raico (1977); Rockwell (2001).

[12] According to Mises (1969B, pp. 65-66): "Government, taught Hume, is always government of the many by the few. Power is therefore always ultimately on the side of the governed, and the governors have nothing to support them but opinion. The struggle for freedom is ultimately not resistance to autocrats or oligarchs but resistance to the despotism of public opinion."

[13] Let us do this in any case, since it is part and parcel of libertarianism: full privatization of everything.

[14] But not before. Not when there are still vast amounts of really unowned land, and water.

Talk," "Money, God and Greed – Why Capitalism is the Answer and not the Problem." If this does not establish libertarian credentials, then nothing does. Secondly, and far more important, he is not only a United States congressman, but attained that office in perhaps the most stupendous victory by an underdog in the nation's history, his win over then Congressman Eric Cantor.[15]

With this introduction, let us now consider Congressman Brat's views on the matter.

Stated Brat (2014) as cited in Redden and Corn (2014):

"On the amnesty card, it's a matter of motivation. I teach third-world economic development for the past 20 years, I love all people, I went to seminary before I did my economics, and so you look at the motivation. Why is Eric (Cantor) pushing amnesty? It's not a big issue in our district, everyone's opposed to it, and so why is he doing it? And the answer is, 'cause he's got his eye on the speakership. He wants to be speaker, and big business, right? The Business Roundtable and the US Chamber of Commerce wants cheap labor. So he actually is selling out the people in our district. He's not representing the district, the will of the people, and he's getting big paychecks by doing so. So he's very clear on amnesty" (Material in parenthesis supplied by present author).

This is an interesting, not to say contrary to libertarianism, argument against amnesty for illegal immigrants: big business wants, and can benefit from cheap labor. But there are problems here. For one thing, immigration is a victimless "crime." It is a basic understanding of the liberty philosophy that such activities as addictive drug use, pornography, prostitution, between consenting adults, should be legal. Amnesty should be declared for all of those incarcerated for such "crimes," since they do not violate rights. But immigration, too, falls under this rubric. Therefore, amnesty is justified in this case also. For another just because "big business" wants something, does not make it a per se violation of rights. This is a strange position for a libertarian to hold. It all depends upon, precisely, what it is that is so desired by the corporate world. If it is a bailout for a firm "too big to fail," well and good; this must be rejected. But a desire for "cheap labor" is hardly objectionable. Do we not all want to purchase goods and services at the lowest prices possible? Should this be considered a crime under libertarianism? Certainly not. Were it the case, we would all be in jail.

Let us consider another viewpoint put forth by this newly credentialed congressman. According to Laura Ingraham (2014), a supporter of David Brat's candidacy against Congressman Eric Cantor (cited in Epstein, 2014):

"The lives of most Americans aren't getting any better year after year… Their wages are down or flat as the cost of living is going up. And for the past two years they've seen Eric Cantor focus an inordinate amount of time on how to improve the lives of illegal immigrants. So why should they be expected to return the same politicians back to Washington election after election? Eric Cantor was perceived as arrogant and disconnected–and voters thought it was time that he try to find a real job in this lousy economy."

Again, this is problematic from a libertarian point of view. If these "illegal immigrants" were actually guilty of a crime that falls under the libertarian criminal code, then, yes, it would be unwarranted to "improve" their lives. Criminals, real ones that is, ought to be punished to the full extent of the law. However, it cannot be established, at least not according to libertarian law properly interpreted, that any such status prevails. As for the "inordinate amount of time" focused on this one issue, Mr. Brat may well have a point. It is difficult to know, for reasons mentioned by Mises (1969A) just how much effort would be optimal for a bureaucrat to spend on any one effort. This is due to the Austrian economic calculation problem (Mises, 1949); since there are no market prices in this sector of the economy, there are no objective answers. Brat may be correct in his criticism of Cantor in this regard, and then again he may not be.

Let us consider one last point emanating from this source. Epstein (2014) wrote as follows: "Mr. Brat

[15] Brat's triumph over Democrat Jack Trammel in the 2014 Congressional election is less remarkable, given the GOP sweep of that year.

campaigned as a stark opponent of comprehensive immigration reform. To Fox (News), he couched his opposition to immigration reform as part of a broader theme accusing Mr. Cantor as being too allied with corporate interests.

"'The issue is the Republican Party has been paying way too much attention to Wall Street and not enough attention to Main Street," Mr. Brat said.

"Of immigration reform, he said: 'It's the most symbolic issue that captures the difference between myself and Eric Cantor in this race but it also captures the fissures between Main Street and Wall Street.'"

Again, there are problems. At least for libertarians, the issue is not between Main and Wall Streets. There are businesses on both of these avenues that may be counted as crony capitalist, and also those that operate within the bounds of laissez faire capitalism.[16] It all depends upon whether or not[17] a firm relies on benefits, subsidies, protections, from government. If it does, no matter whether its location is on Wall or Main Street, it is operating illicitly.

Brat's attack on free immigration is to be sure far less sophisticated than that of Hoppe's, but it is no more correct.

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LOGISTICS MANAGEMENT OF PROCESSES ENSURING THE OPERATIONS OF OIL DERIVATIVES CHAIN

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Abstract

This article examines an approach towards logistics supply chain management of oil derivatives. All constituent systems of a logistics chain are analyzed altogether with their parameters and connections and their weak links. Criteron for process optimization of these units is: a high degree of service of the end customers and optimal costs to ensure reliable operation with the necessary resources for this purpose. The three main constituent phases of a logistics chain with their relevant parameters are discussed. In the third phase of the different subsystems are determined safety stocks to ensure flawless service to the end users.

Keywords: *management, transportation, terminal, stocks, distribution, technology, logistics*

1 INTRODUCTION

Being a major sector of the national economy, transport creates conditions of normal functioning and development of the economy itself and it is an important factor to achieve efficiency of production systems. The present article aims to describe a part of the decisions and algorithm of logistics supply chain management of oil derivatives.

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In this case ***the logistics chain*** consists of ***multiple units (sites) related to transport services.*** The sites are places where material flow is processed and passes to the next stage of the process.

Transport services move material flows between sites using transport systems of different modes of transport, sometimes as a part of ***a logistics chain***. The supply chain of main raw materials for oil industry should meet the requirement of high reliability. Its provision with resources and way of transportation directly affects the production process due to the technological requirements of continuity and commitment of the logistics system structural units. The technological description of the activities and their synchronization in a supply chain require different time and resource characteristics in the various states in which system might be. These conditions examine: the irregularities in pessimistic and optimistic scenarios, identification of the key dependencies and connections in the logistics chain (LC), simulation of different strategies when choosing operation and analysis of extreme conditions that result in a failure in the end customer services. On this basis a common concept for operation of the chain with provision of necessary reserves of power and resources is being developed which helps for the predicted extreme conditions and determining the value of total logistics (business) cycle.

In the presented case the logistics management encompasses all activities in a corporate supply chain and distribution of oil derivatives, which properties are: a port terminal ‘Petrol’, a regional base for distribution, a chain of gas stations and specialized road transport for supplies. This means that the subject of study and optimization are the external parameters for the chain, which cannot be influenced by managerial decisions, such as: the supplies and the work of maritime transport at the beginning of the logistics chain, railway carrier which is a link to the port and a base for distribution and the rate of consumption by the end users of oil products through the chain of gas stations. In this case, the railway transport and the working options in various irregularities of the process are extensively researched and described in (Borisov, 2015). Its technological parameters can reliably be determined and regulated in contracts with transport companies for freight services, which ensures low fluctuations in supply. The situation with supplies at the port is similar, as these processes are subject to long-term contracts. An occurrence of possible extreme conditions in the system is taken into consideration. Bottlenecks in the logistics chain are: the pace of realization of oil derivatives, their uniformity, rhythm (frequency) of reloading gas stations and determining the necessary product inventories to ensure quality and timely customer services.

The purpose is the absence of failures in customer services due to lack of derivatives at optimal costs. This optimization process requires detailed market research by regions within which the gas stations are situated, classification of objects by volume and variations of the sales on daily and annual terms.

2 CONCEPT FOR ACHIEVING THE PURPOSES

Step 1. Research, analysis and structure of the logistics chain. Description of the process.

It includes the functional structure of the logistics system with different phases of material flow service which is shown in Fig.1 Description of activities and actors in the process with their connections.

- ***Phase 1*** – includes the processes of arrival of ships in the water area of the port of Varna, unloading and departure. Technology and organization of load-unload processes with the corresponding derivative. Organization of wagon flows for transporting the requested freight out of the port. Determining the technological parameters of the process;
- ***Phase 2*** – technology and organization of main rail transport. Train Traffic Schedule (TTS) and reservation of routes on the National Railway Network. Development of technology for exploitation and signing a contract with a railway transport carrier serving the logistics chain;
- ***Phase 3*** – determining the volumes in terminal ‘Oil Derivatives’, rhythm of entry, safety stock, distribution and service of end users– chain of gas stations.

Step 2 Analysis of random parameters affecting the performance on the entry of the logistics chain– maritime transport (intensity of the incoming flow, variation in intervals and volume, duration of handling the ships).

The ‘Petrol’ tanker port is located in the region of Varna port complex served by Varna railway region. It is equipped with three overpasses for unloading oil derivatives (fuel oil, diesel, gasoline and oil) of three quays as Quay-3 is specialized for unloading diesel and base oils, which is the aim of this study.

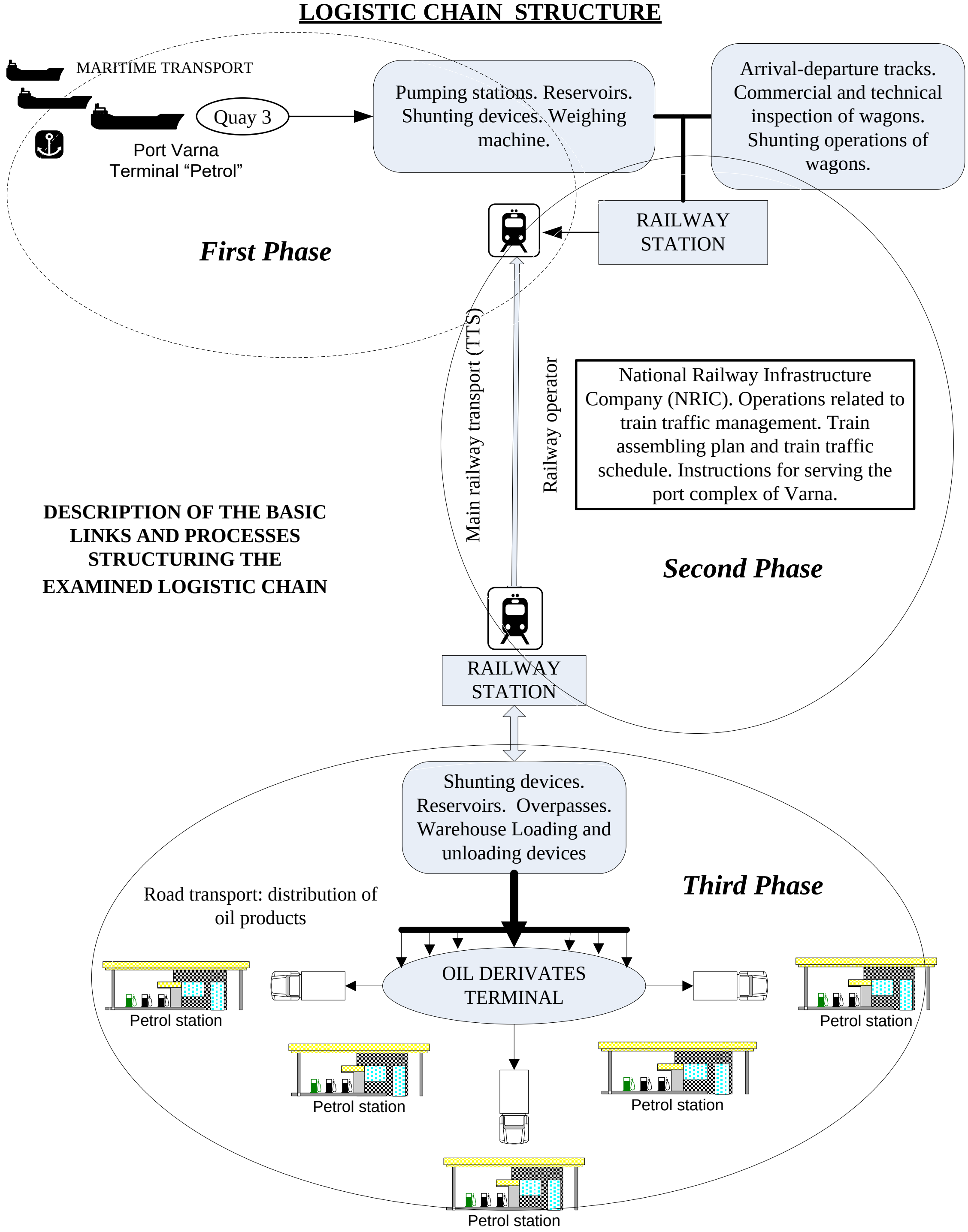

Fig.1 Description of the basic links and processes structuring the examined logistic chain

The load-unload system is run through pumps with processing capacity for diesel of 250 t/h. For safety reasons diesel is unloaded by ‛tanker-tank-wagon‘ scheme. These processes are governed by regulations ruling all activities in the port complex related to handling vessels with dangerous goods according to IMDG Code and IBC Code of IMO.

The handling of ships with hazardous freight is carried according a technology, which is preliminarily developed by the port staff for each load using a technology roadmap agreed upon with competent authorities. Unloading of hazardous freight shall begin immediately after berthing of vessels at the port. The recipients of seaborne hazardous freight are obliged to immediately transport it from the port. If there is a delay in the delivery of dangerous freight, Maritime Administration and competent authorities should be informed.

All time characteristics related to processing of ships are registered in a special document called 'STATEMENT OF FACTS' which has information about: the port, arrived vessels, berthed and commenced vessels, completed, accepted and handed notices, cargo, tons, provided vessels, used time and discharging. These parameters are used as a base to collect statistical information. The average tonnage of all arrived ships at Quay-3 for a period of 18 months was 3600 t, time for unloading (with preparation of hoses) – 16 h, interval of arrival 16.3 hours (min.-7,2; max.-26).

The data about intervals of arrival of 'river-sea' type ships with diesel fuel for Quay – 3 is processed using STATGRAPHICS Plus 5 Professional and after determining the law of distribution of examined variables, the process is modeled for a future period of time. In order to develop the technology of operation at the oil terminal, a pessimistic scenario is created with the compressed intervals by arrival of ships.

Results of the quantity examined in hours:

Analysis Summary: Data variable: Diesel; 17 values ranging from 7.69 to 58.34; Fitted normal distribution: mean= 27.339; standard deviation = 10.1256; fChi-Square= 1.17396 with 6 d.f. P-Value = 0.278588.

Step 3 Implementation of the process of technological design of the transport system 'port – railway transport – oil terminal' (selection of railway carrier).

The process includes the following steps:

- Determination of resources to ensure the railway transport process for 72 hours at a maximum usage of the system;
- Technological design of the system 'main railway transport – port terminal' and selection of optimal version for operation of the railway carrier in the logistics chain;
- Determination of technological parameters of the process (scheduling service, number of wagons, number of trains and shunting sets, duration of operations, number of locomotives, etc.) and resource dimensioning with the examined option.
- Signing a contract with a railway carrier to serve the workflow with previously defined in advance parameters, such as: time and workload of rail transport, volume of traffic flows at the port terminal, regulation of the processes and payments.
- The following results of the rate of incoming freight flow from maritime to rail transport for the busiest period of 3 days were obtained:
- Maritime transport – 5 ships with an average load of 3200 t. In this case the ships are of river-sea type;
- Required number of wagons is 35 wagons/day with load capacity 45 t/wagon;
- The number of trains needed to meet the existing volume of freight is determined (standard for train) depending on the traction characteristics of licensed locomotives used by the railway carrier and the railroad. The maximum gross tonnage in this case is from 685 to 1200 tons with a single traction and 2400 tons for two locomotives. At 75 t gross weight of a wagon there are 32 wagons in train with a length of 544 m (17 m/wagon). This allows to form different train compositions with available rolling stock, with different locomotive resource depending on the of the generated freight flow (for the necessary train gross mass) in the port and different infrastructure charges according to the Train Traffic Schedule (TTS).

Step 4 Service of petrol station chain and end customers in the oil base by road transport. Determination of diesel reserves in the distribution and sales system, supply organization and etc.

The third phase of the process of distribution system is a critical point (the weak link) in the construction of logistics activities management. For its optimization it is necessary to analyse and test:

A. Existing practices in the distribution and realization of oil derivatives in the company;

B. Theoretical models for determining the stock and size of orders to the end users;

C. Determining the level of stocks and organization of supplies in the various units of the final phase of the process;

D. Determining the different types of costs and financial analysis.

In our case we examine the distribution of oil to two types of stations - high turnover and low turnover, generating different types of variations in the consumption of diesel and representing 80% of the total number of sites. The statistical data is for a period of one year, including the amount of annual and average daily sales of diesel from different types of stations, oil base data (with seasonal variation), time for processing the orders to different groups of stations in different periods of the year. The company's network includes 98 stations, 82 of them owned by the company, while other dealers have franchise agreements. Each site of the commercial network is connected to Vendor Managed Inventory (commercial management of inventory), which provides everyday summaries of the quantities that are traded by each site, stocks of different types of fuel and what forecasted sales. The distribution department of the company prepares duty schedules for the reloading of the stations. The duty schedules are prepared 1 day in advance, while on Fridays they are prepared for 3 days in advance. After retrieving the data from the system a model is made. In this model, on the basis of previous sales, forecasted quantities are calculated and they can be applied in the oil base. The organization of supplies by road transport (route, type of vehicle, drivers, load schedule, etc.) is a subject of a specialized software.

Stock management requires investigation and determination of costs associated with freezing of capital (at large reserve), provision of storage areas (tanks), insurance, fees, contract costs, costs due to deficit/unsatisfied demand etc. In our case stocks are managed by the provider (Vendor Managed Inventory - VMI), and he takes full responsibility to satisfy that demand with minimal costs. One of the main tasks is the determination of safety stock serving as a buffer in case of random variations in demand and uncertainty over the duration of deliveries. It allows the company to satisfy customer demand in case of:

1. Late delivery by the supplier or lack of supply;
2. Industrial action, accident, natural disaster;
3. Poor quality of available stocks;
4. Increased level of demand due to a lack of this product in competition;
5. Random events that influence consumer demand.
6. A fault in the equipment;
7. An unexpected increase in demand.

Most models for stock management are described in (Chopra & Meindl, 2012), (Hugos, 2003), (Karagyozov K. , 2012), (Karagyozov, Razmov, & Varadinova-Milkova, 2012), (Muller, 2011). In practice there are many software products, which cover the entire range of variants of problems, that a logistics system could encounter and equations for: lead time of the order, economic order quantity, safety stock (at different demand and delivery term), re-order point at a different type of demand etc. The model that provides sufficiently reliable solutions in our case is a derivative of 'Economic order quantity and safety stock (permanent monitoring)' EOQ ((Bowersox, Closs, & Cooper, 2012), (Karagyozov K. , 2012), (Lambert, Stock, & Ellram, 1998), (Muckstadt & Sapra, 2010)).

For the purposes of the article the following indicators are used:

Rop - Re-order Point;

SS - Safety stock;

L - Lead time of the order;

Rop-SS – average annual demand during the period of order finalization;

Rop-Dmax- maximum demand during the period of the order finalization;

Rop- Dmin- minimum demand during the period of the order finalization;

PSL- the service level, i.e. the probability of not having a stock-out.;

1-PSL- the probability of having stock out;

d_λ - average consumption per unit of time;

σdλ- mean square deviation of the demand for a period of time.

The aim is to determine such safety stock, which can provide the lowest mean of the total cost to provide the process.

The base equations of the model are:

Service level:

(1) $z = F^{-1}(P)$ Laplas

Demand for time - L [days];

(2) $D_l = d\lambda \times L$

Standard deviation of the demand for a specific period of time;

(3) $\sigma_{dl}^2 = \sigma_\lambda^2 L + (d\lambda)^2 \sigma_L^2$

Coefficient of variation of the daily demand:

(4) $C_\lambda = \dfrac{\sigma_\lambda}{d\lambda}$

Coefficient of variation for the lead time of the order:

(5) $C_L = \dfrac{\sigma_L}{L}$,

Safety stock (in litres):

(6) $$ss = z\sqrt{\sigma_\lambda^2 L + (d\lambda)^2 \sigma_L^2} = = z \times d\lambda \times L\sqrt{C_\lambda^2 / L + C_L^2}$$ [litres]

Re-order point:

(7) $Rop = D_l + ss$,

Fill Rate:

(8) $fr = 1 - \dfrac{Edef}{Qopt} = 1 - \dfrac{\sigma_{dl} L(z)}{Qopt}$.

Order size under normal distribution of the demand is indicated with CL = 0, while under uneven distribution - with CL> 0.

2.1 Results

Tables 1, 2 and 3 show the results for three cases: stations with low turnover (the most common case of low consumption), stations with high turnover (the most common case of high consumption) and the Oil base - distribution centre for diesel in the researched area.

Table 1. Main Results for a station with low turover

MAIN RESULTS			
LOW TURNOVER STATION		C_L=0	C_L>0
Economic Order Quantity	Qopt=EOQ	5,047.05	5,047.05
Demand for time L	D_l=dλ*L	4,187.3	4,187.3
Level of Service	z	1.881	1.88
Standard deviation of the demand for a period of time until order finalization	σ_{DL}	592.17	1,276.27
Safety Stock	ss	1,113.76	2,400.39
Re-order Point	Rop	5,301.05	6,587.69
Increase of Qo %			116%
Standard Loss Function	L(z)	0.012	0.012
Fill Rate	fr	0.999	0.997

In table 2, there are shown the results for high turnover station

Table 2. Main Results for High Turnover Station

HIGH TURNOVER STATION		C_L=0	C_L>0
Economic Order Quantity	Qopt=EOQ	7,181.06	7,181.06
Demand for time L	Dl=dλ*L	8,476.88	8,476.88
Service level	z	1.881	1.88
Standard deviation of the demand for a period of time until order finalization	σDL	1,198.81	2,583.71
Safety Stock	ss	2,254.72	4,859.42
Re-order Point	Rop	10,731.59	13,336.3
Increase of Qo %			116%
Standard Loss Function	L(z)	0.012	0.012
Fill rate	fr	0.998	0.996

Table 3. Main Results for Oil Derivatives Base

OIL DERIVATIVES BASE		C_L=0	C_L>0
Economic Order Quantity	Qopt=EOQ	50,873	50,873
Demand for time L	Dl=dλ*L	106,359	106,359
Service Level	z	1.881	1.88
Standard deviation of the demand for a period of time until order finalization	σDL	12,281	31,233
Service Stock	ss	23,099	58,743
Re-order Point	Rop	129,458	165,102
Increase of Qo %			154%
Standard Loss Function	L(z)	0.012	0.012
Fill Rate	fr	0.997	0.993

The presented results were obtained from the data for past periods of time and cost parameters.

The costs that the oil company has for safety stock maintenance and the total costs in inventory management in the oil base are presented in Table 4. In Table 5 the possible costs for different service levels (1) for normal distribution of random variables are calculated.

Table 4. Costs in the oil company

Costs	CL=0	CL>0	Currency
Order Costs	7,631	7,631	BGN/year
Holding Costs	7,631	7,631	BGN/year
Safety Stock Costs	6,930	17,623	BGN/year
Total Warehouse Costs	14,561	25,254	BGN/year
Total Costs	22,192	32,885	BGN/year

Table 5. Possible costs for different service levels

P, Service level	0.8	0.85	0.9	0.95	0.999
z	0.842	1.036	1.282	1.645	3.09
ss(C_L=0) liters	10,336	12,728	15,739	20,200	37,952
Total Costs BGN/year	18,363	19,081	19,984	21,322	26,648
ss (C_L>0) liters	26,286	32,370	40,027	51,374	96,517

3 CONCLUSIONS AND RECOMMENDATIONS FOR THE LOGISTICS CHAIN OPERATIONS

For the presented model the following results are obtained:

1. For low turnover station – the number of orders per year at constant and fluctuating demand is 121.41; the interval between two orders at constant and fluctuating demand is three days, the total costs of inventory management at constant demand are 7392.97 (BGN), while at fluctuating – 8,936.93 BGN;

2. For high turnover station – the number of orders per year at constant and fluctuating demand is 1,755.43; the interval between two orders at constant and fluctuating demand is two days; the total costs of inventory management at constant demand are 11,322.94 BGN, while at fluctuating– 14,448.59 BGN.

3. For the oil base – the number of orders (supplies) per year at constant and fluctuating demand is 254.36; the interval between two orders at constant and fluctuating demand is 1.43 days; the total costs at constant demand are 22,191.53 BGN, while at fluctuating– 32,884.77 BGN.

4. While keeping greater safety stock, the share of the satisfied demand is also increasing, but this leads to increased warehouse stocks. The costs taken into consideration are only associated with inventory management in the different units of the final stage of supply chain. These costs compared to total operating costs of the company (related to product acquisition, transport, opening and closing operations in the different subsystems of the logistics chain, excise taxes, insurance, etc.) could help its strategic and financial management.

5. The annual costs could increase by 24% at low turnover station, by 33% at high turnover station and by 45% at the oil base, when selecting service levels between 0.8 and 0.999%. Calculations show that the costs are increasing progressively, but upon reaching the 0.95% percentage of service and at a very high confidence coefficient of probability the costs increase sharply until they reach 0.999% of service. So if the managers of company want to have a maximum level of service, they should make huge investments.

6. In the first and second phase of the logistics chain the transport systems have sufficient capacity to satisfy supplies for the oil base in the worst case of scenario - maximum demand with a high level of service;

7. Maritime and railway transport systems with their connecting units can operate with a high degree of reliability within the investigated variations and described technological solutions, which ensure the competitiveness of the company.

8. The concept of an integrated approach to logistics management of processes in the chain allows the identification of weak points and also simulation of different strategies for their management.

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CORRUPTION IN SERBIA AND IN SURROUNDINGS

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Abstract

Corruption is connected to society since its beginnings, and struggle against it can be seen not only through moral categories but also through positive legislative regulations. Corruptions as a term and its constitutive elements have not yet been defined precisely in the Republic of Serbia. The definition used in the RS is the one given by Law on fight against corruption. The term "corruption" in broader legal sense, relates to all the forms of abuse of power and social positions done out of greed (bribery, abuse of official and social position, giving and using privileges, counerfavours, taking provisions and presents), and in narrower sense giving and taking bribery. In any case, giving and taking bribery dominates all the criminal acts of corruption. Bribery is permanently present in our citizens' consciousness as they think that corruption is mostly present in health care, Judicial system, and police force, while "politicians and political parties stand apart of all the categories". Comparative practice in the world understands corruption as abuse of power for private gain. This concept is used in Global programme of the United Nations against corruption and is accepted in European Union practice. How broad this problem is in Serbia one can see from the fact that Serbia was in the 80th place out of 176 countries in 2012.

Keywords: *politics, National Strategy, Agency for fighting against corruption, criminal Law, corruption, bribery, moral, nepotism, cronyism, conflict of interest, public functions.*

1 INTRODUCTION

If we mark criminal offences based on corruption as a tip of the ice-berg, than it is understandable that versatile and efficient struggle against corruption requires adequate legal regulative, and much more than that – moral judgment of the whole society we live in. As a matter of fact, morality decrease is a social phenomenon controlled by a number of social norms based on which people form their judgment and behaviour in relationships with others in social community, or social group they belong to.

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Moral appeared in primitive community, in before state collectives. We can state with certainty that moral is a category older than rights because there were periods of human society development where human relationships were ordered by moral, not by law, as there were no positive rights, so the relationships in these periods cannot be seen from the point of view of both morality and law.

In any case, giving and taking bribery is among criminal acts based on corruption. That is the case in Serbia, where according to available data, in December, last year citizens used to give 168€ in an average, which is more than in June 2012. Bribery is permanently present in our citizens' consciousness as they think that corruption is mostly present in health care, Judicial system, and police force, while "politicians and political parties stand apart of all the categories". Actually, Serbia regressed according to annual list of *Transparency International and is now at* 86th place, with corruption perception index (CPI) 3,3. During 2010, Serbia was positioned between 78. and 84. place with China, Greece, Columbia, Lesotho, Peru and Thailand, while in 2009, with the same index it was in the 83rd place. Research presented in Media Center showed that 41% of the questioned people consider that corruption level will decrease by 2013, and that public support to the Government of Serbia concerning struggle against corruption increased considerably. (Ivanović, 2013)

2 APPEARING AND PREVENTING OF CORRUPTION THROUGH CENTURIES

In the Matica Srpska dictionary, bribe is money or some other thing of value as a gift, reward that is used to make somebody satisfy the givers wish (in a dishonest, unlawful way). The older word is "diškrecija" which refers to bribe, bribery. (Vujanic & at al, 2011) Corruption is connected to human kind ever since it has appeared, struggle against it is obvious through centuries, not only through positive regulative but also through moral categories. The Bible says "You shall not take a bribe, for a bribe blinds the clear-sighted and subverts the cause of the just." (Bible, 1963)

During the first centuries of Roman state, magistrates and other officials had an obligation to answer for any irregularity that might have appeared, within a year after their office had been finished. Numerous problems connected to corruption appeared during the last years of the Republic, when the Roman Empire grew. A procedure named questionis (court enquiry) was an attempt to prevent such cases. The procedure was performed for large offences connected to political disputes pecium repetundae – receiving bribery for the account of a province or for purposes to prevent nominating for magistrate election – election offences. Marking criminal offences as "taking presents" and extortion (crimen repetundarum) had an aim to prevent massive bribery, extortion and other abuse which could have appeared in that period while in office. By Lax Servilia a performer of an offence not only had to compensate the damages but also lost his political rights. In Raka, Syria, a Dutch team of archeologists found 150 tiles with text in cuneiform writing in 1997, which show that Raka was an administrative centre of Assyrian civilization from XIII ct. BC. They also found an archive with data on the officials receiving bribery, including names of high officials and Assyrian princess. (Koprivica, 2013)

In early feudalism, by the end of the fifth ct. Salina Law was made, stating regulations on power and position abuse and it lists abuses being made by counts. Burgundy and Ostrogot Legal Codes appear, they all mention different offences one of which is bribing judges. They all predict death penalty. In 1716, a special court was established in France whose jurisdiction was to process all the abuses connected to King's finances. However, in 1717, as embezzlements, extortions, overcharging and other forms of cheating were so common they gained a status of custom, the special court was abolished.

With appearing capitalism in France, these criminal acts were placed in new criminal Legal Codes of Europe. "Crimes of Public Officials while in office" and "Criminal Legal Code" were established in France in 1810. This period in development of France was stained by immense abuse by officials which was enabled by The Constitution and Legal Code as courts were forbidden to prosecute officials. By the Constitution of 1870, administrative guarantee for the officials was abolished. German Criminal Law from 1871 stands out. The reason for this Law coming into life was to make punishments exceptionally strict as the abuses of the officials were omnipresent.

In the 18th ct. England, the term “corruption” meant bribery and corrupting government. Francis Bacon gave his personal contribution to understanding corruption. After coming to the highest legal position in England – he became lord canceller, and was caught receiving bribery for 28 times. He defended himself with words: ”I usually take bribe from both sides, so dirty money cannot influence my decisions.” The Parliament didn’t accept his reasons so he was relieved of duty and sent to prison, where he stayed for only a couple of days as he succeeded in bribing the judge.

First written reports on criminal acts of government officials in Serbia we can trace as late as Nemanjić State, which means from XIII ct. Sava’s Nomokanon from 1219 belongs to these Legal Codes. At the very end of the early period of Serbian State we can find Dušan’s Legal Code (Dušan, 1349) where in the Article 110 states: “On Judges: Judges wherever they go on the lands of the Tsar and his field, that is not authorized to take meals with force, or what any other than gifts, which one gifts of his will”.

During the first Serbian Rebellion there was Karađorđe’s Criminal Legal Code containing 38 articles, among which we can find regulations on abuse of official position and taking bribery. Article 32 forbade the elders, captains or couplers to let the soldier go home for received bribe. The punishment was giving the money back and dishonourable discharge from the army.

In 1829 Duke Milos gave guidelines, in fact decrees, on political power in Serbia. By Act 12, it is forbidden to receive bribe or fleecing somebody.

First Criminal Code for the Kingdom of Yugoslavia was Criminal Law from 1929. Not long after it was brought the Law on abuse of official power was brought. Criminal Law makes distinction between two types of receiving bribery: 1. passive bribery in broader sense or simple bribery and 2. passive bribery or hard bribery. The law also contains regulations on bribing judges. Criminal Law from 1955, in section XXIV, under the title “Criminal Act against official duty” together with other criminal act was marked as abuse in line of duty, and Article 325 stated the act of receiving bribery.

Criminal Code of 2005 of the Republic of Serbia was renewed in 2012, apart from giving and receiving bribery and abuse of power, mostly for purposes of more effective struggle against corruption, and it contains a special chapter – XXII, named “Special criminal acts of corruption” and contains eleven articles. Those acts are: giving and receiving bribery in internal relationships, foreign affairs personnel bribery, trading influence, criminal acts of corruption connected to international or supranational institutions, criminal acts of material gain (money laundry) and other criminal acts connected to corruption.

3 CONTENTS AND EFFECTS OF CORRUPTION

Etymologically, the word “corruption” (lat. *corruption)* in general sense it means neglect and abuse of power for personal gain and bribing official personal. In broader legal sense it marks all the forms of official power abuse for greed, (bribery, power abuse and authorizations, giving and using privileges, counterfavours, provisions and receiving gifts), more specifically it is an act of giving and receiving bribery. (Boskovic, 1999, p. 145) Receiving bribery (passive bribing) is aimed against proper, conscienscious, legal act of officials so by committing it one endangers a service and thus aims and tasks that service regularly fulfills. (Milosevic, 2012) Modern definitions of corruption can be classified as Administrative definitions of corruption – corruption is a deviant behaviour of an individual in comparison to forma role; Economic definition – corruption is maximization of profit by breaking Law and morality; Public interest definitions – corruption is using public resources for personal gains. The definition of corruption was also given by World Bank: Abuse of public resources for personal gains; followed by Vito Tanci: Disturbing the principle of impartiality; and Nye and Khan: Deviant behaviour compared to formal role. (Tanci, n.d.)

Appearing corruption in a society or an institution is enforced by a monopoly in decision making and unlimited discretion rights without personal – legal and moral – responsibility. This leads us to a famous Klitgaard formula (Klitgaard, 2008):

C=M+D-A

C – corruption appears when there is a monopoly of power M and discretion D, and there is no responsibility A.

Development programme of the UN (UNDP) modified the formula adding two more dimensions – transparency (T) and integrity (I) (Selosa, 2010):

C = (M+D) - (A+T+I).

Corruption has been considered as an evil ever since the antic period, which influences public rule and political functioning, and today it ruins the basis of free enterprenuring eliminates rules of healthy competition important for economic development, weakens influence of democratic institutions and generally of legal state. The great minds of the past connected corruption with moral values going bad, considered it immoral and corrupting phenomenon of society and pointed out that bearers of official functions must fight for common, not for personal causes. There is a fomous Latin proverb actual even today: "*corruptissimus republica plurimae leges*" – most crooked state has the greatest number of Laws.

Criminal act of corruption can only be performed with intention. Intention should contain consciousness of the performer on all the circumstances of the deed, as well as a will to commit the deed, while the consciousness on the deed includes consciousness on breaking Law, consciousness of achieving personal or somebody else's gain, or bringing harm to somebody, while consciousness of possible consequences is a basic motive for committing such an act that brings to corruption. In times we live in, when basic values lose their sense, consciousness on damages or consequences that can appear while committing criminal offence of corruption, is less and less present in our society. Accepting the idea that things will get easier if somebody is bribed, leads to changing existing traditional norms.

The word corruption itself often loses its original meaning, becomes euphemism for bribery and has completely different, considerably narrower meaning than it had originally. Considering such a state, seeing certain forms of criminality that didn't exist before, and discovering all the forms of corruption and criminal behaviour and their connection to legal authorities is one of the steps of facing corruption.

The other step in consequent contact of the two already mentioned groups of social rules, law and morality. This coexistence between these two terms must exist so as to order human behaviour in a humane and decent way, or we will again come to a situation to confirm that money has the role of value measurement and that it is connected to every segment of our lives. Society itself is inclined to that idea. Criminal law theory must be extremely alive for that reason and must predict movements in this domain of positive law. Each conformism and indecisiveness in fighting corruption provokes difficult consequences society and an individual as a part of it. (Ivanovic, 2013)

4 BASIC CLASSIFICATION AND DEFINING CORRUPTION

Besides general understanding that bribery and corruption mean the same, there are a few types of corruption and borderline appearances. They are:

- *White corruption* – giving privileges based on cousin and friendship relationships, without expecting counterfavours. Example: a relative with a job in a hospital takes us to a doctor without waiting for our turn. White corruption cases are not criminal offences but could be seen as disciplinary responsibility which should be sanctioned by the employer. Gray corruption – giving privileges on "favour for favour principle". Example: There is a man in the police force that hides your traffic offence denunciation and then one day mentions that his daughter has a bad mark in mathematics that your mother teaches. Black corruption – giving privileges with direct financial award. Example: a patient is waiting for a surgery and cannot wait for his turn for a "good doctor". A friend, working in the hospital offers to give the doctor a certain amount of money so the doctor would operate before his turn.
- *Nepotism* is a special kind of interest conflict. The term itself has a broader usage, its meaning is connected to a situation where somebody uses his power to gain advantage

for his family member (for example an uncle uses his position to employ a nephew). Cronyism is a broader term than nepotism and is used for situations when advantage is given to friends and colleges. For example, in the UK, cronyism means "old school relationships" or "boys from the old club". Conflict of interest is a situation when, for purposes of material gain, a public official puts private in front of public interest. These are situations when a public official fixes a profitable deal for a firm he works for or owns stock in it. Public officials are obliged to deliver a report on their personal ownership and income 15 days after coming in office, for themselves, a spouse and children for purposes of preventing this type of corruption. Public officials must deliver these reports each year, and incomes gained during their time in office that have not been reported are considered illegal.

It is usual to distinguish corruption as contracting, political, spontaneous, judicial and general; as well s centralized and decentralized corruption.

Contracting corruption (corruption in public service) means concluding harmful contracts, assigning concessions, contingents and similar and taking provisions or other types of personal gain.

Political corruption has different forms, from creating black funds for financing political parties, to conscious implementation laws or acts. Political corruption is present in all the political systems, modern or ancient, regardless their class character and political shape and will certainly exist and endanger social prosperity and future regardless the fact that its existence is denied by individuals and political parties at the top of power.

Spontaneous corruption assumes all the types of spontaneous corrupting of public officials or responsible individuals with an aim to avoid their obligations defined by law, without a previous plan and a special announcement. These cases of corruption are characteristic for bribing customs officials, traffic police, financial police, inspection and other officials.

Corruption in administration of justice assumes all the forms of illegal behaviour of public administrators which have a consequence of breaking the rule of justice, equality under the law etc.

General corruption assumes all the other forms of corrupting official or responsible individuals in education, health, sport, etc.

Centralized corruption – appears only at the top of a state government for purposes of achieving personal gain and enlarging fortune (for example: taking percentage for enabling profitable contracts), so the state ruling circles become generators of this phenomenon, while decentralize corruption is committed by public administrators for their own gain when the state is not inclined to their wrongdoing, and it is mostly present in democratic societies. (Ivanovic, 2013)

Pantoflage is moving an administrative official from public to private sector, his employment or business cooperation is connected with economic subjects or international organizations whose business is connected to the job he previously did.

Pantoflage and cummulation of functions are not corrution, but by Law against corruption they are put among criminal acts. The question is why? Pantoflage carries a high risk of corruption because a pubic official is employed in a private firm and does the same job as he does at his public function. Cummulation of functions is a question of how a public official can do more functions at the same time and do all of them well and honestly. We come to a conclusion that pantoflage and function cummulation are not pure corruption but a hidden one. Serbian public is familiar with cases of public officials holding even 4 public functions which are all well paid and their day lasts for 48 hours.

Pantouflage is known in anglosaxon world as a "system of rotating doors" and during the recent years it has been identified as an area with extereme risk of corruption. We introduced it as a term by Law on corruption in 2010. By Law, it is called "Abolishment of employment or business cooperation after performing a public function". Pantoflage is when a public official aafter his public function has been finished goes to a firm which has business in an area he dealt with or he organized by his decisions. Law on fighting against corruption orders that a public officer whose function finished can not be employed or cooperate with an individual, business owner or an international organization which does activity in connection the official performed unless he receives agreement from the Agency. The Agency must decide upon a request within 15 days of application. Prohibition does not reffer to a public official elected directly by the citizens – committee members, representatives, president. (ANEM, 2014)

Function cummulation endangers responsible execution of power. Conflict of inerest while cummulating functions does not mean basic conflict of interest – conflict of public and private interest. When we talk about conflict of interest while cummulating functions it refers to possibility to responsibly and fairly perfrm to demanding functions as functions of committee members, and Mayers. One more type of inerest conflict while cummulating functions is “collision“ of oversight or controlling function with a function that is to be controlled. Struggle against function cummulation has been active ever since Republic board for solving interest conflict was established, when law enabled two functions at most. The Agency initiated changes in 2013 which enable one function only, and exceptions that are now a rule were diminished to only a situation when the Law allows an official to be obliged by some other function to perform both of them (for example – a Minister of finance is required to be a member of The Governing Board of the Fund for Development). More than 10,000 legal proceedings were submitted in 2009 for double functions. By June, 2014, Administrative Board allowed 14 emissaries to an additional job. In a large number of cases they do not need an approval from the board or Agency against corruption for some additional engagement, because state officials by law can have double functions if they do not cause a conflict of interest. Until October, 2014. more than 200 resignations to double functions were submitted.

A Present – “money, a thing, a right or a favour performed without a proper reward and any other gain given to an official or a connected person to a public function”. The Law recognizes two categories “protocol gift” is a gift given by a foreign state, her organ or organization, international organization or an individual which was received during an official visit or a similar occasion and “an appropriate present” which is in practice the same as protocol but the giver is not a foreign state or its organ. An official is not allowed to receive a gift connected to performing a public function, except from protocol or appropriate gift, and not even then if it is money or valuable papers.

The official must submit the present to the authorized organ for dealing with public property, unless the value of the present is less than 5% of an average monthly pay without taxes deducted in the Republic of Serbia, or around 18€. The same goes for appropriate present – an official cannot keep an appropriate present if its value exceeds 5% of average monthly income – which means appropriate presents during the calendar year when total value exceeds one average monthly pay (around 360 Euros). Research conducted in 2012 showed that every fifth citizen considers giving presents to an official, so that he would do something that is actually his job was not a sin. Completing obligations through connections or using acquaintances is not corruption for 19% of people. (D.M.S, 2012)

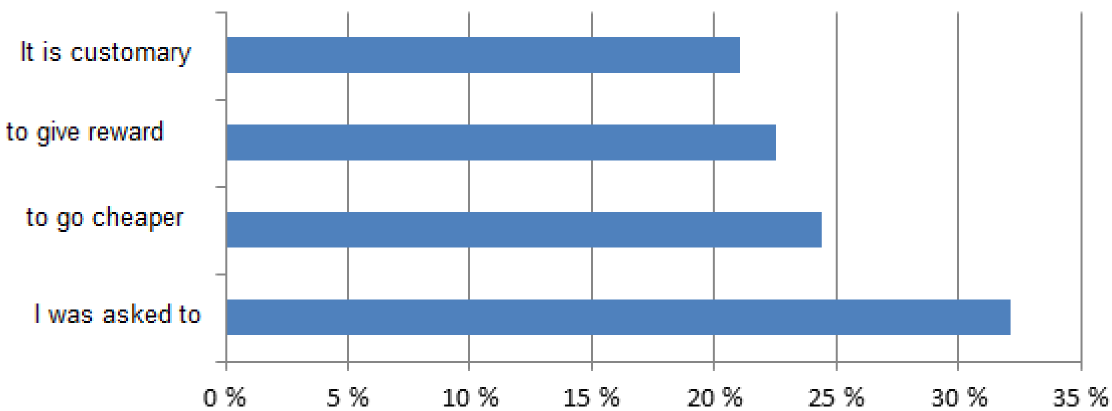

Fig. 1 Why did you give bribe?

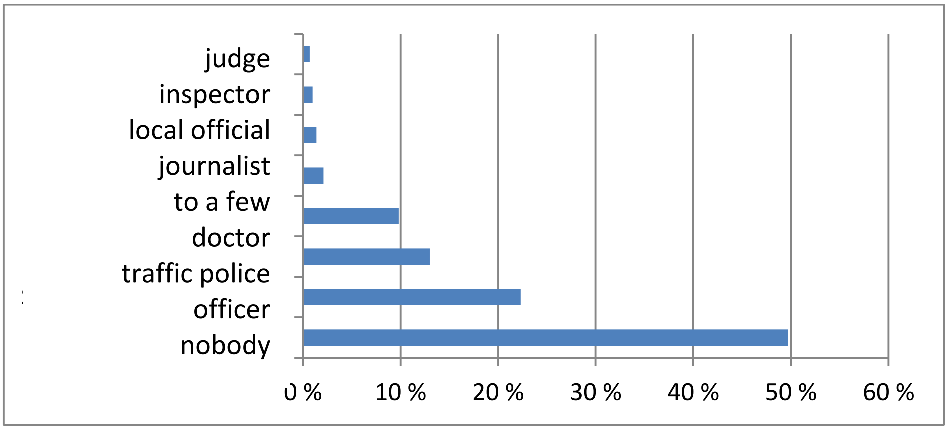

Fig. 2 Who did you give bribe to?

Site 021.rs conducted a research to why (fig. 1) and to whom (fig. 2) is bribe mostly given.

The questioners were answered by 788 visitors. (021, 2014A) The question "Who did you give bribe to?" was answered by 2640 visitors. (021, 2014B)

5 CORRUPTION IN 2012–13.

It has already been pointed that by available research, citizens gave 168 Euros bribe in December, last year, which is more than in Jun, 2012. Citizens think that corruption is most present in healthcare, judicial system and police, while "politicians and political parties go out of all the categories" as the research show. When questioned whether things in Serbia go to a right or wrong direction, 45% of the questioned chose wrong in December 2012,while in Jun, last year more than 70% of the questioned had that attitude, while 32% answered that Serbia is moving into a right direction, while in Jun, less than double questioned people had that attitude .

Citizens mostly bribed doctors, 25% of them, 19% bribed policemen, administrative officials and teachers 9% each, judges and prosecutors 5% each. Almost three quarters of citizens, 72%, think that political parties are most corrupted, then healthcare 69%, judicial system 64%, prosecutors 62% and lowers 60%.

The largest number of citizens 49% considers that the police are the central figure in fight against corruption, 41% sees the Government in that role, and 37% judicial system and 26 % think that the Agency against corruption is the leader in the fight. Almost 4/5 or 79% think that prison, or strict punishment measures are the best means in fight against corruption. 69% think that it is necessary to improve legal measures, while 61% pinpointed the necessity of strengthening state control over public administration.

6 SITUATION IN SERBIA AND SURROUNDING COUNTRIES

Serbia regressed in annual list of Transparency International and is now in 86th place, with corruption index (CPI) 3.3 as we were informed by organization Transparency Serbia on 01.12.2012. In the annual report of Transparency it is stated that there is a decrease of score of corruption perception index from 3.5 in the last two years to 3.3 in 2011. The President of Transparency Serbia, Vladimir Goati, stated that the reasons for corruption in Serbia are slow reform of judicial system and weakening of institutioions, and called political parties generator for corruption. The list is marked from 1 to 10, where the best mark goes to New Zeeland 9.5, and the worst, 1, goes to North Korea and Somalia. During 2010, Serbia shared a place between 78th and 84th with China, Greece, Columbia, Lesotho, Peru and Thailand, while in 2009 with the same index it was alone in the 83rd place.

Of all the ex-YU countries the best place holds Slovenia with a score of 5.9, in the 35th place, Croatia and Montenegro share 66th place, Macedonia is in the 69th place while BIH is worse than Serbia and with an index 3.2 occupies 91st place. Kosovo is ranked separately and is in the 112th place with an index of 2.9. Albania is also worse than Serbia with 3.1, while Bulgaria has the same index as Serbia, concerning the countries in the region. (Beta, 2011)

Considering corruption in society our country is in the 83rd place out of 180 countries where “Transparency International” conducted research on the topic. A conference in the palace “Serbia” was held for the World‘s day of fight against corruption, where a research of the TNS Media Galluš Agency was presented. The research was conducted on around 1000 citizens of Serbia. Disastrous statistics look like this:

– 15% said that they paid bribe to mostly doctors, policemen and state administrators in the last three months.
– 78% of the question citizens see the healthcare system as corrupted.
– 76% think that corruption exists in political parties.
– Judicial system or judges are seen as corrupted by 70 % of the questioned.
– 72% of questioned people see the customs in the third place for the degree of corruption.
– Military (23 %) and religion (25 %) are seen as the least corrupted.
– 62% of questioned citizens see the parliament as corrupted institution.
– 61% think the Government is corrupted.
– 82% thinks that corruption influences their personal lives.
– 91% thinks that corruption is present in political life.
– 88% answered that corruption is present in business.
– 88% of the questioned thinks that corruption is a regular practice.
– 60% of the questioned expect corruption in certain degree.
– 65% of the questioned do not accept corruption.
– 41% of the citizens think that the level of corruption has grown in the last year.
– 18% expects the level of corruption to decrease in the next year.
– ¼ of the citizens in Serbia would be willing to give bribe if asked.
– Corruption is the third problem in Serbia, after unemployment and poverty, answered the questioned citizens. (Gluvakovic, 2009)

7 CORRUPTION IN 2014

Agency for fight against corruption has brought 12 criminal charges for existing doubt that an official hasn’t reported his property to the Agency or has given false information about it for purposes of hiding property.

From 01.01.2014 to 01.10.2014 the Agency started 453 procedures, while performing activities in its jurisdiction referring to register of officials, register of property and income, and list on procurement procedures, to establish whether breaking regulations of the Law appeared.

Out of those cases:

– 27 for the officials being late to transfer manager rights during the period defined by Law.
– 4 - for being late to inform the Agency on public procurement procedures
– 3 for receiving presents not according to the Law.
– 210 for being late in delivering report on property and income after starting a job in office.
– 195 for being late to deliver reports on property and income after finishing the job in office.
– 12 for being late to deliver reports on property and income after significant changes.

The Agency for fighting against corruption pronounced 389 warning measures, as follows:

– 14 for the officials being late to transfer manager rights during the period defined by Law.
– 2 for receiving presents not according to the Law.
– 185 for being late in delivering report on property and income after starting a job in office.
– 170 for being late to deliver reports on property and income after finishing the job in office.
– 12 for being late to deliver reports on property and income after significant changes.

Totally 11 measures of publicly announced decisions on braking Law were pronounced as follows:

– 6 for not transferring manager rights during a public function were performed in a period of time defined by Law.
– 48 for being late in delivering report on property and income after starting a job in office.

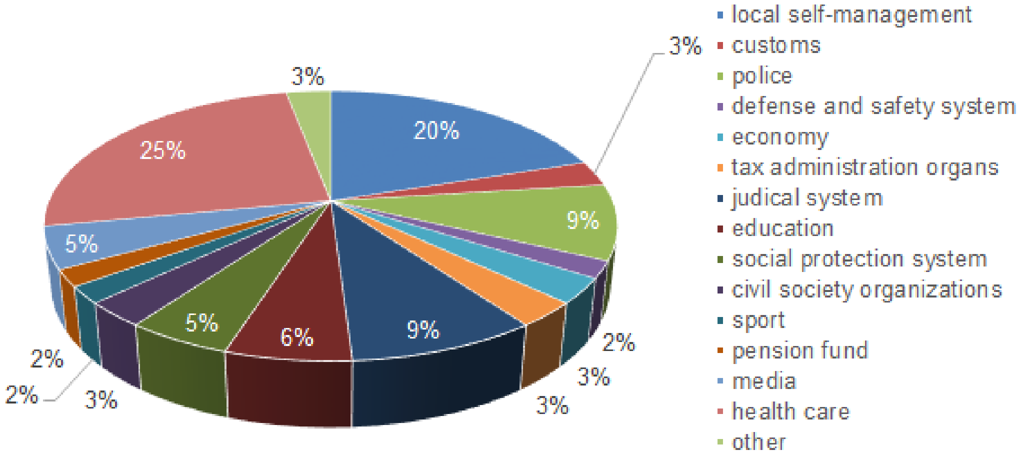

Fig. 3 Distribution of corruption by spheres

– 2 for being late to inform the Agency on participating and public procurement procedures.
– 1 for being late in delivering report on property and income after starting a job in office.
– 2 for being late to deliver reports on property and income after finishing the job in office.

Total 114 requests to start misdemeanor procedures were submitted to Belgrade Misdemeanor court as follows:

– 4 for being late to transfer manager rights.
– 1 for being late to inform the Agency on participating public procurement procedures.
– 1 for receiving presents not according to the Law.
– 6 an organ or a responsible person in that organ was late to inform the Agency on beginning /end of public function of an official in that organ.
– 52 for being late to deliver reports on property and income after finishing the job in office.
– 2 for being late to deliver reports on property and income after significant changes.

12 reports of justifiable doubt that criminal offences were committed for which one should be prosecuted in line of duty were submitted to prosecutor's office and which were not predicted by Law of the Agency. 15 reports were submitted to authorized organs for justifiable doubt that criminal offences out of their jurisdiction were committed and as follows:

11 to money laundry prevention office, 4 to tax administration. (Vesti, 2014)

8 WHERE THE CORRUPTION IS SITUATED MOSTLY?

Research has shown that corruption exists mostly in the spheres shown on fig. 3. (Anketa, 2014)

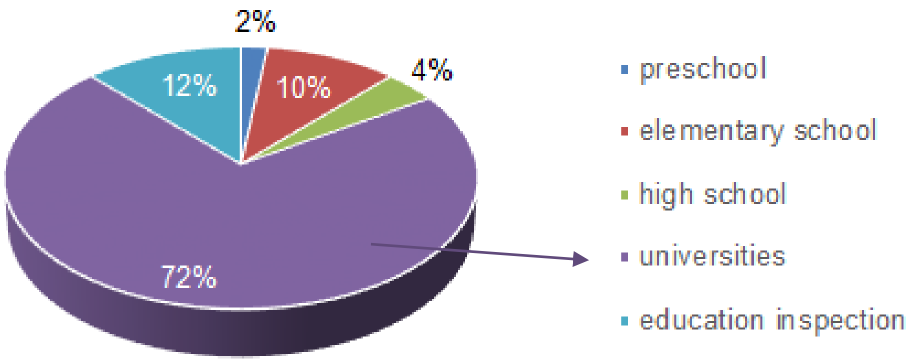

Fig. 4 Areas of education mostly infected by corruption. (Anketa, 2014)

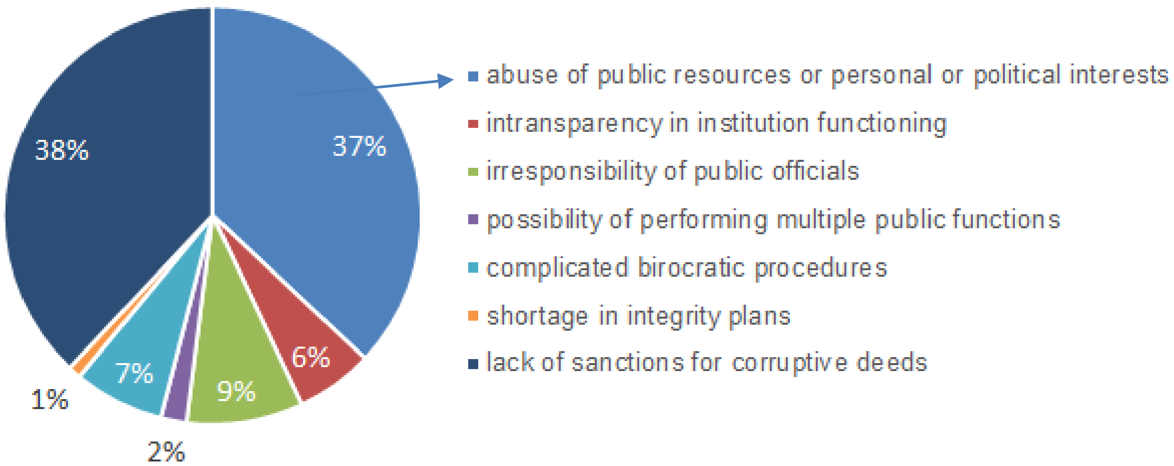

Fig. 5 In public sector corruption is encouraged by… (Anketa, 2014)

From 2007 to 2009 the prosecutor's office received 11.823 denunciations, which mostly came from the police (45%), after that follow denunciations from citizens, whether directly harmed or others. The largest number of denunciations was qualified as "abuse of power" (62%), even though this qualification covers a large number of criminal offences some of which are not corruption cases. The other type of criminal denunciations refers to "breaking law by judges, public prosecutor or his deputy" (16%) and criminal offence of embezzlement (11%). A large number of citizens (39%) who reported on corruption in judicial system did that because they thought that judges or prosecutors broke the Law. Cases of giving or receiving bribe were rarely subject of criminal denunciation (2.5%), and were least submitted by the citizens (only 1.5 %). (Duyne, Stocco, & Dimitrijevic, 2011, p. 11)

9 CONCLUSION

Corruption in our country is nothing new. We are already used to it, so we sometimes do not notice it. Nevertheless, with education growth of the broadest layers of population and their emancipation, a need appears for all the relationships among the factors in our social system to be transparent. Corruptive relationships do not appear by themselves out of nothing. They are the product of a system. Two sides are needed for corruption, one that offers bribe and the other that receives it, and looking from a side somebody should look at it benevolently. All the parts of state system should be coordinated to be able to decrease corruption. Citizens mostly bribed doctors in 2012, around 25% of them, police officers 19%, public officials and teachers 9%, and public prosecutors and judges bribed 5% of citizens each. Almost ¾ of citizens, 72% considers political parties to be most corrupted, followed by healthcare 69%, judicial system 64%, prosecutors 62% and lowers 60%.

Higher quality system of giving awards, or evaluating work, is a basic premise of prevention which will most directly cut off or start corruption. A worker, official or a manager with decent wages will not easily decide to lose the privilege of regular monthly income for some money or a favour. On the other hand, low, irregular wages, which are mostly the case, open the door for corruption and this is why there is a feeling that everything is for sale. This is confirmed by results of numerous researches.

Sanctions for corruption are also a significant element preventing people to do such deeds. Transparent and strict sanction politics would lead to punishing all the similar cases in similar way, and bringing new criminal laws and making regulations stricter would undoubtedly have prevention effect or general prevention. From 2007–2009 prosecutor's office received 11,823 criminal denunciations, done mostly by the police and then citizens. The largest number of denunciations was qualified as "power abuse", even though this qualification covers a number of criminal offences that are not all corruption.

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Review article
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ENHANCEMENT OF ADMINISTRATIVE REFORM IN RUSSIA: CASE OF ST. PETERSBURG

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JEL Category: **H83, D73**

Abstract

The focus of the paper are administrative reforms implementation issues in Russia in case of St. Petersburg as well as analysis of the state and municipal services provision. The main task of the state services provision on a step of the modern development in Russia is effective satisfaction of needs of the individuals and legal entities, who make their requests to the entities providing public services. The particular case requires own tasks fulfilment i.e. provide public services, however, there is a general i.e. do both make the process of the service receiving comfortable for the clients and make it transparent for the controlling authorities. The result of the administrative reform is a system for the effective public function implementation that would ensure high rates of economic and social development as well as improvement of the quality of population life. Administrative reform in Russia far from completion, however, based on its implementation, it is possible to conclude that the necessary conditions for the comprehensive modernization of management system are already developed in St. Petersburg. The paper is descriptive by design. The main methods used are documents analysis, monographic research, comparison and synthesis.

Keywords: *Administrative Reform, State and Municipal Services*

1 INTRODUCTION

One of Russian's focus is improvement of State and Municipal management. Administrative Reforms (AR) in Russia started influenced by various factors namely inefficiency and growth of the state apparatus, increase of its maintenance costs, state's incapacity manage corruption and crime, weak competitiveness of the national economy on the world market and finally low public confidence in the government.

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Based on the previous research we can highlight some countries among those that implemented reorganization of their administrative systems in the last decades. Those are Brazil, Canada, China, France, Germany, New Zealand, Poland, South Korea, the Netherlands, the UK, and the USA etc. These countries are different by their development levels and forms of government. All of them have succeeded in AR. The scale and direction of changes mainly were defined according to the internal (local) causes of a reform in each of the mentioned country. Nonetheless, all these countries obeyed to the general pattern of world development that turns all these transformations into the universal phenomenon. Each country that decides to carry out AD will be forced to consider this phenomenon.

In the end of the 20th century, researchers of Russia ((Gritsenko, 2014) (Gronlund, 2007) (Drozhzhinov, 2013) (Istomin, Kirsanov, Sokolov, & Yayli, 2014) (Kadnevskiy, 1998) (Kirsanov, 2007; 2008, 2010, 2015)) activated efforts to explore the experiences foreign reforms and reforms of Russia. They tried to propose application of those experiences good practices to fulfil the state level tasks based on previous Russia AR transformations analysis and reveal of the common regularities of the reform processes and their importance for the country development. The majority of the researchers outlined authorities delay in the society's reformation. It made the authorities to choose an option of so-called "overtaking development". Besides this, the carried out reforms not always adequately met the needs of society and the state.

Therefore, the objective of the paper is to identify AR implementation issues in Russia on example of St. Petersburg. As the present research is descriptive by design, the main tasks of the paper are to provide the analysis of documents on implementation of the administrative reform in St. Petersburg, identify issues and perspectives of AD in St. Petersburg, and describe the advantages of some activities organization in multifunctional centers in St. Petersburg. The main methods used are documents analysis, monographic research, comparison, and synthesis.

2 ANALYSIS OF DOCUMENTS ON IMPLEMENTATION OF THE ADMINISTRATIVE REFORM IN ST. PETERSBURG

In St. Petersburg, functions the Program of reduction of administrative barriers, optimization and improvement of state and municipal services quality including state service provision by the multifunctional centers (Dokumenty po administrativnoy reforme v Sankt-Peterburge, 2001-2015). This is the first document that is analyzed within this article.

The program includes:

– *Goals of the management subjects.*
– *Tasks of the management subjects.*
– *Deadlines of the management subjects.*
– *Basic organizational provisions of the management subjects.*

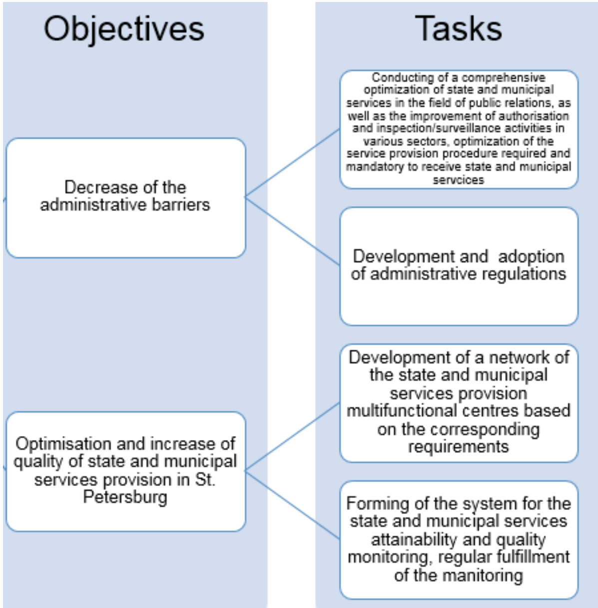

Fig. 1 Objectives and Tasks of St. Petersburg's Program on Decrease of the Administrative Barriers, Optimization and Increase of Quality of State and Municipal Services Provision, also Based on the Multifunctional Centers for State and Municipal Services Provision (Administrativnaya reforma v Sankt-Peterburge, 2011)

This document's development is based on the programmatically targeted approach. Objectives and tasks are reflected on Figure 1. The main objectives of the program are optimisation and increase of quality of state and municipal services provision in St. Petersburg. The expected outcomes of the program are (Administrativnaya reforma v Sankt-Peterburge, 2011):

– *The procedure for providing state and municipal services is optimized.*
– *The quality and attainability of the state and municipal services as well as the state and*

municipal functions for individuals, legal entities, and sole proprietor is increased.

- *Legal entities' organizational, time and financial costs overcoming administrative barriers are decreased.*
- *Possibility of obtaining state and municipal services by the principle of "one window" (all questions can be solved on the same spot by the same consultant) is provided at each metropolis municipal formation* (O deyatel'nosti MFC, 2015)*.*
- *Quality control system of the state services provision is created.*

Total amount of the program financing is quite three billion of RUB (Figure 2). The amount of financing variate from year to year. The biggest amount of financing was allocated for the first year of the program implementation (2011).

In the administrative districts of St. Petersburg, creation of a sectoral registry is carried out. It happens towards allocation between sectoral branch offices of state functions and state services contained in the Registry of the state functions and the state services that are performed and provided by the city executive authorities.

The registry is the second document analyzed within the subject. The registry has been developed by the authorities in 2008. It has been published on the official Web site of St. Petersburg administration, section "Administrative reform in St. Petersburg" (Reyestr gosudarstvennykh funktsiy i gosudarstvennykh uslug, 2008) in order to be publicly reviewed and discussed. It contains information on (Postanovleniye Pravitel'stva Sankt-Peterburga ot 26 avgusta 2008 goda No. 1078, 2008):

- 29 general state functions.
- Two general state services.
- 213 specific state functions.
- 111 specific state services.

All these functions and services are entrusted to the district administrations of St. Petersburg in accordance with their authority.

Overview of normative and legal provision of the administrative reform demonstrates new priorities of Russian Federation in field of the state administration reformation. A list of activities that became the priorities is:

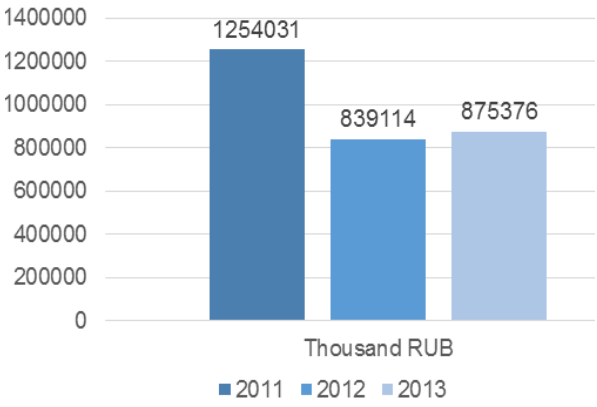

Fig. 2 Amount of Funding of St. Petersburg's Program on Decrease of the Administrative Barriers, Optimization and Increase of Quality of State and Municipal Services Provision also based on the Multifunctional Centers for State and Municipal Services Provision (Protokol 37, 2011)

- *Optimization of structure and functions of the federal executive authorities.*
- *Civil service reform.*
- *Streamlining of the executive authorities' activity procedures.*

After the activities' implementation comes performance assessment. There is a number of effectiveness criteria of activities implementation for the state and municipal services quality improvement in the region, namely (Protokol 37, 2011):

- *A number of active Multifunctional Centers (MFC, see section 3 and 4).*
- *A number of the state and municipal services provided based on the MFC activity.*
- *Level of territorial executive authorities, federal funds, and municipal formations' administrations engagement.*
- *Level of beneficiaries' awareness.*
- *Time spent in line to receive the services.*
- *Increase of the "windows" number (number of consultancy spots where is possible receive or submit documents towards MFC).*
- *Reduction of the number of complaints from citizens - the state and municipal services beneficiaries received by the state and municipal authorities and the judiciary.*

– *Level of citizens' satisfaction by the state authorities' activity providing the state and municipal services.*

The documents analysis showed the topicality of the administrative reforms in St. Petersburg and its development regulations and paths. The next section is devoted to definition of some AR issues and perspectives in St. Petersburg.

3 ADMINISTRATION REFORMS IN ST. PETERSBURG – ISSUES AND PERSPECTIVES

The current government program "Public Administration Effectiveness Improvement in St. Petersburg" is aimed to improve effectiveness of the executive authorities' activity of the Northern Capital in Russia i.e. St. Petersburg (Administrativnaya reforma v Sankt-Peterburge, 2011). The city government approved a unified procedure of state functions and services administrative regulations development (Postanovleniye Pravitel'stva Sankt-Peterburga ot 02.04.2009 №370, 2009). Commission on carrying out the AR in St. Petersburg approved 820 administrative regulations of public functions and services, which allows to organize their execution and delivery the same by the standard throughout the city (Postanovleniye Pravitel'stva Sankt-Peterburga ot 30.12. 2009 г. № 1593, 2009).

Quite good results were reached since implementation of the AR in the Northern Capital of Russia. According to data by the City Committee for Informatization and Communication, it is possible to receive more than 350 state services via Internet in St. Petersburg. More than 15 million people used this opportunity in 2011. Since 2011, 34 MFC have worked providing state services. The number of services that clients could receive from "one window" increased on 25 from 2011 (150) to 2015 (175). This kind of centres (MFC) are located at all city districts, in total, there are 42 active. There are also 20 information spots (offices) throughout the city. It is possible to visit all Web sites of government and subordinate organizations as well as specialized portals and other Internet resources devoted to the provision of public services using infomats and information spots as well as via Internet (Obolentseva, 2012).

For the last few year, the process of public services reception has become much easier. Many St. Petersburg inhabitants can be often advised to contact the MFC in their district. However, the issue than might appear is the formal address from the citizen's passport does not match his/her actual dwelling address, the citizen will be forced to go to the MFC that is located near the registered address to receive a number of certain services. Therefore, St. Petersburg State public institution MFC is planning to implement a principle of extraterritoriality in short time i.e. public services will be available without reference to the district of registration (Realizatsiya printsipa eksterritorial'nosti, 2012).

There are also a movable MFC. The movable MFC is a minibus equipped with two reception windows. This service is available already now. The service reception towards the minibus is already available without reference to the district of registration. Three movable MFC work each working day moving each day to the certain district (to a different district each). The destinations and schedule of the movable MFC is available on the St. Petersburg portal of public services (MFC, 2015; Mobil'nyye MFTS Sankt-Peterburga, 2015).

AR in St. Petersburg are implementing according to the plan, some additional needs of improvements appear, and solutions comes immediately aiming to stop customers (citizens) inconvenience and improve effectiveness of public services provision. The next chapter is devoted to the most detailed analysis and description of the MFC activity in St Petersburg.

4 ORGANIZATION OF ACTIVITIES IN MULTIFUNCTIONAL CENTERS IN ST. PETERSBURG

"Multifunctional Centers that provide public services in St. Petersburg are structural units of state fiscal institution of St. Petersburg called the "Multifunctional Centers for public service provision", which functions throughout the territory of all city's administrative districts" (Mnogofunktsional'nyye tsentry Sankt-Peterburga, 2015). The operating procedures of the MFC is determined in accordance with the administrative regulations for public services on the basis of MFC, which are developed and approved by the executive authorities of St. Petersburg of the subjects of conduction.

For the automation of the MFC is being created an interagency automated information system for the MFC activities maintenance. When the collection of an applicant documents electronically is temporarily difficult or impossible, there is an opportunity to obtain the missing documents paper version towards the MFC's courier services. However, it is possible only, if the relevant documents are issued on the territory of the Northern Capital. In case, the documents reception is needed from other Russia regions, federal executive bodies, local authorities or other organizations the communication happens towards an organization of these bodies and organizations of electronic interaction by the applicants themselves (Mnogofunktsional'nyy tsentr Moskovskogo rayona, 2015). Currently MFC provides public services of 46 authorities of St. Petersburg and 10 federal authorities.

MFC service become more and more popular among St. Petersburg citizens. A number of appeals received by MFC in St. Petersburg is increasing from year to year (Figure 3).

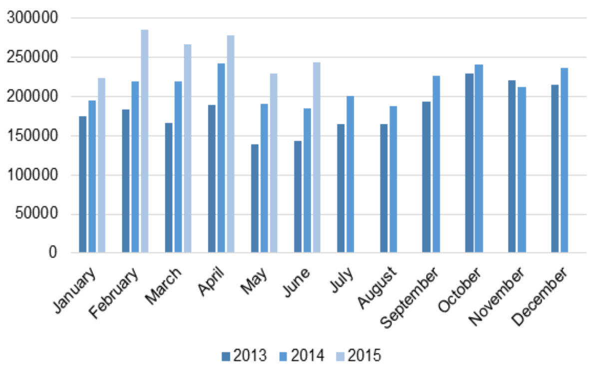

Fig. 3 Dynamics of a number of appeals received by MFC in St. Petersburg for years 2013-2015 (Dinamika kolichestva obrashcheniy v MFTS, 2015)

As an integrated automated system according to the standard, the information-analytical system "one window" is a collection of interconnected automated systems, where the function of one of them depends on the results of operation of the other; consequently, this set can be observed as a single automated system (GOST 34.003-90, 1992).

Processes of service provision tend to be inter-ministerial by nature i.e. exchange of information under the authority - territorial division or in the triangle - ministry, agency, office, or horizontally between the authorities of various departments.

Experience a variety of subjects of the Russian Federation shows that implementation, application and development of "one window" principle allows ensuring quality of a new functioning level of the authorities while they interact with each other as well as with other organizations and applicants. Creation of the centre allows significantly increasing quality of the service provision and decreasing cost on Standard of public services provision comfort" implementation.

According to the resolution of the Government of St. Petersburg (Postanovleniye Pravitel'stva Sankt-Peterburga ot 30.12.2009 №1593, 2009), the list of public services of executive authorities of the city was approved. The services are provided based on MFC for public service provision in the city. Currently, there are 321 services named in the list (Mnogofunktsional'nyye tsentry Sankt-Peterburga, 2015).

For the intended purpose for the operation of the MFC, the Inter-branch Automated Information System ("IAIS MFC") was developed and implemented into operation. The system is intended both to ensure the provision of public services on the MFC base by the principle of "one window" and to provide a framework for the provision of public services in e-form (Godovova, 2010).

Work goes also to ensure the municipal service provision on the MFC base. As part of events to support local government, a model of municipal services register with 11 items was developed. The standard model of administrative regulation was developed for each item of municipal service. This was necessary to render municipal services at all 111 municipalities in St. Petersburg created on a common methodological basis and in compliance with the quality standard.

Development of the MFC is a prerequisite for informative society formation, because the MFC should do both ensure access to the portal of the state and municipal services and promote higher standards of computer and legal literacy of population. MFC should become a starting point for population to access the state and municipal services. It is necessary to create the MFC in each municipality to ensure cohesion of Russian Federation subjects' population possibilities to receive the qualitative and attainable the state and municipal services.

Improvement of activity of the MFC for public service provision in St. Petersburg will allow increase effectiveness of executive authorities' activity as well as level of population trust in the state and municipal authorities' activities; in addition, it will help to cut costs on public administration.

Effective service provision quality management system requires the establishment of operational feedback from users of public services that practically is absent on practice today. Creation of the MFC in conjunction with the "electronic government" will make service provision process operative as well as interactive. Impersonal but controlled communication between an officer and a citizen, which allows citizens to monitor the process of resolving their queries, ultimately, will lead to creation of a self-governing system of providing services to the population of regions.

Considering the MFC creation as one of the most important activity of the National plan against corruption, it is possible to hope that creation of the MFC in the Russian Federation (RF) regions and comfortable reception of the state and municipal services in the nearest future will be a regular life activity in the RF.

5 CONCLUSIONS

The objective of the paper was identification of the AR implementation issues in Russia on example of St. Petersburg. The main outcomes of the research that helped to reach the objective are summarized.

Administrative reform in Russia started under the pressure of various factors, such as:

- *Ineffectiveness and the growth of the state apparatus.*
- *Increase of expenses on maintenance of the state apparatus.*
- *The state's inability to deal with corruption.*
- *Weak competitiveness of the national economy on the world's market.*
- *Low public confidence in the government.*

Theoretically, AR is a complex of actions aimed to optimize the core functions as well as structures and systems of the executive authorities. Implementation of the AR is focused on optimisation of activity by the authority's bodies on federal, regional and local levels; formation of a clear and functionally transparent system of the authorities in the country with a clear division of their competence.

From one hand, the AR is connected to the need to get rid of redundant and overlapping functions and the construction of a new, adequate to the structure of these functions system of government bodies. From another hand, it is connected to development of an effective mechanism for implementation of these functions, ensuring transparency and improvement the of the public services quality.

For the first time at the legislative level, the federal law on organisation on the state and municipal services provision accepted in July 27, 2010 (Zakon, 2010) founded implementation of the major activities of the AR. In accordance to this law, citizens and organizations have a right to have complete, relevant and reliable information about the state and municipal services, as well as the right to receive them electronically (applying federal and regional portals of the state and municipal services, the MFC). On the regional level with the same objective, the Program on the implementation of the administrative reform of the Federation is being executed.

While the Concept of the AR in Russia has been implemented, several tools were formed namely normative and methodological bases for improvement of the state functions implementation and AR management, stimulation mechanisms quality. Nevertheless, at the end of the second stage of the AR in Russia, it became clear that none of the reform directions has not been implemented, and e.g. corruption perception index even dropped significantly (Indeks vospriyatiya korruptsii-2014, 2014). Success in implementation of the anti-corruption policies prevent the various issues e.g.:

- *Weak institutions of civil society in Russia.*
- *Slow development of e-government in Russia.*
- *Absence of independent mass media in Russia.*

- *Ineffective activity of the supervisory bodies at the level of local authorities of Russia, etc.*

Therefore, the AR in RF:

- *Had no significant effect on the effectiveness of public administration – there are more negative changes today than positive ones.*
- *Instead of the claiming reduction of the state apparatus stimulated its growth, and cost of its maintenance increased.*
- *Did not lead to achievement of public authorities actions transparency - a lack of important information reveals on the official websites i.e. information is provided selectively and updates happen irregularly.*
- *Did not change the inability of society to control the power and ignoring the views of officials and citizens' needs have led to the fact that citizens' confidence fell down - people do not believe in the success of any reform, and are indifferent to the ongoing processes.*

Consequently, the mechanisms that were applied to implement the AR in the leading world's countries (decentralization of state power; the establishment of operational administrative structures to flexible respond to needs of population; effective personnel policy i.e. training and placement; control and accountability increase based on the civil servants performance) have not worked out efficiently in Russia yet.

One of the possible solutions to improve the quality and accessibility of public services, which is actively developing in Russia in recent years as part of the AR activities, could be an institution of the MFC. MFC is a single room or complex of rooms for providing state and municipal services by different agencies based on "one window" principle.

Improvement of public services quality and attainability presumes changes in the organisation of public service provision based on the principle of "one window" and organisation of effective interagency exchange. Issues of interdepartmental cooperation and territorial fragmentation are accompanied by the underdeveloped communication infrastructure and are the major barriers to:

- *Reduce time of service provision.*
- *Reduce the number of supporting documents.*
- *Working out the draught regulations.*
- *Reduction of lines.*
- *Citizen satisfaction from work of the state and local executive authorities.*

Russia has chosen the path of administrative change, but in spite of common goals, successes for Russia is not obvious.

Based on all analysed data, it is possible to conclude that it is not enough to have a single sincere desire to have a modern and efficient governmental apparatus in Russia. The real and perceived interest of the ruling political elite to the actual improvement of governance in Russia is needed.

The outcomes of the present research is going to become a base for the further researches on the topic.

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MIRCE MECHANICS ANALYSIS OF IN-SERVICE RELIABILITY OF NASA-CONTRACTED COMMERCIAL RE-SUPPLY SERVICES

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Abstract

The main purpose of this paper is to apply Mirce Mechanics to the analysis of in-service reliability of Space Exploration Technologies Corporation and Orbital Sciences Corporation, organizations that have been selected by NASA to participate in the Commercial Orbital Transportation Services, COTS. The reason for this is the fact that at the moment of writing this paper, both CRS Programmes are out of action due to catastrophic launch failures that took place on 28th June 2015 and 28th of October 2014, respectively. It is expected that analysis performed on the past missions, conducted by both corporations, based on the publicly available information, will get incites into their practices and experiences gained, as well as highlighting the areas of potential applications of the Mirce Mechanics based knowledge to increase in the probability of the successful continuations of NASA-contracted Commercial Resupply Services.

Keywords: *Mirce Mechanics, In-service Reliability, NASA, Contracting for in-service performance.*

1 INTRODUCTION

According to Einstein ***"****Everything that the human race has done and thought is concerned with the satisfaction of felt needs*". (Einstein, 1935)

Human needs for transporting, cooling, heating, communicating, navigating, sheltering and many others are continuously satisfied through the work done by transportation, ventilation, communication, refrigeration and other industrial systems. Their design-in performance in terms of speed, capacity, frequency, power and similar physically measurable quantities can be accurately predicted during the design process and tested at the delivery, as they are functioning in accordance to well understood laws of natural sciences, such as: Newton's laws of motion, Coulomb's law of solid friction, Hook's law of stress and strain, Maxwell's law of electrodynamics, Boltzmann's law of thermodynamics, to name a few, which are characterised by certainty, reversibility and independence of time, location and humans.

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However, the main concerns of the owners and users of industrial systems are related to how much of their "felt needs" will be satisfied during the life time of a system and how much maintenance and support efforts are expected from them to keep the system going[1]. This, property of industrial systems is known as functionality[2]. Regrettably, system producers/ constructors do not provide answers to these questions on the delivery day. Instead, years later the statistics for various functionability measures become available. The reason for this is the fact that in-service behaviour of industrial systems is governed by the complex processes that are governed by the laws of science, human rules and environmental impacts, which are characterised by irreversibility, inseparability, and dependence on time, location and humans. (Knezevic, Functionability in Motion, 2010)

To rationally address questions of the predictions of in-service performance of industrial systems, described through functionability measures, Dr Knezevic has established the MIRCE Akademy at Woodbury Park, Exeter, UK, in 1999. Staff, Fellows, Members and students of the Akademy have endeavoured to subject in-service behaviour of industrial systems to the laws of science and mathematics to:

- Determine the trajectory of the motion of functionability through life of a given industrial system, which is defined by the sequence of occurrences of positive and negative functionability events, resulting from the atomic, environmental and human actions.
- Understand mechanisms that lead to the occurrence of functionability events starting from atomic structure that drives the behaviour of matter, up to the solar system that drives the energy conversions (a physical scale ranging from 10^{-10} to 10^{10} metre). (Knezevic J. , Atoms and Molecules in Mirce Mechanics Approach to Reliability, 2012)
- Define a mathematical scheme for predicting expected in-service functionability measures of a given industrial system together with the expected work done on the system under a given maintenance policies and planned support strategy.

While in classical mechanics a force is said to do work if, when acting on a body, there is a displacement of the point of application in the direction of the force, in Mirce Mechanics a given industrial system is said to do work, if whenever required, there is a continuous provision of a measurable function through time.

In summary, the body of knowledge comprising of axioms, mathematical equations and computational methods that enable prediction of functionability measures, based on the on the scientific understanding of the processes that generate them, constitutes Mirce Mechanics. ((Zaczyk, 2010), (Zaczyk & Knezevic, Cosmic Phenomena in Mirce Mechanics Approach to Reliability and Safety, 2013), Baumann, R. (2005), Silberberg, R., Tsao, C. H. and Letaw, J. R. (1984).

The main purpose of this paper is to apply Mirce Mechanics to the analysis of in-service reliability of Space Exploration Technologies Corporation and Orbital Sciences Corporation, organizations that have been selected by NASA to participate in the Commercial Orbital Transportation Services, COTS. The reason for this is the fact that at the moment of writing this paper, both CRS Programmes are out of action due to catastrophic launch failures that took place on 28th June 2015 and 28th of October 2014, respectively. (Carreau, 2015) It is expected that analysis performed on the past missions, conducted by both corporations, based on the publicly available information, will get incites into their practices and experiences gained, as well as highlighting the areas of potential applications of the Mirce Mechanics

[1] Boeing 747, registration number N747PA, which belonged to Pan Am transportation system, have delivered the work of 80,000 flying hours and received 806,000 maintenance man-hours, during the 22 years of in-service life. (Knezevic, 1997)

[2] Functionability, n, defined as the ability of being functional through life, in the book (Knezevic, Reliability, Maintainability and Supportability – A probabilistic Approach, 1993)

based knowledge to increase in the probability[3] of the successful continuations of NASA-contracted Commercial Re-supply Services.

2 NASA-CONTRACTED RE-SUPPLY SERVICES

In 1958 the United States government created the National Aeronautics and Space Administration (NASA) with a specific responsibility to develop the civilian space program as well as aeronautics and aerospace research. Since that time, NASA has lead large number of space exploration efforts, including the Apollo moon-landing missions, the Skylab space station, and later the Space Shuttle. In early 1990s NASA was directed to pursue commercial options for launching spaceflight missions, whenever such commercial offerings are available.

The development of the Commercial Resupply Services, CRS, vehicles began in 2006 with the purpose of creating American commercially operated uncrewed cargo vehicles to service the International Space Station, ISS. The development of these vehicles was under a fixed price milestone-based program, meaning that each company that received a funded award had a list of milestones with a dollar value attached to them that they didn't receive until after they had successful completed the milestone.

On 23rd December, 2008 NASA awarded Commercial Re-supply Services contracts to:

– Space Exploration Technologies Corporation, which is an American aerospace manufacturer and space transport services provider, with headquarters in Hawthorne, California, USA, which uses its Falcon 9 rocket and Dragon spacecraft. This, $1.6 billion contract was for 12 cargo transport missions to ISS with spacecraft SpaceX.

– Orbital Sciences Corporation, which is also American company, specialising in the design, manufacture and launch of small- and medium- class space and rocket systems for commercial, military and other government customers, based in Dulles, Virginia, USA, which uses its Antares rocket and Cygnus spacecraft. This contract was worth $1.9 billion for 8 missions to ISS using Cygnus cargo spacecraft, covering deliveries to 2016.

As NASA has contracted all the missions, the primary payload, date and time of launch, and orbital parameters for each mission are determined by NASA.

3 MIRCE MECHANICS ANALYSIS OF IN-SERVICE RELIABILITY OF ORBITAL SCIENCES

Orbital Science Corporation plan for the commenced regular ISS cargo missions to ISS under the Commercial Resupply Services contract was to deliver approximately 20,000 kg, or 20 metric tons, of cargo to the space station over the course of eight missions by using the Antares launch vehicle and Cygnus spacecraft. Antares is a two-stage launch vehicle designed to deliver medium-class payloads weighing up to 6120 kg into space. Antares utilises refurbished Russian-built engines which were originally manufactured in the 1960s and 1970s for the Soviet space programme. Cygnus spacecraft is capable of delivering 2000 kg of pressurised cargo to the ISS. It was planned that an enhanced version to be flown in later CRS missions will be able to deliver 2700 kg of pressurised cargo. The first of the eight contracted Cygnus missions to the ISS was expected to be completed during 2013.

According to the planned sequence of in-service events, 10 minutes from the liftoff of the Antares the Cygnus space craft would separate, deploy its solar arrays and enter in its initial orbit. When it arrives to the orbiting laboratory four days later, after a series of checks, ground controllers command began to increase the altitude of Cygnus, until it matched that of the space station. At that point NASA was to make go/no-go decision for Cygnus to berth with the station. Cygnus would autonomously approach within 12 metres below the space station, where it would stay. Astronauts aboard the station would then command Cygnus

[3] Mirce Mechanics Axiom 2: Probability of in-service failure in any interval of time is greater than zero.

to a “free drift” mode, when the space stations robotic arm would take hold of the spacecraft. At that moment the Ground commands would send command, from mission control in Houston, for the station’s arm to rotate Cygnus around and install it on the bottom side of the station’s Harmony module, enabling it to be bolted in place for its stay at the ISS.

In the preparation for an on-pad hot-fire test of the rocket scheduled for the early November 2012, Orbital Sciences rolled out its Antares rocket to the launch pad at the Mid-Atlantic Regional Spaceport in October 2012. The rocket successfully made its initial launch with a test payload on 21st April, 2013, from Wallops Flight Facility in Virginia. Orbital Sciences' first COTS demonstration mission was successfully carried out on the 29th September, 2013, a week behind schedule due to a software malfunction.

3.1 Orb-1

This was the first of eight contracted flights by Orbital Sciences under NASA's Commercial Re-supply Services program. The launch of Orb-1 was scheduled for November 2013, but a series of delays pushed the date to 20th December UTC.

The Antares launch vehicle left the Wallops Horizontal Integration Facility, HIF, on the morning of 17th December, and was later erected at Launch Pad 0A. However, later that day, due to the need for a series of spacewalks to fix a faulty coolant system on the ISS, NASA directed Orbital to stand down the Antares rocket. It was rolled back to the HIF where the time-sensitive cargo was removed. The launch date was rescheduled for no earlier than 13th January 2014.

However, after a scheduling conflict was resolved, at Wallops, the launched was moved forward to 7th of January. The launch was delayed one extra day due to cold temperatures at the launch site. Then on the 8th of January, NASA Wallops and Orbital Sciences announced that the launch attempt was scrubbed due to "an unusually high level of space radiation that exceeded by a considerable margin the constraints imposed on the mission to ensure the rocket's electronic systems are not impacted by a harsh radiation environment. Later, Orbital revised this, stating that a more extensive review of the radiation environment found it to be "within acceptable limits" of the Antares program, and that a launch would be attempted on 9th January.

In the fourth attempt, on the 9th of January the Orb-1 mission successfully started at 18:07:05 UTC from the Mid-Atlantic Regional Spaceport Launch Pad 0A. Cygnus was filled with 1261 kg of supplies for the ISS, crew provisions and spare parts, together with hardware to expand the research capability of the station. This included 12 experiments flying as part of the Student Spaceflight Experiments Program, selected from 1466 entrants and involving 7200 North American students. The Cygnus spacecraft arrived at the International Space Station early on 12th January, where it was successfully docked with the assistance of Canadarm2, as originally planned.

On 18th February 2014 at 10:25 UTC, Canadarm2 unberthed the Cygnus spacecraft from the nadir port of the Harmony module on. The spacecraft was then maneuvered to a position below the station, where it was released from the RMS at 11:41 UTC. It followed by a series of separation maneuvers that moved it away from the ISS. The spacecraft re-entered the atmosphere and burned up on 19th February 2014 over the southern Pacific Ocean, disposing of approximately 1470 kg of trash.

3.2 Orb-2

This was the second of eight scheduled flights by Orbital Sciences under the Commercial Resupply Services contract with NASA. It was the third flight of the Orbital Sciences' un-manned re-supply spacecraft Cygnus and the fourth launch of the company's Antares launch vehicle.

The mission was scheduled for the 1st May 2014. The Cygnus is expected to deliver 1650 kg of cargo to ISS and dispose of about 1470 kg of trash through destructive re-entry. However, the original launch date was delayed to no sooner than 6th May, which followed by the following sequence of estimated times, 17th June, 10th July and again to NET on 11th July, due to test stand failure of an AJ-26 engine. On the 12th the local weather conditions prevented the launch.

Finally, the second mission of the Orbital Science Corporation was launched from the Mid-Atlantic Regional Spaceport on 13th July, 2014.

During the Flight Days, 36 through 41 Cygnus was detached from the station and maneuvered a safe distance away. Engineering tests were performed for up to 15 days before a series of engine burns are conducted to slow the spacecraft for re-entry over the South Pacific Ocean, where it and the cargo inside were destroyed. Total weight of cargo was 1494 kg (Crew supplies, 764 kg; Hardware: 355 kg, Science and research, 327 kg, Computer supplies, 8.2 kg; Spacewalk tools: 39 kg).

3.3 Orb-3

Orbital Sciences CRS Flight 3 was the first attempted flight of the Antares 130, which uses a more powerful Castor 30XL second stage, and the last flight of the standard-sized Cygnus Pressurised Cargo Module.

Orb-3 carried a variety of NASA-determined payloads, some of which were finalised very close to the launch day. The cargo module from the rocket carried 2300 kg of supplies and experiments meant for the International Space Station. In addition, the Arkyd-3 satellite would have been transported to the ISS on this flight and 34 of the Planet Labs small “Dove” Earth-observation spacecrafts.

The mission was scheduled to launch on 27th October, 2014, at 22:45 UTC from the Mid-Atlantic Regional Spaceport at the Wallops Flight Facility in Wallops Island, Virginia, with rendezvous and berthing with the ISS early in the morning on 2nd November. This was the first night-time launch for both the Antares launcher and Cygnus spacecraft. The launch was scrubbed due to safety concerns of a sailboat entering the exclusion zone less than ten minutes before launch. A 24-hour delay was put in place.

The Antares rocket carrying the Orb-3 Cygnus was launched, from Launch Pad 0A on 28th October, 2014, at 6:22 p.m. (EDT). Fifteen seconds after liftoff a failure of propulsion occurred in the first stage and the vehicle began falling back to the launch pad. Before reaching the ground, the vehicle was destroyed by its flight termination system, which was engaged by a command from the Wallops Range Control Center. According to NASA’s emergency operations officials, there were no casualties and property damage was limited to the south end of Wallops Island.

The resulting explosion was felt in Pocomoke City, Maryland, 32 km away. The fire at the site was quickly contained and allowed to burn itself out overnight. Initial review of telemetry data found no abnormalities in the pre-launch, the launch sequence, and the flight, until the time of the failure. According to the NASA press release, there were no known issues prior to launch and that no personnel were injured or missing but that the entire payload was lost and there was significant damage to the launch pad and site fuel tanks.

On 29th October, 2014, teams of investigators began examining debris at the crash site. With some preliminary investigation completed, Orbital Science Corporation cited the cause of the Orb-3 launch failure is likely to be a turbo pump malfunction in one of the AeroJet Rocketdyne AJ-26 engines (refurbished Russian NK-33 engine).

Repairs of the damage caused to Wallops Flight Facility, by the launch exploration, started in January 2015.

By the time on writing this paper there was not an official report regarding the cause of the failure of the Orb-3.

3.4 Orbital Science’s CRS Plan

To meet its Commercial Re-supply Services obligations to NASA, Orbital is planning to launch at least one enhanced Cygnus cargo spacecraft via an Atlas V launch vehicle in 2015. Orbital has yet to officially announce which engine may replace the AJ-26, but evaluation of other engines such as the RD-181 and RD-193 were being conducted as an AJ-26 replacement prior to the incident. The re-designed Antares launch vehicle is expected to fly again sometime in 2016.

4 MIRCE MECHANICS ANALYSIS OF IN-SERVICE RELIABILITY OF SPACEX

Under the NASA COTS contract it is expected that SpaceX will make 12 deliveries of cargo to ISS, with each flight carrying up to 3300 kg of internal and external cargo to the space station and return up to 2500 kg of equipment to Earth.

The space agency paid SpaceX $396 million in instalments as the company accomplished design, testing and flight milestones, including two test launches and demo missions of the Falcon 9 rocket and Dragon capsule.

4.1 SpaceX CRS-1

SpaceX CRS-1 was the third flight for Space Exploration Technologies Corporation's uncrewed Dragon cargo spacecraft, the fourth overall flight for the company's two-stage Falcon 9 launch vehicle, and the first SpaceX operational mission under their Commercial Resupply Services contract with NASA. The launch occurred in accordance to the plan on 8th October 2012 (UTC) and successfully placed the Dragon spacecraft into the proper orbit for arriving at the International Space Station with cargo re-supply several days later.

During the launch, one of the nine engines suffered a sudden loss of pressure about 80 seconds into the flight, which was followed by its immediate shutdown. The remaining eight engines continued to fire, while the flight control software adjusted the trajectory to insert Dragon into required orbit.

At launch the CRS-1 Dragon was carrying approximately 905 kg of cargo, 400 kg without packaging (120 kg of crew supplies and 180 kg of critical materials to support the 166 experiments on board the station and 66 new experiments) and 105 kg of hardware for the station as well as other miscellaneous items. It was also planned to launch a 150 kg prototype of the second-generation Orbcomm satellite, as a secondary payload from Falcon 9's second stage.

4.1.1 Falcon 9 Engine Anomaly

During the ascent, an engine anomaly occurred with one of the nine engines on the Falcon 9 first stage. SpaceX has emphasized for several years that the Falcon 9 first stage is designed for "engine out" capability, with the capability to shut down one or more malfunctioning engines and still make a successful ascent. In this event, the SpaceX CRS-1's first stage shut down engine no.1 and as a result continued the first-stage burn on the remaining eight engines longer than usual at a reduced thrust to insert the Dragon spacecraft into the proper orbit. SpaceX referred to the event as a "Rapid unscheduled disassembly" which, although unintended, was the first in-flight demonstration of Falcon 9's "engine out" design and "provides a clear demonstration of the engine out capability."

4.1.2 Post Flight Investigations

In response to the anomaly, NASA and SpaceX jointly formed the CRS-1 Post-Flight Investigation Board. Preliminary information from the post-flight review board indicates that the Engine no.1 fuel dome, above the nozzle, ruptured but did not explode. The burning fuel that existed before the engine was shut down caused the fairing rupture, as seen in the flight video recordings. Subsequent investigations revealed in a Congressional hearing pinpointed the issue as a result of an undetected material flaw in the engine chamber jacket, likely introduced during engine production. During flight, the data suggests this material flaw ultimately developed into a breach in the main combustion chamber. This breach released a jet of hot gas and fuel in the direction of the main fuel line, causing a secondary leak and ultimately a rapid drop in engine pressure. As a result, the flight computer commanded shutdown of engine 1 and Falcon 9 continued on its path to ensure Dragon's entry into orbit for subsequent rendezvous and berthing with the ISS.

The primary payload contractor, NASA, requires a probability of 0, 99 that the stage of any secondary payload on a similar orbital inclination to the International Space Station will reach their orbital altitude goal above the station. Due to the one engine failure, the Falcon 9 used more propellant than intended, reducing the success probability estimate to approximately 0.95. Consequently, the second stage did not attempt a second burn, and Orbcomm-G2 was left in an unusable orbit and burned up in Earth's atmosphere within 4 days after the launch.

Video of the launch shows debris falling from the rocket as it speeds to orbit, though SpaceX indicates that the engine did not explode, as they continued to receive data from it.

4.2 SpaceX CRS-2

The second CRS mission from Space Exploration Technologies Corporation took place on 1st March, 2013. A minor technical issue on the Dragon spacecraft involving the RCS thruster pods occurred upon reaching the orbit, which was recoverable.

When launched the CRS-2 Dragon was filled with 6 77 kg of cargo, 575 kg without packaging (81 kg of crew supplies, 347 kg of scientific experiments and experiment hardware, 135 kg of hardware for the station) and other miscellaneous items. The two Heat Rejection Subsystem Grapple Fixtures (HRSGFs) had a combined weight of 221 kg and were transported to the ISS inside the unpressurised Dragon trunk as external cargo.

The vehicle was released from the station on March 26th, 2013, at 10:56 GMT, and splashed down in the Pacific Ocean at 16:34 GMT.

The Dragon returned 1370 kg of cargo, 1210 kg without packaging. Included is 95 kg of crew supplies, 660 kg of scientific experiments and experiment hardware, 401 kg of space station hardware 38 kg of spacesuit equipment and other miscellaneous items.

4.3 SpaceX CRS-3

There were several delays between the nominal December 2013 date that had been planned since early 2013, mostly due to limited berthing windows in the ISS Visiting Vehicle schedule, and delays to Programmes, Orbital's Cygnus and SpaceX's Dragon, resulted from the December 2013 cooling issue on the ISS which required several spacewalks to mitigate.

The launch planned for 12th March 2014 was rescheduled to 30th March and then for 2nd April 2014 due to a variety of reasons, including data buffering issues, some operational issues with the new Dragon design and some contamination of the impact shielding blanket. SpaceX ultimately decided to move forward and use the shielding blanket with the minor contamination problems, believing it would not impact the optical payloads being carried in the Dragon trunk

However, a further delay was announced on 26th March, which was related to a fire at one of the radar facilities on the Eastern Range. There is mandatory radar coverage for any launches from Cape Canaveral, and the fire forced a delay until that section of the launch trajectory could be covered, possibly by alternative means that would have telemetry communication capability to the Air Force facility responsible for launch safety.

By April 4th the Eastern Range radars were repaired and back online to support launch and the CRS-3 launch was slated for no earlier than 14th April with a backup date of 18th April, contingent upon a ULA Atlas V flight scheduled for 10th April.

On 11th April, the International Space Station suffered a failure of an external computer known as a Multiplexer/Demultiplexer (MDM), which required a spacewalk on 22nd April to replace it, in order to restore vital redundancy to the station. Despite the challenges, the CRS-3 mission, which could have been impacted by the MDM failure, was still on for Monday, 14th April, with ISS berthing scheduled to take place two days later on 16th April.

However, during the launch attempt on 14th April, a primary helium supply valve used in the stage separation system failed a pre-launch diagnostic test approximately one hour prior to the scheduled launch, so the SpaceX launch manager scrubbed the mission. In ground tests following the scrub, the redundant backup helium supply valve tested okay so the mission would likely have succeeded.

The launch was immediately rescheduled for no earlier than the backup date, 18th April. That date was confirmed two days later, following replacement of the defective valve, but it was noted that weather constraints may prevent the launch on 18th April from occurring. If the launch had been scrubbed on 18th April, the next launch window would have been, 19th April at 3:02 pm ET. However, on Friday, 18th April 2014 at 7:25:21 p.m. UTC, the vehicle was successfully launched.

During this flight the CRS-3 booster made history by being the first liquid-rocket-engine orbital booster that successfully performed the controlled ocean soft touchdown. The booster included landing legs for the first time which were extended for the simulated "landing", and the test utilised more powerful gaseous nitrogen control thrusters than had been used in the previous test to better control aerodynamic-induced rotation. The booster stage successfully approached the water surface with no spin and at zero vertical velocity, as designed. The SpaceX team was able to receive video from cameras placed on the first-stage booster during soft landing test, as well as vehicle telemetry recorded by aircraft, but swells of 4.6–6.1 m were reported in the anticipated recovery area. The first stage successfully hovered over the ocean surface, but heavy waves destroyed the stage before boats were able to retrieve it.

Two days after splashdown, the 1600 kilograms of down-mass cargo, from the mission was returned to the Port of Long Beach by a marine vessel. Time-sensitive cargos are unloaded in California and flown to NASA receiving locations. The remainder of the cargo was unloaded and transferred to NASA at the SpaceX McGregor test facility in Texas, where the Dragon capsule was fully decommissioned and defueled. Although water was found inside the Dragon capsule, the preliminary checks indicated that no scientific equipment had been damaged. The source of the water has not been confirmed and will be investigated during the decommissioning of the capsule.

4.4 SpaceX CRS-4,

SpaceX's fourth CRS mission was scheduled for launch on September 20th, 2014, but was delayed due to adverse weather conditions. The launch took place on 21st September, 2014 at 1:52 a.m. EDT from Cape Canaveral Air Force Station in Florida.

As contracted, the CRS-4 mission the payload consisted of 2216 kg of cargo (1627 kg of pressurised and 589 kg of unpressurised.

The CRS-4 mission, which lasted 31 days, 22 hours and 41 minutes, was successfully completed on the 25th October 2014.

4.5 SpaceX CRS-5,

By July 2014, NASA scheduled this for "no earlier than" December 2014, with docking to the station projected to occur two days after launch.

This mission, was scheduled for launch on December 9th, 2014, but was delayed over several dates in December due to manifest adjustments for items lost from the Cygnus CRS Orb-3 launch failure (described in 4.3), technical issues found from a static fire test, the U.S. holiday season and staff scheduling, as well as a beta angle period during late December where thermal and operational constraints would make a Dragon berthing prohibited.

On 6th January 2015, the launch attempt was placed on hold at 1 minute 21 seconds prior to scheduled lift-off after a member of the launch team noticed actuator drift on one of two thrust vector control systems of the Falcon 9 second stage engine. As this launch had an instantaneous launch window, meaning no delays are possible in the launch sequence, the flight was postponed to 9th January 2015. On 7th January, the flight was rescheduled for 10th January 2015.

The Falcon 9 rocket carrying the CRS-5 Dragon spacecraft successfully launched on 10th January 2015 at 9:47 UTC. Dragon reached the station on 12th January. It was grappled by the Space Station Remote Manipulator System at 10:54 UTC and berthed to the Harmony module at 13:56 UTC.

The Dragon spacecraft for CRS-5 carried 2317 kg of cargo to the ISS. Included in this was 490 kg of provisions and equipment for the crew, 717 kg of station hardware, 577 kg of science equipment and experiments, and the 494 kg Cloud Aerosol Transport System (CATS).

In this flight, SpaceX attempted an unprecedented operation, which was to return the nearly-empty first stage of the Falcon 9 through the atmosphere and land it on a 90x50-meter floating platform called the autonomous spaceport drone ship. In October 2014, SpaceX had revealed that the ship was being built for SpaceX in Louisiana, and by mid-December, the ship was docked in Jacksonville, Florida, ready to go to sea to support the test flight landing attempt.

SpaceX attempted a landing on the drone ship on 10th January. Many of the test objectives were achieved, including precision control of the rocket's descent to land on the platform at a specific point in the South Atlantic Ocean and a large amount of test data was obtained from the first use of grid fin control surfaces used for more precise re-entry positioning. The SpaceX webcast indicated that the boost-back burn and re-entry burns for the descending first stage occurred, and that the descending rocket then went "below the horizon," as expected, which prevented the live telemetry signal. Shortly after that, the information released by SpaceX stated that the rocket did get to the drone spaceport ship as planned, but it had “hard landing”, while ship itself is fine, although some of the support equipment on the deck will need to be replaced. Full details of what happened to the rocket are not yet publicly known (one of the possible problems was the grid fins running out of hydraulic fluid).

4.6 SpaceX CRS-6

As of July 2014, this mission was tentatively scheduled by NASA for February 2015, with expected berthing to the station occurring two days later. However, as a result of delays in the launch of the SpaceX CRS-5 mission, in late March 2015, the tentative launch of this mission was scheduled for 13th April 13, 2015.

Due to bad weather conditions 13th April launch was postponed. Finally, the sixth SpaceX mission was successfully launched on 14th April 2015, at 20:10:41 UTC from Cape Canaveral Air Force Station in Florida. It was the eighth flight for SpaceX's uncrewed Dragon cargo spacecraft and the sixth SpaceX operational mission contracted to NASA under a Commercial Re-supply Services contract. It was docked to the International Space Station from 17th April to 21st May 2015.

The Dragon spacecraft was filled with more than 2000 kg of supplies and payloads, including critical materials to directly support about 40 of the more than 250 science and research investigations carried out at the ISS.

Planetary Resources will transport Arkyd 3 to the ISS aboard Dragon on CRS-6, which was the attempt to validate and mature the technology of its Arkyd series of spacecraft, (the first Arkyd 3 satellite was destroyed on launch in the explosion of the Orbital Sciences Antares launch vehicle carrying it aboard the third Cygnus cargo resupply flight to the ISS, as was described in 4.3).

SpaceX has the primary control over manifesting, scheduling and loading secondary payloads. However there are certain restrictions included in their contract with NASA that preclude specified hazards on the secondary payloads, and also require contract-specified probabilities of success and safety margins for any SpaceX reboosts of the secondary satellites once the Falcon 9 second stage has achieved its initial low-Earth orbit.

CRS-6 included science payloads for studying new ways to possibly counteract the microgravity-induced cell damage seen during spaceflight, the effects of microgravity on the most common cells in bones, gather new insight that could lead to treatments for osteoporosis and muscle wasting conditions, continued studies into astronaut vision changes and test a new material that could one day be used as a synthetic muscle for robotics explorers of the future. Also making the trip was a new espresso machine for space station crews!

After the separation of the second stage, SpaceX conducted a flight test and attempted to return the nearly-empty first stage of the Falcon 9 through the atmosphere and land it on a 90x50-meter floating platform called the autonomous spaceport drone ship. Although the unmanned rocket technically landed on the floating platform, as it came down with too much lateral velocity, it tipped over and was destroyed. According to SpaceX, as the bipropellant valve was stuck the control system could not react rapidly enough for a successful landing.

The sixth mission was successfully completed on 21st May 2015, at 16:42 UTC.

4.7 SpaceX CRS-7

In January 2015, the launch of the seventh SpaceX CRS mission was tentatively scheduled by NASA for no earlier than 13th June, 2015. This was adjusted to 22nd June, then moved forward to 19th June and adjusted again to 26th June, 2015. Subsequently, the launch had been rescheduled to 28th June, 2015 at 14:21:11 UTC, from Cape Canaveral LC-40.

A full listing of the cargo aboard the failed mission included the following items:

690 kilograms of Crew Supplies related cargo and 573 kg of the cargo required for the operation, 36 kg of Computer Resources, 462 kg of Vehicle Hardware, 167 kg of Hardware for Extra vehicular activities (including Russian Cargo, Russian Segment Torque Wrench) and International Docking Adapter # 1 weighing 526 kg.

As of July 2013, the first International Docking Adapter, IDA-1 was scheduled to be delivered to the International Space Station on this mission in order to be attached to one of the existing Pressurised Mating Adapters and convert the existing docking interface to the new NASA Docking System (NDS). The new adapter is intended to facilitate future docking of new U.S. human-transport spacecraft. Previous United States cargo missions since the retirement of the Space Shuttle have been berthed, rather than docked, while docking is considered the safer and preferred method for spacecraft carrying humans.

The spacecraft was planned to stay in orbit for five weeks before returning to Earth with approximately 640 kg of supplies and waste.

4.7.1 Planned Landing on Floating Platform

The launch was scheduled to be the third controlled-descent and landing test for the Falcon 9's first stage. It was planned that after the second stage separation, SpaceX planned to conduct a flight test and attempt to return the Falcon 9's nearly-empty first stage through the atmosphere and land it on a 90x50-meter floating platform barge. SpaceX calls the barge an autonomous spaceport drone ship (ASDS), and this particular mission's ASDS was named “Of Course I Still Love You”.

4.7.2 Launch Failure

The vehicle's second stage failed with a measured overpressure at T+02:19, well after max Q (at T+01:26) and before first stage engine shutdown (MECO, scheduled at T+02:45). The second stage developed a very large Liquid Oxygen Tank leak, releasing large clouds of vapour while the first stage continued to thrust stably on course for about 9 seconds, until it disintegrated at T+02:28.

It was the first Falcon 9 failure in the 19 launches of the rocket type. According to SpaceX, the launch vehicle experienced a problem shortly before first stage shutdown due to an overpressure event in the upper stage liquid oxygen tank.

It is not clear if the destruction of the first stage was due to the flight termination system, which would have been activated automatically by on-board sensors. The Eastern Range's range safety officer did transmit a remote destruct signal, but only as a formality, 70 seconds after the event when there was nothing left to be destroyed.

5 CURRENT STATUS OF NASA-CONTRACTED COMMERCIAL RE-SUPPLY SERVICES

At the time that this paper was written (July 2015) NASA-contracted Commercial Resupply Services had no capabilities of supporting the ISS, due to catastrophic launch failures that took place on 28th June 2015 and 28th of October 2014, respectively. Consequently, NASA was without spares for the water filtration system of ISS.

The first opportunity to improve the water filtration system of ISS will be in mid-August 2015 when the planned launch of a Japanese ISS re-supply mission will take place. It is expected that Japan’s HTV will be loaded with water containers and other supplies that should help to ensure six-crewmember operations until late this year.

6 THE FUTURE OF NASA-CONTRACTED COMMERCIAL RE-SUPPLY SERVICES

On February 21st, 2014 NASA posted Request for Information, RFI, about a possible follow on options to the current Commercial Re-supply Services to the International Space Station.

The anticipated contract regarding the future flights will include:

– delivery of pressurised and unpressurised cargo,
– return and disposal of pressurised cargo,
– disposal of unpressurised cargo,
– ground support services for the end-to-end re-supply mission

and will include: delivery of approximately 14000 to 17000 kg per year, 55 to 70 m^3 of pressurised cargo in four or five transport trips delivery of 24–30 powered lockers per year, requiring continuous power of up to 120 Watts at 28 Volts,.

The draft Request for Proposal, RFP, was released in May 2014 with a final RFP in June 2014.

Five companies are known to have submitted proposals to NASA, namely: SpaceX, Orbital ATK, Boeing, Sierra Nevada, and Lockheed Martin. Although the contract awards were originally anticipated by NASA in April 2015, they moved back to a June target date, and in April, delayed again to a contract award target date of September 2015.

In 2015, NASA extended the contract by ordering another three re-supply flights from SpaceX and one from Orbital Sciences. It is expected that the second round of contracts, CRS2, will cover deliveries from 2017 until 2024 and are expected to be awarded in 2015.

In summary NASA through its Commercial Re-supply Services to the International Space Station is attempting to establish a scheme for risk management of these processes, in similar way as the passenger air transport community is achieving through well-established international standards and procedures (Kyselova, 2013).

7 CONCLUSIONS

The factual results of the analysis of NASA-contracted Commercial Re-supply Services presented in this paper are another confirmation of the uncertainty of the in-service behaviour of industrial systems. Hence, this is another confirmation of the validity of the Mirce Mechanics Axiom related to the probability of occurrence of in-service failures. Even further, it is also confirmed that causes of mission failures are not due to the failures of their consisting components only. Several launches have been postponed due to unsatisfactory environmental conditions during the attempted launches on one hand and high level of space radiation on the other. (Knezevic & Papic, 2015)

Both catastrophic launches are still under investigations, which only confirm the complexity of the processes taking place in the launch process, and even more the complexity of the interactions between internal components of the launch system, as well as the interactions between the launch system and the surrounding natural environment.

Finally it is necessary to stress that all processes from the conceptions of both the launch systems, Space Exploration Technologies Corporation and Orbital Sciences Corporation, through their design, production, testing, launches, space flights, berthing with the ISS, return flight to the Earth and finally post failure analysis are performed by humans that despite all creative, scientific, motivational and similar positive qualities also have proven abilities to make errors on the execution of tasks required to be performed by them, to the level that the 3rd Axiom of Mirce Mechanics states "*The probability of a human error in the execution of any functionability action is greater than zero".*

In summary this paper provides further confirmation that in-service reliability and safety considerations of a large number of modern industrial systems, including NASA-contracted Commercial Re-supply Services, are complex properties whose full understanding requires scientific approach towards understanding intricate mechanisms that lead to the occurrence of in-service failures, starting from atomic structure that drives the behaviour of matter, up to the solar system that drives the energy conversions (a physical scale ranging from 10^{-10} to 10^{10} metre). Then and only then, can accurate and meaningful reliability and safety predictions become possible, enabling the ultimate goal of reducing the probability of the occurrence of in-service failures during the life of industrial systems like power networks, aviation, satellite services, pipelines, digital control sand many others, including NASA-contracted Commercial Re-supply Services of today and of the future

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ANALYSIS OF A TIME-VARYING RISK PREMIUM IN THE VISEGRAD GROUP

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Abstract

The risk premium for the Visegrad countries was analyzed. The period of the considerations is between 2005 and 2015. Daily, weekly and monthly data outcomes were compared. It was found that the outcomes are quite similar for all countries. Moreover, changing to weekly or monthly data does not incorporate significantly new knowledge. Generally, daily data remain the best one to analysis. The historical period from which the stock market returns are computed was narrowed to just one calendar year (i.e., 250 stock session days). As a result, it was obtained that the risk premium varies from -70% up to 115%, whereas the average measures vary between and 1.89% and -10.46%. Generally, a negativity of a risk premium was confirmed. But, on the other hand, no leverage effect was found. Nor the significant impact of the company size. The models were based on GARCH types, i.e. AR-GARCH and GARCH in mean models were evaluated. The methods were restricted to simple GARCH(1,1) in case of the variance equations.

Keywords: *GARCH, leverage effect, risk premium, size premium, Visegrad countries*

1 INTRODUCTION

One of the basic economic and financial concepts is the notion of a risk premium. Namely, financial instruments, which are assumed to be riskier bring higher returns, in comparison to less risky ones. Stocks can serve as an example – being subject to the relatively higher risk exposure than government bonds – considered a safe investment (Jajuga & Jajuga, 2011).

The risk premium plays a key role, for example, in the popular CAPM methodology, etc. It is also an important feature in the processes of valuation, capital cost estimation, etc. Its estimates are very useful thus.

However, the review of the literature reveals that starting from various methods and considering different time horizons significantly different results are obtained. Hence, the risk premium itself seems to be worth examination, and also its volatility. Indeed, this is the aim of this paper for a particular case of the Visegrad countries.

2 LITERATURE REVIEW

On the capital market a risk premium can be defined as the difference between the expected rate of the return of stocks (i.e., assets burdened with a significant risk) and a risk-free rate. It is therefore important to determine the benchmark of

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a risk-free rate. It can be done, for example, with a help of treasury bills or yield of the 10-year treasury bonds.

It seems that the usual choice of the yield of a 10-year treasury bonds in the best one. It is the usual choice also if the considered economies are bank-based. If they are market-based, one can speculate that the short-term interest rate should be also taken under consideration. Bonds are not only guaranteed by the state, as also treasury bills, and therefore, in practice risk-free, but they are also characterized by relatively high liquidity (which cannot be said about treasury bills). Actually, the lack of liquidity also generates a specific risk by itself (Szczepankowski, 2007).

For example, Mehra and Prescott (1985) observed that the difference between the rate of return from stocks and bonds is significantly higher than it can be derived from the above arguments. This can be explained, for example, by the increasing risk-aversion of investors.

Yet, estimating a market risk premium can be done in several ways. The easiest way is to compute the difference between the average annual rate of return from the market portfolio and the average rate of return on the investment in bonds, where the average is calculated in a long horizon.

The disadvantage of this method is mainly the omission of the historical diversity of the various periods. In addition, significantly different estimates are obtained depending on whether the estimated average is the arithmetic or the geometric one. For example, for the United States arithmetic average for the period of 1926 – 2007 gives a figure of 6.9%, while the geometric mean gives 5.1%. For the period of 1978 – 2007 they are respectively 5.7% and 4.9% (Zenner, Hill, Clark, & Mago, 2008; Sfiridis, 2012).

Other methods of estimating risk premium include the usage of the dividend model, the Sharpe model, and the comparison with bonds. These methods provide, for example, for the United States a wide range of values, i.e., between 5% and 8.6% (Zenner, Hill, Clark, & Mago, 2008, 2008). For Poland, a similar studies were conducted by Dobija (2005) and Zarzecki (2008; 2009). The problem was presented in the perspective of various economies by Damodaran (2015). A variety of methodological approaches and practical aspects were fairly presented in the review article of Kurek (2009). It was noted there that the very wide range of values can be obtained with different methodologies and constraints for different periods of time.

Another, interesting problem, closely related with the above one, is the question whether larger companies are characterized by slightly lower risk compared to the market average (Demsetz & Strahan, 1995; Fama & French, 1993; Zarzecki, 2009). Sometimes, such an assumption is made. For example, in the three-factor CAPM, proposed by Fama and French (1993). Then, a size premium is also included (Fama & French, 2012).

This issue is, however, debatable. For example, Foye, Mramor, and Pahor (2013) analyzed the new European Union members and found that the model of Fama and French (1993) has some serious disadvantages in such a context. Thus, some researchers have proposed modifications. For example, Czapkiewicz and Wójtowicz (2014) basing on the monthly data from the Warsaw Stock Exchange from the period of 2003 – 2012. On the other hand, Słoński and Kwiatkowski (2010) recognized the three-factor model as a sufficient enough to describe Polish companies. They also claimed that the size premium is important for the smallest companies.

However, Sekuła (2013) basing on data from the period of 2002 – 2010 questioned the relationship between the market capitalization of companies and the rates of return. Moreover, it was noted that the size premium effect is reversed, i.e., companies with medium and large capitalization generate higher returns than companies with low capitalization.

Similarly, doubts on the existence of the size premium appeared during the analysis of data from developed markets (Horowitz, Loughran, and Savin, 2000). Van Dijk (2011) conducted a fairly extensive comparative analysis and came to the conclusion that the premium for the size fades since 1980s. Similarly, its presence on the markets was disputed by Paschall (1999). For the markets of the Central and Eastern Europe doubts were presented also by Konieczka and Zaremba (2014).

Also, some interesting researches for the other Visegrad countries were done, for example, by

Gersl and Lesanovska (2014), Vonnak (2010), Boubakri and Guillaumin (2011) and Poshakwale and Murinde (2001a; 2001b).

3 METHODOLOGY

One of the econometric models used in the modelling of the volatility of time series is GARCH model. This model was proposed by Bollerslev (1986) as a generalization of earlier ARCH model of Engle (1982). The simplest (and simultaneously the best for various applications) is GARCH(1,1).

Formally, it is said that the variable x_t follows GARCH (1,1), if:

$$x_t = a_0 + a_1 \cdot y_1 + a_2 \cdot y_2 + \ldots + a_k \cdot y_k + e_t ,$$

$$e_t = z_t \sqrt{h_t} ,$$

$$h_t = c_0 + c_1 \cdot (u_{t-1})^2 + d_1 \cdot h_{t-1} ,$$

where $y_1, \ldots, y_k$ are explanatory variables and u is the residual term. The variable t is a time index. It is assumed that the variable z_t follows the standard normal distribution (with mean 0 and variance 1), i.e., N(0,1) process.

It is said that the variable x_t follows ARMA(m,n)-GARCH(p,q) process, if

$$x_t = a_0 + a_1 \cdot x_{t-1} + \ldots + a_m \cdot x_{t-m} + b_1 \cdot e_{t-1} + \ldots + b_n \cdot e_{t-n} + e_t ,$$

where:

$$e_t = u_t \sqrt{h_t}$$
$$u_t \sim N(0,1)$$
$$h_t = c_0 + c_1 \cdot (e_{t-1})^2 + \ldots + c_p \cdot (e_{t-p})^2 + d_1 \cdot h_{t-1} + \ldots + d_q \cdot h_{t-q}$$

More on GARCH models can be found for example in the book of Xekalaki and Degiannakis (2010) or Tsay (2010). In this paper, following the methods of Heryan (2014) and Sekuła (2011), the risk premium is substituted as the variable x_t.

Notice, that h_t is a variance, which cannot be negative. Therefore, estimated parameters c_0, c_1, ... , c_p, d_1, ... , d_q should be positive. Sometimes, it happens that numerical outcomes are negative.

However, the risk premium is also often estimated using GARCH-M (Doman & Doman, 2009; Asness, 2000). Then, of course, its conceptual meaning is understood slightly different.

It is said that the variable x_t follows AR(m)-GARCH-M(p,q) process, if

$$x_t = a_0 + a_1 \cdot x_{t-1} + \ldots + a_m \cdot x_{t-m} + b \cdot h_t + e_t ,$$

where:

$$e_t = ut \sqrt{ht}$$
$$ut \sim N(0,1)$$
$$h_t = c_0 + c_1 \cdot (e_{t-1})^2 + \ldots + c_p \cdot (e_{t-p})^2 + d_1 \cdot h_{t-1} + \ldots + d_q \cdot h_{t-q}$$

In such a case, the parameter b itself is interpreted just as the risk premium (Doman & Doman, 2009). Indeed, high volatility should be compensated by a higher rate of return. Hence, this parameter should be positive (Glosten, Jagnnathan, & Runkle, 1993). However, it is sometimes found that there is a negative correlation between the rate of return from stocks and their volatility over time. In other words, high volatility is present during price declines, while price increases follow rather stable processes. Such a phenomenon has been observed in certain situations and named the leverage effect (Ait-Sahalia, Fan, & Li, 2013).

GARCH models are very useful in finance and economics, especially in the analysis of high-frequency time series (Alexander, 2001; Fiszeder, 2009). Rarely, GARCH(p,q) with p > 1 and q >1 is needed, because greater complication of the model does not provide a relatively better outcome estimation (Matei, 2009; Hansen & Lunde, 2005).

Despite many advantages of the simple GARCH model, for example, Nelson (1991) pointed out that from the definition the existence of a negative correlation between the future conditional variance and the current value of the modelled rate of return is excluded. In addition, the estimated coefficients often do not meet theoretical assumptions (the mentioned requirement of non-negativity). As a result, GARCH model has been expanded to include various modifications (Xekalaki & Degiannakis, 2010).

Some simple test to indicate a certain likelihood of the leverage effect is to check if there is a negative correlation between $(x_t)^2$ and x_{t-1} (Andersen et al., 2009). One can also analyse a news impact curve (Jondeanu, Poon, & Rockinger, 2007), i.e., a graph of the conditional variance h_t vs. lagged innovation e_{t-1}.

The asymmetric GARCH models were examined for Warsaw Stock Exchange (WSE), for example, by Małecka (2011) and Rozkrut (2007). The problem of parameters' restrictions – by Galin (2008).

Fiszeder and Kwiatkowski (2005) analyzed selected 28 companies from WSE and came to the conclusion that in the case of stock market indices GARCH(1,1) describes the volatility in the best way out of other GARCH type models. On the other hand, Bartkowiak (2007) analyzed only the assets related to the derivatives markets. Their results are in part consistent with those from the developed markets. On the other hand, obtained concerns and doubts suggest that it is still worth to examine the Visegrad markets. In this sense, even the "stylized facts" are worth noting.

Płuciennik (2007) pointed out that the use of models with autoregression (i.e., AR-GARCH) results in a considerably better results than the simple GARCH(1,1) models for the WIG 20 index. GARCH models were also applied to volatility estimation on WSE and other Visegrad stock exchanges by Filipowicz (2013), Karkowska (2013), Doman (2004), Jakubowska (2015), Waszczuk (2013), Borys and Zemcik (2009), Borys (2011), Doman and Doman (2013), Wdowiński and Zglińska-Pietrzak (2005), Brzeszczyński and Welfe (2004), and others.

Finally, it should be mentioned that it usually happens that the sum of parameters in the variance equation in GARCH(1,1) model is equal to 1. In other words, $c1 + d_1 \approx 1$. Such a restriction can be implemented into the model itself. Such a model is called I-GARCH (Fiszeder, 2009). However, this modification is not in the scope of this research.

4 DATA

In the view of just presented consideration, it is clear that the examination of the volatility of a risk premium (Chen, Grundy, & Stambaugh, 1990; Chou, 1988) for Poland and other Visegrad countries appears to be an interesting problem. For the purpose of this analysis, it is assumed that the risk premium is the difference between the yearly rate of return on the portfolio from the stock exchange (based on a market index) and yield of a 10-year treasury bonds. For the computations, it was assumed that there are 250 session days in a calendar year. A similar method was used by Sekula (2011) to analyze the Polish capital market, between 1995 and 2010. A broad estimation of the risk premium ranging from 2.9% to 8.6% was obtained.

The data daily were obtained for the database Stooq and Federal Reserve Bank of St. Louis, stock exchanges and central banks (Stooq.pl, 2015; Federal Reserve Bank of St. Louis, 2015; Prague Stock Exchange, 2015; Czech National Bank, 2015; National Bank of Slovakia, 2015). In case of Slovakia only SAX (all stocks) index was considered. In case of Hungary: BUX (all stocks) and BUMIX (small and medium stocks) indices. In case of Czech Republic: PX (big stocks) and PX-GLOB (all stocks) indices. In case of Poland: WIG (all stocks) and sWIG80 (small stocks) indices. The data were taken from the period between 28-11-2005 and 27-05-2015.

Computations were done in R (R Core Team, 2015) with a help of rugarch package (Ghalanos, 2014).

Much of the methodology present in Duan and Zhang (2013) is adopted. Usually, over 500 or even 1000 observations is preferred for GARCH model (Hwang and Valls Pereira, 2006; Raymond and Lam, 2006). In our case, the initial data consist of 2474 observations for each time series.

Of course, the volatility of a stock market is higher than bonds. Therefore, it also makes sense to model a bit less frequent data. As a result, daily, weekly and monthly data were analyzed and outcomes were compared.

Indeed, the volatility clustering is usually present at weekly, daily or more frequent data. Nevertheless, in case of GARCH models there is no direct transmission between different time periods estimation. Usually, daily frequency is found to be the most suitable one (Zivot, 2009).

As the inflation is relatively stable and low (less than two digits) in all analyzed countries, just nominal rates were computed. Indeed, if all cash flows are calculated without including the impact of the inflation, then consistent results are obtained.

5 ANALYSIS

It can be observed from Fig. 1 that the risk premium in Poland, Czech Republic and Hungary behave quite similarly. In case of Slovakia this behavior is less volatile and takes more moderate values. This can be the effect of relatively smaller capitalization of Bratislava Stock Exchange and Eurozone accession.

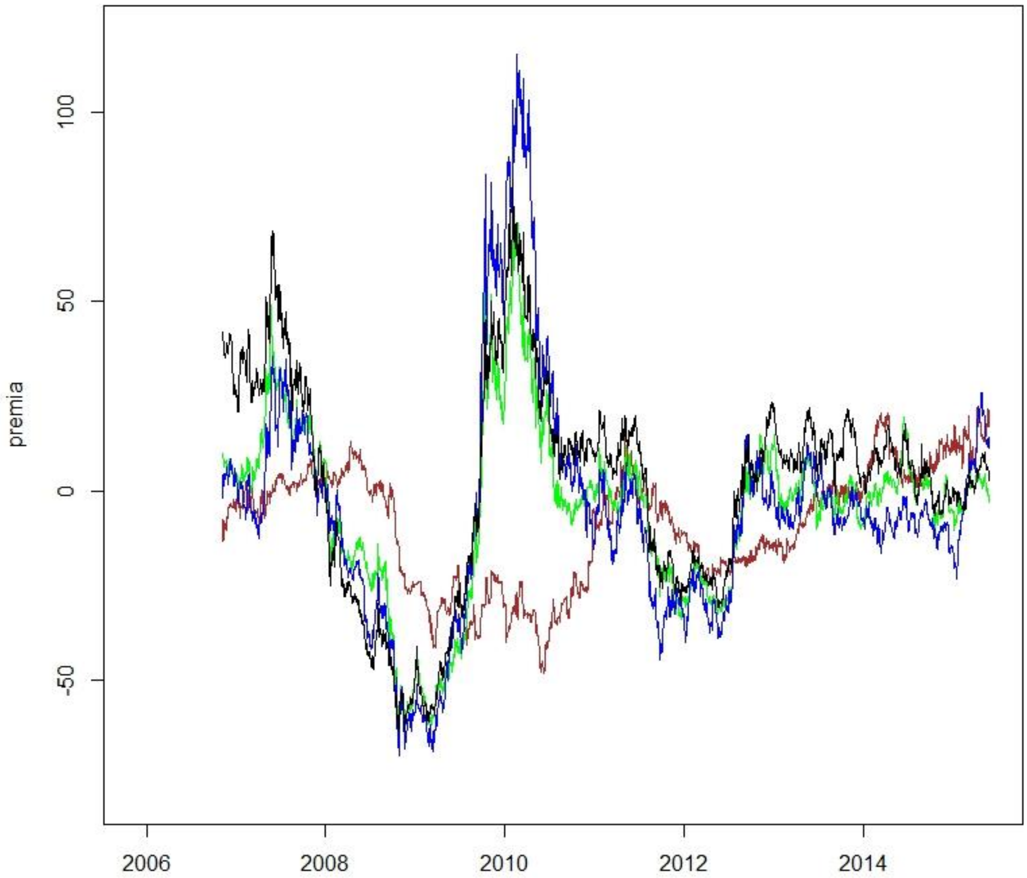

Fig. 1: Risk premium in pp points Poland (black), Czech Republic (green), Slovakia (brown) and Hungary (blue)

Tab. 1: Outcomes of ADF test and ARCH LM test for risk premium time series

	PL	SK	CZ	HU
ADF statistics	-1.9844	-1.5802	-2.2035	-2.0716
p-value	0.5849	0.7561	0.4922	0.5480
ARCH-LM statistics	2170.3980	2176.8800	2170.3380	2170.1060
p-value	0.0000	0.0000	0.0000	0.0000

Tab. 2: Akaike information criteria for different GARCH type models for risk premium

AIC	PL	SK	CZ	HU
GARCH(1,1)	7.4751	6.9036	7.1289	7.3525
ARMA(1,1)-GARCH(1,1)	4.0091	3.1658	3.8534	4.2983
ARMA(1,0)-GARCH(1,1)	4.0125	3.1653	3.8552	4.2996
ARMA(0,1)-GARCH(1,1)	6.6685	6.1991	6.3633	6.7013

The stationarity of all four time series were checked with a help of augmented Dickey-Fuller test (ADF). The outcomes are reported in Tab. 1.

Unfortunately, from the augmented Dickey-Fuller test, assuming 5% significance level, it can be concluded that all series are non-stationary. On the other hand, the ARCH-LM test (see Tab. 1) supports at 5% significance level that ARCH effects are present in all analyzed series. The ARCH-LM test for weekly and monthly data (detailed outcomes not reported here) also support the existence of ARCH effects in all analyzed countries. Therefore, it is reasonable to consider GARCH models for these time series.

Four types of GARCH models were evaluated for each country for risk premium based on daily data. However, the generalized error distribution was assumed (the estimated distribution parameters are not reported here) instead of the normal one. For all countries, except Slovakia, the most preferable type of a model is ARMA(1,1)-GARCH(1,1) model, if Akaike information criteria is considered (see Tab. 2). But even in the case of Slovakia the difference between ARMA(1,1)-GARCH(1,1) and the preferred model is very small. It can be noticed that including ARMA term in the base GARCH(1,1) model strongly improves the information criteria. However, the inclusion of AR term has much greater positive impact on the criterion than MA term. The difference between ARMA(1,1)-GARCH(1,1) models and AR(1)-GARCH(1,1) is very small basing on the Akaike information criteria. Because of the simplicity and the outcomes of the previously mentioned researches AR(1)-GARCH(1,1) model was selected as the preferred one.

As a result, the following model is reported in more details:

$x_t = a_0 + a_1 \cdot x_{t-1} + e_t$,

where:

$e_t = u_t \sqrt{h_t}$
$u_t \sim N(0,1)$
$h_t = c_0 + c_1 \cdot (e_{t-1})^2 + d_1 \cdot h_{t-1}$.

Such a model was estimated for daily (Tab. 3), weekly (Tab. 4) and monthly data (Tab. 5).

It seems that there is not much difference between outcomes obtained on the base on different time frequency. Moreover, decrease of the frequency can lead to more statistically insignificant terms in the model. Fortunately, all evaluated models managed to completely describe the ARCH effect. High p-values of ARCH-LM test for post-estimation (Tab.3, 4 and 5) indicates that there remained no ARCH effects in the estimated models. Moreover, the estimated parameters seem to be numerically quite similar in all four countries.

Tab. 3: Estimates of AR(1)-GARCH(1,1) for risk premium based on daily data

	PL	SK	CZ	HU
a_0	42.024320	-13.217436	8.603385	-2.147171!
a_1	0.999638	1.000000	0.997779	0.997276
c_0	0.034018	0.056731!	0.072766	0.063531
c_1	0.059882	0.047726!	0.108344	0.079757
d_1	0.931621	0.944421	0.871929	0.908876
ARCH-LM	0.3017	0.9948	0.8322	0.7839

! Not-significant at 5% significance level

Tab. 4: Estimates of AR(1)-GARCH(1,1) for risk premium based on weekly data

	PL	SK	CZ	HU
a_0	38.551851	-8.133543	7.68422	2.86400!
a_1	0.998599	0.981912	0.98764	0.99201
c_0	0.886614!	0.163908!	2.17150	1.62778!
c_1	0.079558!	0.035997!	0.19423	0.12563
d_1	0.875370	0.948648	0.70303	0.81875
ARCH-LM	0.0601	0.7359	0.9873	0.6348

! Not-significant at 5% significance level

Tab. 5: Estimates of AR(1)-GARCH(1,1) for risk premium based on monthly data

	PL	SK	CZ	HU
a_0	5.447453[!]	-8.13248	-5.132260	-14.84248[!]
a_1	0.927750	0.97863	0.847593	0.90852
c_0	0.000001[!]	1.64803[!]	0.000124[!]	47.25805
c_1	0.006111[!]	0.18614[!]	0.000002[!]	0.95257
d_1	0.985064	0.77606	0.993966	0.00000[!]
ARCH-LM	0.7450	0.9129	0.5893	0.8156

[!] Not-significant at 5% significance level

The volatility of such understood risk premium is very high, as one can see from Fig. 1. From Tab. 1 it can be seen that the value of a_0 parameter for Poland is very high, whereas in Slovakia it is negative. Also, in Hungary it is a small but negative number. In Czech Republic it is a moderate positive number.

Next, AR(1)-GARCH-M(1,1) models for daily data were estimated. However, in this case it were time series with bond yields and returns from market indices considered as variables (i.e., x_t). Not the difference between them as previously. In particular, the following equations were estimated

$$x_t = a_0 + a_1 \cdot x_{t-1} + b \cdot h_t + e_t ,$$

where

$$e_t = u_t \sqrt{h_t}$$

$u_t \sim N(0,1)$ and

$$h_t = c_0 + c_1 \cdot (e_{t-1})^2 + d_1 \cdot h_{t-1} .$$

However, also in this case the generalized error distribution was assumed (details not reported here). Due to the clarity and simplicity the details of the estimations are not reported. Only the parameter b, which is of the most importance. It can be understood as the risk premium itself for a particular time series. The outcomes are presented in Tab. 6.

Tab. 6: Estimates of a risk premium based on AR(1)-GARCH-M(1,1) for daily data

parameter b	PL	SK	CZ	HU
bonds	-0.000185[!]	-0.000185[!]	-0.000185[!]	NA
all stocks	4.04227	0.000000[!]	-0.025733[!]	1.90555
small stocks	NA			-0.057735
big stocks			NA	

[!] Not-significant at 5% significance level

NA estimation not available due to numerical problems reported by R

Tab. 7: Correlation between $(x_t)^2$ and x_{t-1} for daily data

	PL	SK	CZ	HU
bonds	0.9917661	0.9868588	0.9772921	0.9815614
all stocks	0.2666952	-0.745914	-0.09816701	0.5869707
small stocks	0.7344908			0.2710908
big stocks			-0.02099556[!]	

[!] Not-significant at 5% significance level

Unfortunately, in three cases the estimation of the model was not possible due to the numerical problems in the programme. Moreover, only for all stocks in Poland, all stocks in Hungary and small stocks in Hungary the estimated parameter was statistically significant. However, only in case of small stocks in Hungary there were not any numerical problems with the diagnostic of the model. The ARCH-LM test indicated that the ARCH effect does not remain. But Ljung-Box test indicates autocorrelation.

Yet, basing on these outcomes it can be slightly deliberated that there exists a small leverage effect for small stocks in Hungary. However, comparing the parameters between the models for small and all stocks, it could be concluded that small stocks are less risky. It is contradictory to the well-known theory.

Finally, a correlation between $(x_t)^2$ and x_{t-1} was tested for the time series. The results are presented in Tab. 7.

The correlation is negative and statistically significant only in two cases: for all stocks in Slovakia and all stocks in Czech Republic. However, AR(1)-GARCH-M(1,1) model did not confirm the leverage effect in these cases. The tentative indications of the leverage effect reported in Tab. 6 and 7 are not consistent. Therefore, there are no significant arguments to support the hypothesis of the leverage effect in any of the analyzed case.

6 CONCLUSIONS

Basing on daily data and considering the historical period of 250 stock sessions the risk premium (difference between yield of 10-year treasury bonds and return from all listed stocks) was found to be between -64% and 82% in Poland. The arithmetic mean is 1.89% and the geometric mean is -2.55%. In Slovakia it is between -48% and 22%. The arithmetic mean is -9.06% and the geometric mean is -10.46%. In Czech Republic it is between -66% and 74%. The arithmetic mean is -4.65% and the geometric mean is -7.84%. In Hungary it is between -70% and 115%. The arithmetic mean is -4.94% and the geometric mean in -9.83%. Obtaining a negative risk premium for the analyzed countries is somehow in agreement with the studies of, for example, Gabrish and Orlowski (2011).

It was also found that simple AR(1)-GARCH(1,1) model can quite well describe the volatility of a risk premium. Moreover, it was found that daily data are generally superior over weekly and monthly data in case of the modelling.

Unfortunately, AR(1)-GARCH-M(1,1) model was not able to provide any significance evidence on whether a risk premium is influenced by the size of the companies. Yet, as GARCH type models constitute quite numerous family of models, there is a huge place for further researches in this direction.

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INTRODUCING BUSINESS EDUCATION IN EARLY MIDDLE SCHOOL – MATH PERSPECTIVE

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Abstract
This paper presents briefly the authors' experience in stating educational goals, developing didactics and organizing elements of early business education. St. George Private Secondary School, Sofia, Bulgaria, educates mainly students who are potential managers and leaders in various areas of the industry and social life. The school plan for the 8^{th} grade contains a course in management where the concepts of business are introduced from a qualitative and descriptive perspective. However, there are a lot of topics related to business education in mathematics curricula for the 6^{th} and 7^{th} grade. The methods we apply are of three types: problem solving as a manager activity, project design from the perspective of business practice, and giving idea about optimization. The problem-solving approach allows students to operationalise some concepts via putting business strategies into practice. We modified the Polya's 4-step problem-solving plan to a 5-point check-list which could serve as a general management strategy. In order to help students to learn in meaningful ways we incorporate project-oriented initiatives connected with the relevance of an interest-based curriculum. Parallel to the particular subject objectives the project-oriented initiatives provide opportunities for multipurpose integrated consideration of topics. The integrated approach we apply encourages the future managers to take decisions in various situations: content interpretation, implementation of IT, layout design, etc. Any project-oriented initiative is planned to form a kind of knowledge and skills that synthesize the analytical knowledge and skills developed in particular subjects. Central role in this practice plays the mathematics teaching-learning process performed in Socratic style. The incorporation of new teaching methods has been done with respect to the TRIZ theory.

Keywords: *business education, project-oriented education, synthetic competenc, TRIZ, Socratic style*

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1 INTRODUCTION

The target group of St. George Private Secondary School, Sofia, Bulgaria, is mainly of students who are potential managers and leaders in various areas of the industry and social life. The building of common knowledge and skills of such students is expected to take into account the profile of the target group. The school plan for the 8th grade contains a course in management where the concepts of business are introduced from qualitative and descriptive perspective (Jones, 2011). However, there are a lot of topics related to business education in both mathematics curricula for 6th and 7th grade: the mandatory (according to the Bulgarian secondary school standards) and the facultative (with respect to the National Curriculum for England and Wales). This dichotomy allows to reconsider a lot of math activities from different view points and to meet some specifics of the target group. First, we apply problem-solving method that allows students to operationalize some math concepts via putting in practice strategies which have interpretation as business routine. Second, we designed an interest-based curriculum to incorporate project-oriented initiatives. This approach provides additional opportunities for students to learn some theoretical topics in meaningful way from manager's perspective.

2 THEORETICAL FRAMEWORK

Recognizing the importance of individual support of students in a matter like business education, we designed our own theoretical model based on the so called Didactical Model Taipei (Lazarov, 2013). Central role in this model plays the modern Socratic style of teaching. The Didactical Model Taipei aims to serve the gifted education, but it was modified for education of students with average abilities in mathematics. Crucial component of the model is the structure of the local behavioral environment. In our opinion the integrated approach, realized via project-oriented initiatives, is the school strategy, which assures proper local behavioral environment.

Another important component of the model is the assessment style. We prefer fuzzy achievement scale when evaluating the outcomes which allows us to state indicators for positive evaluation of students' projects: we assess the progress in any direction instead of highlighting the students' gaps in knowledge or their incomplete coverage of the standards. The interventions we make to correct students' learning are mostly indirect – by giving some good examples of other teams or individuals as well as some potentially helpful ways to improve their work. Often the control on the students' project work is left to the students themselves and the teacher's role is just to moderate a discussion.

Parallel to the particular subject objectives, the project-oriented initiatives provide opportunities for multipurpose integrated consideration of topics. The integrated approach we apply encourages the future managers to make decisions in various situations: content interpretation, implementation of IT, layout design, etc. Any project-oriented initiative is planned to form some kinds of knowledge and skills that synthesize the analytical knowledge and skills built in some particular subjects (Lazarov & Severinova, 2014). After building and proving it in reproductive tasks, the creative work of teams and individuals is appreciated.

The antinomies we met while putting the theory into practice were partially solved by us applying the TRIZ (or Altshuller's) method (ibid.).

3 PROBLEM SOLVING AS A MANAGER ACTIVITY

G. Polya stated 4 steps in solving a math problem which became classic in math education because of their universal implementation (Polya, 1961). However, a lot of variations of these steps were created to meet the specifics of different particular educational programs.

We reconsider the problem-solving in mathematics stating additional goal: *building initial skills in managing challenges*. Our modification of the Polya's model is a Five-point-checklist (FPC) that serves the stated goal a little bit better: *Question*; *Resources*; *Plan*; *Execution*; *Evaluation.* The methodology we apply is

- students start with the simplest reproductive problems to elaborate the steps of the FPC;
- they are encouraged to apply it to various similar situations;
- students are consulted in Socratic style interaction whenever it is necessary which corresponds to the tutoring model (Lazarov, 2013);
- some comments about the implementation of the strategy highlight its importance in business decision making.

Below we are going to describe the steps of the FPC in general and an example of how it works we give in Appendix 1.

3.1 Question

Understanding the task to be solved means some (intuitive) connections to be established between the desired outcome and the data given via available technological status quo. Bulgarian math textbooks contain a lot of problems about manufacturing goods. Our teaching style is to present them from actor-oriented perspective.

3.2 Resources

Usually this point is restricted to clarification of data types in the problem, We extend the meaning of resources by adding students' situative know-how (e.g. their knowledge and skills), including general rules (e.g. synchronization of measuring units), mathematical methods (e.g. formula, algorithms) and tools (e.g. map, grid, ruler, compass).

3.3 Plan

This step is related to modeling the situation described in the problem taking into account the available resources. The expected outcome here is a mathematical step-by-step procedure to be designed or composing equations to be solved.

3.4 Execution

Putting the plan into practice and getting a solution or just an answer is usually pure mathematical activity.

3.5 Evaluation

This is perhaps the most important step from business-education perspective. Usually the solution of a math problem ends with a check of the answer. We appreciate this part of the solution but in addition we require a kind of justification of the outcomes, i.e. whether the mathematical results are coherent with the real situation described in the problem. Sometimes the step Execution is skipped in certain problems when some adequate reasoning is made.

3.6 Summary of Section 3

As it was mentioned in the introduction, the 8th grade business course presents a large number of manager's activities from qualitative and descriptive side (Jones, 2011). The quantitative problems give another view point, namely how the numbers in diagrams and graphics come from different real life situations. In our opinion such preparatory work in 6th and 7th grade allows better operationalization of the concepts related to the market and industry that appear in higher grades.

4 PROJECT DESIGN FROM THE PERSPECTIVE OF BUSINESS PRACTICE

The complexity of manager's practice requires estimation of the impact of many parameters. The subject education in middle school presents the big picture of our life in a fragmentary analytical way. This style leads away from the expected competence that our students should have at the end of their education at St. George School. So we adopt an integrated approach in teaching, which aims to form knowledge and skills of synthetic type.

As an important component of our integrated approach we state the goal to build initial skills in organizing and presenting different types of knowledge related to data manipulation.

The problems from the textbooks alone do not provide enough space for realization of this goal, but the project-oriented education does, and we organize auxiliary education in such mode parallel to the main stream of the compulsory curriculum. Data interpretation is crucial for everyday business practice. Some of the POIs we recently put into practice are focused on making the students interpret correctly graphically presented data but also to elaborate abilities in graphical representation of digital data. Below we are going to present two project-oriented initiatives (POIs), which are focused on data manipulation.

4.1 POI Movement and Change

Bulgarian 6th grade compulsory curricula in science and mathematics provide rare opportunities for integration of topics related to change and movement, on one hand, and the types of writing large or tiny numbers as well as digital partitions or distributions, on the other hand. We catch this opportunity to orchestrate the POI titled *Movement and Change*.

4.1.1 Project parameters

Our 6th graders were invited to describe in quantitative way a phenomenon related to science education (physics, biology, chemistry, astronomy). The project assignment included: finding reliable sources about the phenomenon; extracting the related digital information; visualizing this information through diagram; comparing and evaluating the changes. Students were divided into small teams of 2 or 3 persons. The teams distributed the tasks and responsibilities by themselves.

Fig. 1 Phases of life of tiger (L) and comparison of average life pregnancy of tiger, polar bear and koala from a students' project (R)

Fig. 2 Presentation style: each animal is introduced by an imaginary manager

4.1.2 Two examples

There was a variety of topics presented by the students: speed of vehicles, diffusion, stages of mammals' development, etc.

A students' project about the stages of mammals' development (not titled) represents the three phases of mammals' life: embryonic, infant and mature. Students were focused on three species: tiger, polar bear and koala (Figure 1).[1]

The team presented the facts from imaginary manager perspective (Figure 2). The insinuation was that the wild-life protection could be viewed as a kind of management and they are considered about these particular species.

Students demonstrated skills in manipulation and interpretation of digital data which were presented in different modes. They used electronic tables, as well as pie and chart diagrams to visualize the data.

Another emblematic students' project was entitled *Diffusion*.

The team compared the diffusion speed of atoms or molecules in bimetal coins, liquid solutions, fragrances and during explosion (Figure3).

[1] All figures in the paper are taken from students' projects. Following the editor's recommendations the text in Figures 1-4 and 6 is edited and translated from Bulgarian by the authors of the article.

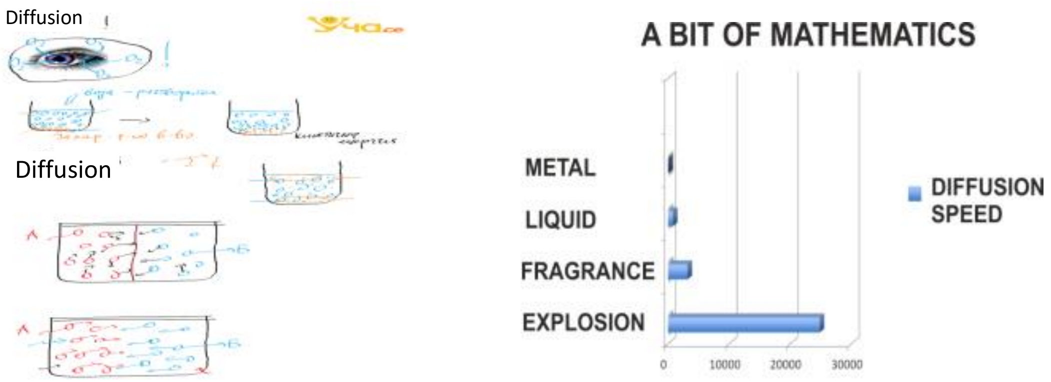


Fig.3. Illustration of the phenomenon (L) and comparison of diffusion speed of 4 processes (R)

Students captured the data from different sources. After gathering the information they unified the measures and wrote the numbers in standard mode to compare them. The qualitative evaluation was done not by the magnitudes but by their powers. We encourage such style and consider it closer to the business practice of evaluation and estimation of quantitative data.

4.1.3 An important detail

Students demonstrated considerable culture in presenting the projects. But a very important detail we would like to stress was the correct use of data sources. In the *not-titled-project* the team cited 4 printed books and in the project *Diffusion* there were references to 9 websites. We consider such attitude a crucial feature of a responsible manager.

4.2 POI Diets

The POI about the diets required higher level of data manipulation because any diet is related to several factors. On one hand, there are the food ingredients: calories, proteins-fats-carbohydrates content, minerals, vitamins; on the other hand, there are the food sources: grain, meat, fruits and vegetables. Some teams composed in their projects daily feeding program: breakfast, lunch and dinner. In fact, our 6th graders solved a real managerial task: to study the state of the matter and to propose a 'business plan' for feeding specific groups of people, like pregnant women (Figure 4) or babies.

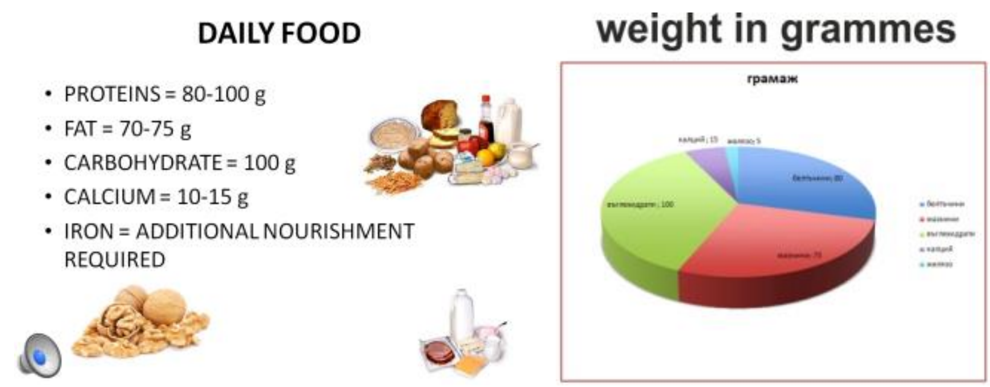


Fig. 4. The digital data and the illustration from the students project Diet during expectancy

The teams' presentation skills were above our expectations. Students demonstrated not only knowledge, skills and attitude but also confidence and style.

5 GETTING IDEA ABOUT OPTIMIZATION

Our impression is that scientific methods are not highly appreciated in Bulgarian business circles. However, the successful business practice, especially of large companies, requires optimizations of different processes which lead to application of mathematical methods. This is why we decided to organize a POI called *Top Profit* to show our students how mathematics works in making money.

5.1 Background and goals

The 7th grade math-in-English curriculum at St. George School includes simultaneous linear equations and an introductory lesson about linear optimization. Another reason to go deeper in the matter is the potential application of simultaneous equation in the examination test at the end of the 7th grade. Hence, the educational goal we stated was manifold, but here we will focus on the business educational component, which is: *to highlight some benefits of the application of mathematical and scientific methods in business practice*.

5.2 Project assignment and results

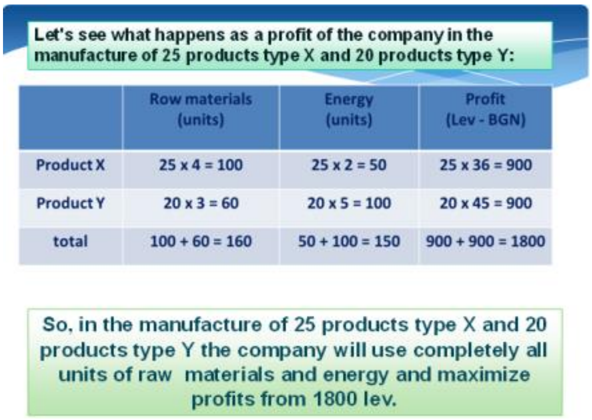
The project assignment was as follows:

- three given problems to be solved in paper-and-pencil mode,
- another problem of the same type to be composed and solved,
- a computer presentation to be designed and performed.

The first two problems were replicas of the ones from the textbook (Pledger, 2009); the third one was taken (directly or slightly modified for different project assignments) from a university math course (Jagdish & Lardner, 1989). The project assignment is given in Appendix 2.

The outcomes of the project work were very satisfactory – the teams demonstrate knowledge and skills in both graphical and analytical method, they prepared accurate diagrams and drawings, their presentation files were properly designed. Students used shorthand as thick and cross to avoid long explanations in their paper-and-pencil part of the project.

Most of the students showed considerable level of reasoning and interpretation of the solutions (Figure 5). The teams gave sensible explanations even when marginal cases appeared in the 4th problem (because the problem data was not well adjusted – the students chose figures from common sense perspective).


Let's see what happens as a profit of the company in the manufacture of 25 products type X and 20 products type Y:

	Row materials (units)	Energy (units)	Profit (Lev - BGN)
Product X	25 x 4 = 100	25 x 2 = 50	25 x 36 = 900
Product Y	20 x 3 = 60	20 x 5 = 100	20 x 45 = 900
total	100 + 60 = 160	50 + 100 = 150	900 + 900 = 1800

So, in the manufacture of 25 products type X and 20 products type Y the company will use completely all units of raw materials and energy and maximize profits from 1800 lev.

Fig. 5. Reasoning the "Top" of the profit

During the pilot experiment we observed that the lack of skills in performing algebraic transformations was a serious obstacle for some students. So we decided to overcome this problem by organizing a short training in dynamic geometry software instead of organizing extra math drills (Figure 6). The effect was a significant growth of the students' interest to mathematical methods. Later we applied the graphical method of solving simultaneous equations to solve several problems like the ones in the graduating test after 7th grade. The GeoGebra solution of such problems was a big surprise for the students but also a clear message that any math knowledge could have a lot of useful applications.

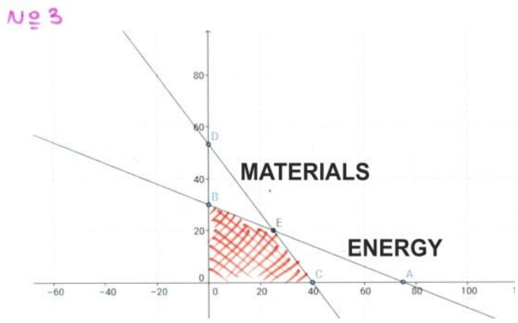


Fig. 6. Students' graphical solution of Problem 3 done by GeoGebra

Closing remarks

The business course (Jones, 2011) is full of charts, graphics and tables, which represents in a qualitative mode different quantitative characteristics of trade, manufacturing etc. But there are little or none explanations of the origin of these diagrams. Such style could be misleading that the business and management are something mysterious or supernatural.

Our approach is rather different – we are trying to explain students that any responsible business decision needs serious preparatory work. Proper orientation in a complex business environment could be successfully supported by scientific methods.

The math education is the natural place for the quantitative description of some business phenomena before starting special business courses. Our practice clearly shows that accommodation of business examples in mathematics education returns dividends to the math education itself. A lot of math concepts and methods make more sense immersing them in a virtual business environment, especially for our students. We consider project-oriented initiatives as an extension of classroom practice. The examples we gave above clearly show that POIs provide much more opportunities for introducing elements of business education on such an early stage like 6th and 7th grade.

Finally we should note that the incorporation of our experimental teaching in regular school practice was done according to the Altschuller's methodology (known also as TRIZ theory) (Lazarov & Severinova, 2014). Altschuller's principles are very helpful any time some antinomies rise. Let us give two examples about the types of antinomies we met.

First example. As a rule the main part of a project initiative is separate in additional facultative classes where no official marks are provided. Thus a motivation factor for the students was the impact of their performance in the POIs on the marks in regular math classes. Such approach requires synchronization of the indicators for progress in POI with official educational standards. But stating strict benchmarks for the indicators contradicts the ideology to evaluate any progress and to neglect the gaps. Here the Altshuller's Principle 3. *Local quality* helps saying: 'make each part of an object or system function in conditions most suitable for its operation' (Altschuller, 1964). We apply this principle in the following manner: in any particular student's project we search for some parts that are better than the similar parts in other projects and highlight these parts in a comparative evaluation.

Second example. The application of dynamic geometry software for solving simultaneous equations requires some changes in the school plan. Some activities like introduction of the interface of the GeoGebra were transferred to the IT classes. All these requires forming teams of teachers, organizing control etc. However, some activities in math and IT classes complete each other and the Altshuller's Principle 5. *Merging* suggests: bring closer together (or merge) identical or similar objects or systems ; assemble identical or similar parts to perform parallel operations (ibid.). We apply this principle by organizing lessons of mixed type – teaching the GeoGebra interface in math classes and performing drills during IT classes on math examples.

We finish this article by quoting Dunaway-Petty's view point that *business education curriculum should be part of a larger system, which comprises a variety of teaching and learning contexts* (Dunaway-Petty, 2013). In our opinion the existing contexts in math education could be a relevant part of such system.

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APPENDIX 1

The textbook *Mathematics for 7th grade* by Lozanov et al. contains several lessons about modeling with linear equations (Anubis, Sofia, 2008, pp 100-116. In Bulgarian). The topic is presented in several lessons about movement, work, alloy and finances, separately for any one of the listed themes (similar is the situation with the other Bulgarian math textbooks for 7th grade). We do not accept such approach because it stands outside the big idea of mathematics to describe different phenomena in a universal mode. Our idea is quite different: to show students how a mathematical model works in different problems and to propose them a general scheme (FPC) for solving such problems (Lazarov & Georgieva, 2001. *Zadachi i testove po matematika (in English 'Math problems and tests')*. Trud, Sofia, pp 100-126). Here we are going to give an idea about our teaching style through application of the distance-velocity-time equation.

The next three examples are given to the students to be worked out consecutively in a lesson. They are offered to follow the five-point-checklist in their solutions.

Example 1. According to the schedule of a shuttle bus, the distance between A and B is to be traveled with average speed of 60 km/h. If the bus departs from A and runs this distance with average speed of 70 km/h, then one hour before the scheduled time of arrival it will be 30 km apart from B. Find the distance between A and B.

Example 2. Mr. Ygreksen must repay a loan in monthly payment of $40 but he decided to repay the loan in $45 per month. This is why one month before the deadline only $20 remained to be paid. Find the total amount of Mr. Ygreksen's loan.

Example 3. A farmer planed to sow a field by sowing 73 dka daily. He managed to sow 14 dka more every day. As a result, two days before the planned time just 6 dka remained to be sown. Find the area of the field.

Solution of Example 1.

Step 1 (Question). Find the distance s=AB by comparing two movements.

Step 2 (Resources). The equation $s=v\cdot t$ and velocity $v_1=60$ and $v_2=70$ data from the statement. Implicit resource: students have in their arsenal also the method of solving simple simultaneous equations by eliminating one of the variables. There is one more resource available after the lesson about the graphical method of solving simultaneous equations performed in GeoGebra.

Step 3 (Plan). Denote by t the scheduled travelling time in hours. We are going to express s in the two movements.

Movement 1: $s=v_1\cdot t=60t$.

Movement 2: $s=v_2\cdot(t-1)+30=70(t-1)+30$.

Since we have more information about t, the plan is to find first t and then s.

Step 4 (Execution). We can write and solve an equation about t:

$$60t = s = 70(t-1)+30 \rightarrow 60t = 70t-40 \rightarrow -10t = -40 \rightarrow t = 4 \rightarrow s=60\cdot 4=240.$$

Step 5 (Evaluation). The result seems plausible because 240 km is a common distance between two towns in Bulgaria. Check: $70\cdot(4-1)+30=240$ – the result is coherent with the second movement too.

Comment. It is clear that the solutions of Examples 2 and 3 repeat the solution of Example 1. The students are encouraged to state by themselves another problems which could be solved applying the same model, e.g. to find the volume of a reservoir that is filled twice from a pipe: the firs time in one flow rate and the second time in another flow rate. The lesson includes also a discussion about the role of a manager in: 1) identifying the problem in a real-life situation, 2) clarifying the available resources, 3) designing a plan for solving the problem, 4) organizing the execution of the plan, and 5) evaluating the outcomes of the execution.

APPENDIX 2

The project assignment for the POI *Top Profit*

Problem 1. A company manufactures two phone models: X and Y. It takes 4 hours to produce each item of type X and the company makes profit of 5 levs (Lev is the Bulgarian currency) from such an item; it takes 5 hours to produce each item of type Y and the company makes profit of 11 levs from it. The company can produce at most 300 phones of each type and has 1600 hours to complete the order. Find the number of phones of each type that should be produced to get the largest profit.

Problem 2. A company manufactures two bicycle gears: X and Y. It takes 4 hours to produce a gear X and the company makes profit of 7 levs from it; it takes 2 hours to produce a gear Y which makes profit of 3 levs. The company can produce at most 400 X gears and 300 Y gears; it has 2000 hours to complete the order. Form four equations as follows: about the maximum number of hours; about the maximum number of each gear type; about the profit. Plot the graph of the first three equations. Find the point that gives the largest profit.

Problem 3. A company manufactures two products: X and Y. Each item of type X needs 5 units of raw materials and 2 units of energy; each item of type Y needs 3 units of raw materials and 4 units of energy. The company has 105 units of raw materials and 70 units of energy. It can make a profit of 200 levs from each item X and 160 levs from each Y. Find the number of items of each type that should be produced to get the largest profit.

Problem 4. (To be designed and solved by the teams.) Below is the genuine problem of a team:

A company produces two products: K and T. For producing one K product are used 10 ones of raw materials and 6 ones of energy; to produce on product T are used 4 ones of raw materials and 8 ones of energy. The profit of one product K is 100 BGN and for one T is 80 BGN. The company has 410 ones of raw materials and 140 ones of energy.

What amount of each product could be produced to find the largest profit?

What is that profit?

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COMPARING PUBLIC AND PRIVATE EMPLOYEES' JOB SATISFACTION AND TURNOVER INTENTION

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Abstract

This study compares the job satisfaction and turnover intentions of private- and public-sector employees in Serbia. Questionnaires were used to collect data from employees of various private enterprises and one public organization. The results show that the general job satisfaction and turnover intentions of public employees are different from those of private employees'. Public employees in Serbia have higher extrinsic job satisfaction and lower turnover intentions compared to their counterparts in the private sector. This satisfaction derived from interpersonal relationship, work organization and information within the organization. The reasons for this result can be fostering fundamental values national culture. Classifying the order culture with a high degree of collectivism, not surprising Serbian workers need to close and harmonious relationships with colleagues, especially need for information within the organization which reducing their uncertainty, insecurity and foster feelings of identification with the organization.

Keywords: *job satisfaction, turnover intention, intrinsic satisfaction, extrinsic satisfaction.*

1 INTRODUCTION

Why employees leave or intend to leave current job is the dilemma faced by almost every organization, especially because they succeed in adapting to changing market forces to retain key employees. Theories of employee turnover have long suggested that job satisfaction plays an important role in the processes leading to turnover (Boswell, Boudreau, & Tichy, 2005; Steel, 2002). In particular, central to most turnover theories is the notion that job satisfaction directly and negatively relates to employees' intentions to quit their jobs (i.e., turnover intentions),which in turn positively relate to actual turnover. Indeed, meta-analyses of over 100 empirical studies (Griffeth, Hom, & Gaertner, 2000; Hom, Caranikas-Walker,

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Prussia, & Griffeth, 1992; Tett & Meyer, 1993; Yücel, 2012; Wang, Yang, & Wang, 2012) have documented the negative relationships of job satisfaction with turnover intentions and actual turnover.

Many empirical studies concluded that public employees have a greater need for job security than private employees do. A higher need for job security could result in a lower turnover rate in the public sector. The literature on general personnel management suggests that a lower turnover rate can save personnel costs in the recruitment, selection, and training of replacement personnel, and can induce the individual employee's loyalty and commitment to the organization, in turn leading to better organizational performance. It can be inferred that with a stronger need for job security, public employees' turnover intentions are lower, which results in a lower level of turnover rate that dampens the public sector's productivity. Another purpose of this study is to compare public and private employees' turnover intentions. The higher need for job security in public employees also hampers organizational performance through influencing the job satisfaction-turnover relationship. In the literature, job satisfaction is found to be negatively associated with turnover intention. When employees are dissatisfied, they think more of quitting their jobs. For public employees, dissatisfaction may stimulate less of an intention to quit because of their greater need for security. If those who are dissatisfied continue to stay on in their jobs, their low work motivation will decrease the overall performance of the organization. There have been no empirical studies conducted to compare the differences in the strength of the job satisfaction-turnover intention relationship between the public and the private sectors. The third purpose of this study is to examine these differences in Serbia.

2 HYPOTHESES

2.1 Comparing job satisfaction between public and private employees

Recent empirical research indicates significant differences in the levels of job satisfaction among employees in the public and private business sector (Table 1). Despite the fact that the degree and sign of the gap between the private-public job satisfaction can be justified by specificities of the institutional framework of the country, employees in the public sector are more satisfied than their colleagues in private enterprises (for example, Germany, Greece, Italy, Great Britain). By examining different job dimensions, a certain number of those that affect the creation of sector satisfaction difference were identified (Kumari, Pandey, 2011). Research conducted in Greece shows that employees in the public sector are more willing to accept a decrease in salary of 4.5% in order to avoid a job in private enterprises (Kioulafas, Donatos, & Michailidis, 1991), while in Italy, public employees are more satisfied with their jobs 3.5% on average than their colleagues in the private sector due to largely better working conditions (Ghinetti, 2006). According to the study results, greater salaries, financial and non-financial benefits, as well as the possibility of bribery affect a higher degree of job satisfaction among employees in the public business sector (Demoussis & Giannakopoulos, 2007; Luechinger, Meier & Stutzer, 2008; Papapetrou, 2006).

Among the employees in public sector banks in India 1.5 percent of them have state that the job satisfaction is low; 38.5 percent of the employees have stated that the job satisfaction is medium and 60 percent of them state that the job satisfaction is high. At outset it is implied that majority of the employees perceive high level of job satisfaction, very few employees perceive medium and low level of job satisfaction. It is interesting to note that only minimum percent of the employees low level of job satisfaction. It is a good sign and it indicates that the organization has better environment for the public bank employees to job (Mallika, Ramesh, 2010). Among the employees in private sector banks, 32.5 percent of the employees have state that the job satisfaction is low, 66.5 percent of the employees have stated that the job satisfaction is medium and 1 percent of them state that the job satisfaction is high. At outset it is implied that majority of the employees perceive medium and low level of job satisfaction, very few employees perceive high level of job satisfaction (Mallika & Ramesh, 2010).

Job security is also stated as an important determinant of sector differences in job satisfaction, especially during economic recessions or unstable economic situations in the country. Job security as a subjective, psychological phenomenon is characterized primarily by the feeling of uncertainty about future employment. Unlike real job loss, job unsafely refers to the anticipation of a stressful event, in such a way that the nature and the continuous existence of the job are considered risky (Sverke & Hellgren, 2002).

The public and the private sector differ significantly according to the objective job security for the following reasons (Clark & Senik, 2006):

1. Employees in public enterprises are often legally protected from being dismissed. For instance, in Germany, job contracts for public employees are defined by a special Law according to which the employed have a very strict business protection since they can be dismissed only if they are convicted of a crime;
2. The decreased sensitivity among the employed in the public sector about economic shocks is the consequence not only of the precisely made job contracts, but also the weaker financial pressure on the need to decrease the unemployment rate in this sector. While private enterprises can go bankrupt, this is not easily the case with the public ones, despite maintaining high employment rate which is most often justified as a countermeasure for the economic crisis. Beside the fact that the line-ups for finding a job in the public enterprises during recession are getting bigger, a high rate of unemployment which implies a lower degree of business certainty leads individuals to look for a more certain (that is, public) job.

Table 1 The list of economic studies about the differences in the public-private job satisfaction

Study	Country	Results
Heywood, Siebert, Wei (2002)	Great Britain	greater salary satisfaction among the employed in the public sector
Clark, Senik (2006)	France and Great Britain	greater salary satisfaction among the employed in the public sector
Demoussis, Giannakopoulos (2007)	Greece	greater general job satisfaction and satisfaction with all job aspects among the employed in the public sector
Ghinetti (2007)	Italy	greater salary satisfaction among the employed in the public sector and all non-financial job aspects
Luechinger, Stutzer, Winkelmann (2006)	20 countries in central and eastern Europe	greater salary satisfaction among the employed in the public sector
Luechinger, Meier, Stutzer (2008)	25 European and 17 South-American countries	in most countries, greater salary satisfaction among the employed in public enterprises
Luechinger, Stutzer, Winkelmann (2010)	Germany	negative selection of the employed in the public sector

In accordance with this idea, a research which included French people between the ages of 20-30 showed that three quarters of the young are looking for a job in the public sector at times when the unemployment rate of younger people is much higher than the already high general rate of unemployment of 10%. The respondents explicitly stated that the only reason for employment in public enterprises is a greater job security (Clark & Senik, 2006). Young people in Serbia are also looking for safety and certainty in business. According to a research *Citizens' initiative,* around 40% of the respondents would choose a safe, even a worse paid job, 33% would choose to own a business, while 27% of the respondents would choose a well-paid and less safe job. Nevertheless, job safety is recognized by both in the public administration that is the public sector. Therefore, 57% of the respondents think that employment in public administration is safe, that is 44% consider it to be the best professional experience (TNS Medium Gallup, 2008). On the other hand, due to a general belief that entrepreneurs do not earn enough in comparison to the invested work and the risk they undergo, 37% of young people would not leave the public service under any circumstances.

At the same time, research of the labour market shows the significant differences in the salaries in the private and the public sector. Employees in Greek public enterprises earn significantly more than their colleagues in the private sector, whereby the discrepancy in the salaries cannot be attributed to greater education or experience of public sector workers (Kioulafas, Donatos & Michailidis, 1991). Data shows that men in public enterprises earn 19% more than their colleagues in the private sector on average, while the difference in salaries among women reach even 42% (Kanellopoulos, 1997). Because the salaries in the public sector, especially in public administration, are increased by different types of bonuses for the realized productivity, reimbursements for work in committees of work groups and/or social work, the interest for jobs in public enterprises goes beyond the realistic capacities of this business sector (Papapetrou, 2006). Salaries in the public sector do not undergo great oscillations in relation to the unemployment rate, which furthermore loads the great state apparatus (Clark & Postel-Vinay, 2009).

Public sector workers (including federal, provincial, and local) enjoyed a 12.0 percent wage premium, on average, over their private sector counterparts in Canada. When unionization status is factored in, the wage premium for the public sector declines to 9.5 percent. Public sector workers seem to enjoy better non-wage benefits than those in the private sector, too. For example, 88.2 percent of public sector workers were covered by a registered pension plan compared to 24.0 percent of private sector workers. Of those public sector workers covered by a registered pension plan, 94.0 percent were covered by a defined benefit pension compared to just over half of private sector workers. In addition, public sector workers retire earlier than their private sector counterparts—about 2.5 years, on average—and are less likely to lose their jobs (3.8 percent in the private sector versus 0.6 percent in the public sector)(Clemens & Palacios, 2013.)

Salaries in public enterprises in Serbia grew more than two times in comparison to the salaries in private enterprises and the general public sector. The increase was caused by freeing salaries in the end of 2010, after which bonuses, regresses and delayed salaries followed. However, even before this increase the earnings in public enterprises were bigger than the ones in the private sector. Although there is no empirical proof, anecdotal evidence suggests that individuals with equal qualifications receive much greater earnings in public enterprises than the employed in the private sector. This says a lot about the dual character of the Serbian labour market, that is, the existence of a sector with relatively safer and better paid jobs (public enterprises) and the private sector with unstable and less paid jobs and weak protection of workers' rights. A great difference in the standards of employees in the public sector and the private sector represents a source of not only fiscal problems, but also distinct negative effects on the economic growth and economic activity. This situation creates a negative system of incentives which hampers private initiative and entrepreneurial spirit as basic sources of sustainable economic growth and development. Especially as employees in the public sector, beside financial privileges, also have other great advantages in comparison to the private sector, such as job safety or strict respect of the guaranteed workers' rights. Accordingly it is possible to set the following hypotheses:

Hypothesis 1: Employees in public enterprises are more satisfied with their jobs than employees in the private sector.

Hypothesis 2: Employees in public enterprises are more satisfied with their salary than employees in the private sector.

2.2 Comparing turnover intentions between public and private employees

Although Baldwin found that the need for security had no negative effect on the work motivation of public employees, he did not fully explore the implications of a greater need for security on the work behaviour of public employees. A greater need for security could lead to a lower turnover rate in the public sector. According to Shore and Tetrick (1994) an employee seeking long-term employment is more likely to form a relational contract with his or her employer. The relational contract stabilizes the employment relationship and results in lower turnover intentions among public employees. In addition, Hammer and Tassell (1983) noted that public employees' stronger need for security often reflects a higher level of risk aversion. This can make them more reluctant to meet the uncertainty involved in changing jobs, and they will be less likely to leave their jobs than private employees.

According to National reports for 2013 labour turnover in the public sector in Germany is much lower than in the private industry (6.3% compared to 10.5% in the first half of 2008). The turnover in the public sector is highly concentrated on the employees with a temporary contract. The high employment protection of permanent employees and their low voluntary mobility explains why the burden of numerical flexibility has moved to temporary employees (Bosch, Mesaros, Schilling, Weinkopf, 2012). In line with the need for security argument, we propose that:

Hypothesis 3: Public employees have a lower level of turnover intention than private employees.

2.3 Comparing the satisfaction-turnover intention relationship between public and private employees

Schneider and Vaught (1993) argued that the intrinsic and extrinsic aspects of jobs moderate the sector-job satisfaction relationship. Public employees are more satisfied with intrinsic aspects of their jobs, but less satisfied with the extrinsic aspects than are private employees. Posner and Schmidt (1982) found that public administrators experience more satisfaction than private corporate administrators from the intrinsic aspects of their jobs—task variety, challenge, and worthwhile accomplishment. Employment in the public sector offers opportunities for serving the public, a significant intrinsic satisfaction that is not available in the private sector. In their empirical study Rainey and Bozeman (2000) concluded that public employees were less satisfied with the extrinsic facets of their jobs because of restrictions imposed on their job autonomy and promotional opportunities by bureaucratic rules. In addition, public-sector employees are often rewarded less abundantly than private-sector employees are. Lower rewards could result in lower extrinsic satisfaction of public employees. Taking the moderating effect of the intrinsic and extrinsic aspects of job satisfaction into consideration, we propose that:

Hypothesis 4: Public employees have a higher level of intrinsic job satisfaction than private employees.

Hypothesis 5: Public employees’ have a lower level of extrinsic job satisfaction than private employees.

3 EXPERIMENTAL

The purpose of this study was to not only advance our understanding of the relationships among the facets of job satisfaction and turnover intentions, but to measure which job satisfaction facets are most significantly related to turnover intentions among employees in the Serbian enterprises. In the period from November 2011 to January 2012, research was carried out by using a sample which encompassed several companies of different activates in private ownership and one enterprise in public ownership (Pension and Disability Fund of the Republic of Serbia). Research methodology was chosen in accordance with the defined research goal and it was based on a combination of qualitative and quantitative methods, as well as comparison with the relevant references and scientific knowledge. Data was collected through a survey, by using previously created questionnaires. The research was carried out on a random sample of 234 employees, 166 employed in branches of the Pension and Disability Fund of the Republic of Serbia in Belgrade, Kruševac, Niš and Zaječar, 68 employed in the private sector for informatics and publishing. In the sample have 68 men (13.9%) and 166 women (34%). The age range among respondents was from 26 to 58, the average age of the respondents was 41. The working year range among respondents was from 1 to 35, the average working year of the respondents was 15 years.

The questionnaire was created in such a way to obtain information about the examined variables of certain aspects of employee satisfaction: direct cooperation with colleagues, manager's support, interpersonal relationships, opportunities for education and promotion, work organization, etc. The questions in the questionnaire primarily refer to the examination of the perception and attitudes of the employed about the organizational determinants of employee satisfaction, general job satisfaction and the turnover intention. These questions were rated on a five–point Likert type scales ranging from 1 - very dissatisfied to 5 - very satisfied. The first two answers (very satisfaction and satisfaction) can be seen as a statement of certain satisfaction factors and answered "dissatisfied" or "very dissatisfied" an expression of dissatisfaction. In accordance with Herzberg theory, the answer "undecided" reflects the zero position on the continuum with one pole means satisfaction and others dissatisfied. The turnover intention was examined by rounding one of the following responses: I changed a job -1; I would not change the job -2.

4 RESULTS AND DISCUSSION

The T-test was used to verify Hypotheses 1, 2 and 3 and hierarchical regression was applied to examine Hypotheses 4 and 5.

The starting hypothesis in research was that the employed in public enterprises were more satisfied with their jobs than their counterparts in the private sector. Based on the T- test (Table 2) we see that the distribution of responses to the question of general job satisfaction is not independent of the sector respondents, which sector affects how it fits (which is a common response). Difference in general job satisfaction between the public and private sector is statistically significant (public sector M=3.84, SD=0.654, private sector M=3.40, SD=0.929). Size differences between the mean values of general job satisfaction by sector (the average difference is 0.438, 95% CI: 0.215 do 0.661) was moderate (eta squared = 0.06). We can conclude, looking at the table that were employed in the public enterprises generally satisfied with their jobs than their counterparts in the private sector which represents a general trend characteristic for countries where research of this type was carried out. Hypothesis 1 was supported.

Table 2 Group Statistics

Sector		N	Mean	Std. Deviation	Std. Error Mean
General job satisfaction	Public	146	3,84	,654	,054
	Private	88	3,40	,929	,099

Table 3 Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Differ.	Std. Error Differ	95% Confidence Interval of the Difference	
									Lower	Upper
General job satisfaction	Equal variances assumed	21.002	.000	4.220	232	.000	.438	.104	.233	.642
	Equal variances not assumed			3.880	139.31	.000	.438	.113	.215	.661

Based on the T- test (Table 4) we see that the distribution of the answers the question of salary satisfaction are no statistically significant differences by sector respondents. Difference in salary satisfaction between the public and private sector is statistically random (public sector M=3.09, SD=1.105, private sector M=2.78, SD=1.198). We can conclude, looking at the table that was not employed in the public enterprises satisfied with their salary than their counterparts in the private sector which represents. Hypothesis 2 was not supported.

Table 4 Group Statistics

Sector		N	Mean	Std. Deviation	Std. Error Mean
Salary	Public	145	3.09	1.105	.092
	Private	88	2.78	1.198	.128

Table 5 Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Differ.	Std. Error Differ	95% Confidence Interval of the Difference	
									Lower	Upper
Salary	Equal variances assumed	1.841	.176	1.982	231	.049	.306	.154	.002	.609
	Equal variances not assumed			1.943	172.26	.054	.306	.157	-.005	.616

Table 6 Group Statistics

Sector		N	Mean	Std. Deviation	Std. Error Mean
Turnover intention	public	146	1.84	.366	.030
	private	88	1.45	.501	.053

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Differ.	Std. Error Differ	95% Confidence Interval of the Difference	
									Lower	Upper
Turnover intention	Equal variances assumed	72.961	.000	6.821	232	.000	.388	.057	.276	.500
	Equal variances not assumed			6.322	143.00	.000	.388	.061	.267	.509

As shown in Table 6 public employees' turnover intentions were significantly lower than those of private employees'. Hypothesis 3 was supported. The difference in the mean values of the turnover intention between the public and private sectors is statistically significant (public sector M = 1.84, SD = 0.366, private sector, M = 1.45, SD = 0.501). Size difference between the means of turnover intention in sectors (mean difference 0.388, 95% CI: 0.267 to 0.509) was exceptionally large (eta squared = 0.14).

Descriptive statistics (Table 7) shows that only 15.8% of public sector employees' intention to leave a job, while 84.2% was determined to retain existing business. On the other hand, more than half of employees in the private sector intend to change jobs, while 45.5% want to stay in the present work.

Hierarchical regression analysis was used to test Hypotheses 4 and 5.

Table 7 Cross tabulation

			Would you have changed jobs		Total
			I changed jobs	I would not change a job	
Sector	public	Count	23	123	146
		% within Sector	15.8%	84.2%	100.0%
		% within Would you have changed jobs	32.4%	75.5%	62.4%
		% of Total	9.8%	52.6%	62.4%
	private	Count	48	40	88
		% within Sector	54.5%	45.5%	100.0%
		% within Would you have changed jobs	67.6%	24.5%	37.6%
		% of Total	20.5%	17.1%	37.6%
Total		Count	71	163	234
		% within Sector	30.3%	69.7%	100.0%
		% within Would you have changed jobs	100.0%	100.0%	100.0%
		% of Total	30.3%	69.7%	100.0%

The data in Table 8 show that the important role of public employees in order to remain in the organization play extrinsic factors satisfaction (interpersonal relationships b=.282, p<.05; work organization b=.412, p<.05; information within the organization b=.297, p<.05) rather than intrinsic factors. Public employees were more likely than private employees to consider leaving their jobs when they were dissatisfied with the extrinsic aspects of their jobs. Hypothesis 5 was not supported. On the other hand, interaction intrinsic satisfaction with private sector on turnover intention was significant (opportunities for advancement, b=.423, p<.05; choice of personal way of working, b=.294, p<.05), thereby indicating that private employees had greater intentions to leave their jobs when they were dissatisfied with the intrinsic aspects of their jobs. Hypothesis 4 was not supported.

5 CONCLUSION

The purpose of this study was to compares the job satisfaction and turnover intentions of private and public sector employees in Serbia. This study confirmed that public employees will have significantly greater levels of job satisfaction and significantly lower levels of turnover with regard to private employees.

Table 8 Coefficients [a]

Sector	Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Correlations		
		B	Std. Error	Beta			Zero-order	Partial	Part
Public	(Constant)	.309	.194		1.592	.114			
	Direct cooperation with colleagues	-.022	.049	-.039	-.459	.647	.278	-.040	-.029
	Time for work completion	.089	.035	.227	2.546	.012	.273	.217	.160
	Support of the managers	-.057	.038	-.164	-1.511	.133	.273	-.131	-.095
	Interpersonal relationships	.107	.036	.282	2.968	.004	.407	.251	.186
	Choice of personal way of working	.087	.038	.228	2.324	.022	.479	.199	.146
	Work organization	-.139	.039	-.412	-3.537	.001	.301	-.295	-.222
	Information within the organization	.106	.030	.297	3.559	.001	.366	.297	.224
	Working area	.035	.023	.124	1.514	.133	.341	.131	.095
	Opportunity for education	.019	.031	.051	.609	.543	.426	.053	.038
	Opportunity for job promotion	.036	.034	.086	1.058	.292	.229	.092	.066
	Salary	.010	.026	.031	.396	.693	.357	.035	.025
	Presenting ideas to managers	.023	.035	.071	.668	.505	.440	.058	.042
Private	(Constant)	-.250	.278		-.899	.372			
	Direct cooperation with colleagues	.057	.068	.090	.834	.407	.327	.096	.066
	Time for work completion	-.026	.059	-.049	-.440	.661	.294	-.051	-.035
	Support of the managers	-.151	.073	-.271	-2.062	.043	.327	-.233	-.163
	Interpersonal relationships	.031	.058	.061	.539	.592	.276	.062	.043
	Choice of personal way of working	.164	.069	.294	2.375	.020	.498	.266	.187
	Work organization	.080	.070	.152	1.135	.260	.455	.131	.090
	Information within the organization	.023	.051	.043	.450	.654	.249	.052	.036
Private	Working area	.073	.043	.172	1.680	.097	.264	.192	.133
	Opportunity for education	-.121	.058	-.209	-2.081	.041	.166	-.235	-.164
	Opportunity for job promotion	.250	.066	.423	3.786	.000	.385	.403	.299
	Salary	-.087	.045	-.207	-1.935	.057	.146	-.219	-.153
	Presenting ideas to managers	.058	.064	.112	.905	.368	.401	.105	.071
a. Dependent Variable: Turnover intention									

The results of this study show that public employees in Serbia have a higher level of extrinsic job satisfaction but lower intrinsic job satisfaction than private employees do. Higher extrinsic satisfaction of public employees is not consistent with what has been shown in literature elsewhere. This satisfaction derived from interpersonal relationship, work organization and information within the organization. The reasons for this result can be fostering fundamental values national culture. Classifying the order culture with a high degree of collectivism, not surprising

Serbian workers need to close and harmonious relationships with colleagues, especially with information within the organization which reducing their uncertainty, insecurity and foster feelings of identification with the organization. Nevertheless, the lower intrinsic satisfaction of public employees in Serbia indicates that there is an opportunity to increase public employees' motivation by addressing the intrinsic aspects of their jobs.

The findings showed that the extrinsic factors were sources of satisfaction rather than dissatisfaction. This is reversal of Herzberg study with concluded that extrinsic factors are sources of dissatisfaction rather than satisfaction.

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ECOLOGICAL CRITERIA IN THE FUNCTION OF CONSTRUCTION METHODS AND APPLICATION OF DIFFERENT MATERIALS

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Abstract

The European Construction Industry (ECI) is facing the challenge of increased consumption of energy, resources, environmental threats and climate changes which are dictating the necessity of using technology that can help in rationalizing consumption of resources. Additionally, environmental protection became a top priority for ensuring sustainable development, maintaining very high international environmental standards, and revitalizing important role of ECI in the world economy. To evaluate the impact of construction objects on the environment, it is necessary to consider all phases of construction, including the use of natural raw materials needed for the manufacturing of construction materials, construction, the exploitation of objects and eventually demolition and recycling. The construction is considered as an activity that consumes the greatest amount of natural resources, such as water, wood and a variety of raw materials for the production of construction materials. The construction industry is one of the biggest air pollutants and causes high energy consumption in all phases of construction. With recycling and reuse of construction material need for natural resources can be significantly reduced. Applying multi-criteria decision-making methods enable us to objectively evaluate impact of the construction object on the environment as well as his ability to meet assigned criteria. The article is devoted to analyzing five most commonly built sports halls made with different materials and systems of construction in order to determine which one is meeting environmental criteria to the fullest extent.

Keywords: *Ecological criteria, sustainable development, different materials, construction methods, environmental protection.*

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1 INTRODUCTION

According to the Statistical Office of the Republic of Serbia, on the territory of Serbia there are 1533 primary schools, of which 50% have no sport halls for physical education and 25% have inadequate (Republicki Zavod za Statistiku, 2013). The challenge that government at all levels are facing is not only the construction of sports facilities, but also integration into European environmental standards that are recommending reduced consumption of resources and energy in all phases of construction, reduced emissions of CO_2, durability and so on.

In this article we analyze the indoor sports facilities. In most cases sports halls are public facilities owned by the local governments. They are built to be used by citizens throughout the Republic. It is therefore essential that persons who are in a position to make decisions on behalf of the wider population make decisions as a result of elaborate analysis and use of multi criteria decision making methods in order to choose the sport facility that will meet European environmental standards to the fullest extent and preserve ecological balance. Thus, the vision of sustainable development has to be followed. It implies meeting the needs of present generations without compromising the ability of future generations to meet their own needs. Sustainable development makes compromise between current and long-term objectives, local and global action on environmental issues as inseparable components of human progress.

1.1 Methodology

Use of relevant literature, factual information and application of "Promethee" multi-criteria decision making method. Paper presents an objective selection of different materials and construction systems in the practical example of choosing best among several commonly built sports halls in terms of environmental criteria, with respect to environmental standards, and sustainable development.

2 RESULTS OF THE RESEARCHE AND DISCUSION

In order to select sport facility that best meets the environmental criteria, analysis was conducted on the five most commonly built sports hall made with different materials and systems of construction: “balloon hall” with wooden structure, steel hall made with “sandwich panels”, hall made of clay blocks with steel roof, prefabricated hall made from reinforced concrete “sandwich” elements (AB hall) and prefabricated hall made from ferrocement “sandwich” elements (FC hall). As the most important criteria from the ecological and environmental perspective following have been taken in to the account: the degree of environmental degradation during exploitation of raw material from the nature, the extent of environmental pollution during the production and processing of construction materials, harmful substances and radiation from the material, the durability of construction materials and possibility of recycling, energy needed for production of building material and energy consumption during exploitation of facility.

2.1 “Ballon hall” with wooden structure

The supporting structure is arched and large in span usually made from laminated wood because it’s impossible to find natural timber of such dimensions and shape. Laminated wood is easily produced in static modal size, and dimensions. PVC materials (polyvinyl chloride) are the cheapest and most commonly used materials for covering the balloon hall.

Fig. 1 Ballon hall with wooden structure

Properties that make this fabric attractive for use in construction are their low mass and transparency. The downside of these types of sport facilities is that they react quickly to the temperature changes in the external environment which significantly affects end user comfort and more power is needed for their cooling or heating. They also have very short lifespan.

2.2 Steel hall made with “sandwich” panels

Each steel hall consists of primary and secondary structures. The primary structure consists of the supporting frame and the stabilizing elements which have a role to ensure the stability of buildings and to transmit the load to the reinforced concrete foundation. The secondary structure consists of roof and facade substructure. The steel structure is filled with water proofed steel panels which consists of two shallow profiled galvanized (275g/m^2) and painted steel sheets (0.5 – 0.7mm thick) with broad, non-flammable insulating core of laminated mineral wool (50 – 240mm thick, specific gravity of 120kg/m^3). All three layers are connected in a compact sandwich element that provides the necessary capacity, tightness and compactness. The core made from non-combustible laminated wool provides thermal and acoustic insulation and high fire resistance of the sandwich elements (Trimo, 2010).

Fig. 2 Steel hall made with “sandwich” panels

2.3 Hall made of clay blocks with steel roof

This type of hall is built using system of strip foundation and load-bearing walls made of clay blocs with steel roof. Clay blocks are standard type of clay blocks with horizontal and vertical holes that allow the safe and economical production of the supporting and separating walls. They represent environmentally friendly product with high durability and quality. The walls made of hollow clay blocks provide good vapor permeability, sound and thermal insulation. Clay block can be insulated with polystyrene or mineral wool. For the purposes of this study we will presume that the clay blocks are insulated with 10 cm thick mineral wool.

Fig.3 Hall made of clay blocks with steel roof

2.4 Prefabricated hall made from reinforced concrete “sandwich” elements (AB hall)

Halls built from reinforced concrete prefabricated sandwich elements consist of two concrete layers which are mutually separated by a layer of insulation. These elements can be used as bearing walls, beams or internal walls .Interest for these types of sandwich panels is on the rise for the past two years because they represent cost-effective, attractive and energy-efficient walls that can be used for the halls as well as for the residential buildings (Keenehan, Concannon, & Hajializadeh, 2012). Energy efficiency of these elements depends on the connectors used to connect elements as well as the insulation. Although there are several kinds and types of insulation on the market, concrete sandwich panels use hard insulation because their properties are the most compatible with concrete in terms of moisture absorption, stability, size and flexibility (Seeber, 1997).

Fig. 4 Prefabricated hall made from reinforced concrete “sandwich” elements

2.5 Prefabricated hall made from ferrocement “sandwich” elements (FC hall)

Ferrocement is a type of fine-grained thin-reinforced concrete reinforced with wire lath and single layer of wire mesh. There are five methods used to produce ferrocement structures from which the simplest and most efficient in practice has proved to be “MC” building system that will be described in more detail below.

Halls built using “MC” system of construction are prefabricated. It consist of ferrocement, prefabricated, thermo insulated, “sandwich " type elements. These elements have a thickness of 19 cm in cross-section. The base is made of ferrocement while the thermal insulation layer is made from simprolit (Styrofoam balls dipped in cement milk). Thermo insulated layer is 15 cm thick and also serves as a protection against fire.

Elements made in such a way are transported to the construction site, assembled over auxiliary steel structures and directly connected with polygonal reinforced concrete arch which is formed on the spot. Halls constructed in such a way are completely resistant to fire, earthquakes, and all the storms, including hurricanes (MC system, 2014).

Fig.5 Prefabricated hall made from ferrocement sandwich elements

3 CRITERIA USED FOR ANALYZING CONSTRUCTION MATERIALS FROM ENVIRONMENTAL PERSPECTIVE

Criteria used to analyze sport hall from environmental perspective are :

– The degree of environmental degradation in the process of extracting raw materials from the nature.
– The degree of environmental pollution during production and processing of construction materials.
– Harmful substances and radiation from materials.
– Durability and possibility of recycling construction materials.
– Energy needed for production of construction materials.
– Energy needed for exploitation of sport facilities.

3.1 The degree of environmental degradatio in the process of extracting raw materials from the nature

Pedosphere is the outer layer of the earth which consists of the land. Land is a source of energy, minerals, place where food is produced and where most of the living organisms including human beings are living. The amount of land available to man is limited and represents a non-renewable resource. Growth of population leads to deforestation, reduction of land covered with plants and increase of land used for construction of roads buildings and other infrastructural objects. All of it inevitably leads to chemical and physical pollution of pedosphere which as a consequence has pollution of underground waters, rivers, lakes, plants air pollution and climate changes. Constant pollution of air, land and underground waters has a long lasting impact on the environment endangering human health and disturbing ecological balance (Poljoprivredni institut Republike Srpske, 2009).

3.2 The degree of environmental pollution during production and processing of construction materials.

During the production and processing of construction materials, the environment is polluted in different ways and one of the most alarming is through the emission of greenhouse gases especially carbon dioxide (CO_2). According to Loncaric B. (2012) polluted air is one that has received the gas, steam, smoke, dust and other materials from a variety of sources in amounts which may harm the health of people, environment and material assets. Clean air is composed of: nitrogen (N_2) 78.09%, oxygen (O_2) 20.94%, carbon dioxide (CO_2) 0.03%, and the remaining 0.94% consists of other dry inert gases such as helium, argon, krypton, xenon, and so on. The biggest air polluter is industry among them construction industry, metal and non metal and chemical industry take significantly high place. Consequences of air pollution are: acidic rain and degradation of land, “greenhouse gasses” effect and variety of health problems in humans.

3.3 Harmful substances and radiation from materials

Harmful substances and radiation from the material during the production, exploitation and destruction of construction products adversely affect the health of people and the entire planet. State agencies continue to study many chemical additives used to build and improve the performance of construction materials. Many are rated as extremely toxic, even carcinogenic. In Serbia, the prohibition or restriction the use of certain building materials and chemicals is done according to the rules of Serbian Chemical Agency. Among three most dangerous chemicals used in Serbia are: radon, polyvinyl chloride and formaldehyde.

PVC stands for polyvinyl chloride or thermoplastic polymer. Over 50% of this material is used in the construction industry as a hard plastic to make window profiles or plates and as a soft plastics roof and wall insulation materials and so on. PVC increasingly replaces traditional building materials mainly due to much lower prices. PVC material is a very harmful to people's health because of the high proportion of chlorine which is used for its production. During production, use and disposal of material highly toxic and carcinogenic gas dioxin is released. Exposure to vapors of dioxin causes serious health consequences (National Library of Medicine, 2013).

Formaldehyde is a colorless strong smelling chemical used in the construction industry in some insulation materials and construction adhesives. All materials that contain formaldehyde are releasing gas or emitting toxic fumes that causes serious respiratory problems and on the long run causes cancer. All laminated wood are containing formaldehyde (American Cancer Society, 2103).

Radon is an inert radioactive gas, which can be found on the surface of the entire planet Earth, comes from the decaying of radium, and it’s also generated by uranium contained in the earth's crust. Radon can be segregated from deeper layers of soil and underground water but it can also be extracted from building materials that contains slag ash or red brick (United States Environmental Protection Agency, 2014).

3.4 Durability and possibility of recycling construction materials

Each material has its own life expectancy, or the period during which it will keep its properties in the same or approximate form observing from the time it’s started being used. After the loss of their properties as some materials can be used in its primary purpose some can be recycled and reused or used as raw material in further processing and some has to be disposed on the landfill. The durability of the material largely defines the lifetime of the facility and affects the energy balance of the building for a specific reference period.

3.5 Energy needed for production of construction materials

Construction materials are generally produced by processing natural raw materials. In order to produce a certain construction material, it is necessary to spend a certain amount of energy to be able to transform the natural raw material in to usable building materials. Except for emission of harmful gasses production process often requires a great amount of energy spent. With recycling, and getting materials from recyclables the amount of energy used can be reduced. In the further chapters the amount of energy needed for most commonly used building materials will be calculated.

3.6 Energy needed for exploitation of sport facilities

Most of the energy needs for heating of object due to the large surfaces and ranges that are preventing implementation of adequate insulation are by far exceeding all others. Energy consumption has a large impact on the ecology, because of the emission of harmful substances needed for the production of energy itself. This criterion should be given considerable attention since its cumulative effect over the years has a significant impact on the balance.

4 MULTIPLE CRITERIA DECISION MAKING METHOD – "PROMETHEE"

The problem of selecting the best among several types of the sports hall according to the environmental criteria falls into bad structured problems. The problem will be analyzed using the "Visual Promethee" method. Characteristics of the "Promethee" methods are:

- In the first step of problem solving, criteria that are characterizing the problem, and are relevant to decision maker, should be well-defined.
- Alternative solutions to problem should be developed. They represent alternative versions of characteristics of buildings that need to be compared and ranked. To each criteria weight ratio is added that reflects his importance from the perspective of decision-maker (Nikolic & Borovic, 2009).
- According to the criteria defined for each action appropriate values in absolute terms are entered. They can also be in unparalleled units.
- Elaborating the results for multi criteria analysis with verbal and graphic interpretation of the obtained ranges using "Gaia" method.

When evaluating investment projects criteria for evaluation are usually classified into four groups: economic, technical and technological, socio-political and environmental criteria. In this analysis, the focus is on the environmental criteria. For numeric processing of the problem using "Promethee" and "Gaia" methods multi criteria decision making, software "Decision Lab 2000" has been used. This is a commercial name for a software product distributed by "Visual Decision" from Canada (Promethee Gaia-net, 2014).

4.1 Analyzing the problem of selecting best among several types of sports hall using "Promethee" method from environmental perspective

In solving the problem of selecting the best type of sports halls according to the environmental perspective: the degree of environmental degradation in the process of extracting raw materials from the nature should be as small as possible, emission of harmful substances and radiation from the material as small as possible, durability of building materials and the possibility of recycling as high as possible, energy used for production of building materials as small as possible, energy consumption needed for the exploitation of the object as small as possible.

For the reasons of the different distances of pillars for different objects (4 – 8m), all analyzes have been based on the halls that are 48m long. This way, we will again compare objects of the same size and volume. All analyzes are comparable and there is no reference value.

4.2 Values used to used to analyze the degree of environmental degradation in the process of extracting raw materials from the nature

Exploitation of raw materials from the nature results in long turn impact on the environment. This criterion refers to the creation of quarries, degradation of agricultural land, excavation sites and deforestation. The criterion is impossible to describe numerically therefore narrative criteria will be used.

4.2.1 "Balloon" hall with wooden structure;

Basic raw materials which are taken from nature are natural salt, oil and wood. Exploitation of natural salt has no lasting harmful effects on the nature while exploitation of oil leads to the formation of greenhouse gases over the crude oil which is extracted from the soil. These gases are then dissipated into the air and they are increasing the level of carbon dioxide which has a lasting impact on the environment (Grec & Maior, 2008). PVC materials which are used to cover balloon hall are obtained from the oil just like synthetic polymers. The composition of wood adhesives is slightly varying from one brand to another but they are all based on PVA (polyvinyl aldehyde) and they contain synthetic polymers which are enhancing their ability of bonding. Timber is obtained by deforestation and over the years leads to erosion and climate change. Taking into account the above factors to this criterion, we assign descriptive value "bad".

4.2.2 Steel hall with “sandwich panels;

The basic material for insulation of the sandwich panels is mineral wool. Mineral wool is produced from the mineral such as diabase, basalt, dolomite, and others. These minerals are available in strip mine. Steel sheets are made from iron which previously has been cleaned from impurities such as sulfur, phosphorus, and silicon. Excavation of minerals and iron from the earth's crust influence the environment before during and after excavation. Consequences vary (depending on the type of ore and the extent of excavation) from erosion sedimentation, pollution of the nature around the excavation site etc. Also it is important to note that the panels are coated with PVC protective layer that is derived from oil which has already been discussed in the previous paragraph. Taking into account the above factors to this criterion, we assign descriptive value "medium".

4.2.3 Hall made of clay blocks with steel roof;

The basic material from production of this type of hall is clay. Clay is the type of soil which in nature appears as a consequence of rocks decomposition and its extraction. Depending on the volume of excavation can cause erosion, damage to the natural habitat of animals, degradation of rivers, etc. It should be noted that the excavation and extraction of clay releases the radioactive gas radon, which is very harmful to human health .Insulation of these halls is made from mineral wool or polystyrene. Raw materials for mineral wool have already been described. Polystyrene is product of oil. Taking into the account above factors, to this criterion, we assign descriptive value "bad".

4.2.4 Prefabricated AB hall;

The base material is cement which is obtained by grinding a material called clinker. Clinker is produced by extraction and processing limestone, clay, bauxite, quartz sand etc.. In the production of this type of hall next to the cement, materials such as steel and polystyrene have been used. Polystyrene is made from synthetic polymers - styrene, which is a by-product of oil. Polystyrene can be easily recycled with minimum energy consumption, as opposed to the mineral wool. Taking into account the above factors to this criterion, we assign descriptive value "medium".

4.2.5 Prefabricated FC hall;

Materials used for the production of this hall are: steel, cement and polystyrene. About the origin of these materials and their impact on the environment it has been discussed in the previous paragraphs. Taking into account the above factors to this criterion, we assign descriptive value "medium".

4.3 Values used to analyze degree of environmental pollution during production and processing of construction materials

This criterion will be calculated based on the values given in table 2.

Table 1. Production of carbon dioxide for standard and alternative construction materials

Type of material	**CO_2 emission (kg/t)**
Limestone	12
Portland Cement	850
Unreinforced concrete MB15-20	170
Reinforced concrete MB 30	370
Soft wood processed	132
Glue laminated wood(PVA adhesive 120 kg/m^3)	570
Portland cement (64-73% slag)	279
Clay	850
Tile	430
Steel bars and plates	1,720
Polypropylene injection	3,900
Mineral wool	500
Polystyrene	2,700
PVC	2,410

Table 2. Total emission of CO_2 needed for production of sport halls

Type of sport hall	Total emission of CO_2(t) needed for production of materials
"Balloon" hall with wooden structure	34.93
Steel hall with "sandwich" panels	88.45
Hall made of clay blocks with steel roof	95.47
Prefabricated AB hall	116.88
Prefabricated FC hall	87.28

4.4 Values used to analyze harmful substances and radiation from materials

– Balloon" hall with wooden structure;

Cooling, heating and deterioration of PVC materials used to cover balloon hall leads to the release of toxic gas - dioxin which cause cancer and respiratory problems. Laminated wood used in balloon halls and cover in industrial adhesive contains formaldehyde which evaporates and causes the cancer and respiratory problems. According to the criterion harmful substances and radiation from the material, this hall is rated as "poor".

– Steel hall with "sandwich" panels;

In addition to steel, which is not harmful to human health, this type of hall consists of sandwich panels insulated with mineral wool which doesn't come in contact with the end user therefore in this case it be considered safe for human health. Sandwich panels are coated with PVC film to ensure water resistance. PVC in lesser extent emits toxic fumes discussed in the previous paragraph. According to the criterion of harmful substances and radiation from material, this hall is rated as "medium".

– Hall made of clay blocks with steel roof;

Hall is made from materials that are not hazardous to human health but red clay can release toxic gas radon which causes various respiratory problems. According to the criterion of harmful substances and radiation from material, this hall is rated as "medium".

– Prefabricated AB hall;

Next to the cement and mineral wool insulation that doesn't come in contact with the end user all the other materials in this type of hall are not harmful to human health. According to the criterion of harmful substances and radiation from material, this hall is rated as "good".

– Prefabricated FC hall;

Next to the cement and polystyrene that doesn't come in contact with end user all the other materials are not hazardous to human health. According to the criterion of harmful substances and radiation from material, this hall was assessed as "good".

4.5 Values used to analyze durability and possibility of recycling

This criterion will also be described according to durability and possibilities of recycling the materials (re-use in the same or other processes).

– "Balloon" hall with wooden structure;

PVC textile foils are mainly used until the end of their life cycle, which amounts to 20 years; therefore in their original form they cannot be re-used. In Serbia center for recycling PVC materials doesn't exist, instead they are disposed to landfill. Life cycle of laminated wood is 30 -50 years if maintained properly, therefore the life cycle of entire hall is measured by it. Laminated wood can be recycled and used for the production of medium density fiberboards (MDF). According to the durability and possibility of recycling "balloon" hall is ranked "bad".

– Steel hall with "sandwich" panels;

When it's not in direct contact with aggressive atmospheric conditions, and when it's located in closed space with adequate protection against corrosion steel has a long lifespan, sometimes for more than 100 years. Steel is easily recycled and when it's recycled saves up to 70% compared to the production of primary raw materials. Sandwich panels are not suitable for recycling mostly because they are made of thin metal sheets reinforced with thick layer of mineral wool. Thin metal sheets are recyclable but it's very difficult to separate them from mineral wool insulation layer or anticorrosion coating. Mineral wool is not recyclable. The lifespan of sandwich panels is according to the manufacturer's declaration. If manufacturer is high quality life spam is usually about 30 years. The lifespan of mineral wool is according to the manufacturer's declaration usually around 20 – 40 years. Due to the large percentage of steel in the total weight of object rating of durability and recycling possibility is "medium".

– Hall made of clay blocks with steel roof;

It also contains a high percentage of steel in the roof structure as well as in the reinforcement of concrete. Reinforced concrete which has been protected from the penetration of sulfates and therefore internal corrosion has a very long lifespan. Facade and mineral wool cannot be recycled. Durability of plastered façade, depending on the quality can be to 50 years. Reinforced concrete and hollow clay blocks can be used after a simple process of grinding (milling) as a basis for local roads or foundations to other construction objects. Durability and recycling possibility is rated "good".

– Prefabricated AB hall;

As the name says, the basic material used is reinforced concrete. Durability of these construction halls is very large, more than 100 years. All the reinforcement is possible to recycle as well as concrete. An insulating layer which is made from polystyrene cannot be used in their original form, but it is also entirely recycled and used as a raw material in the production of polypropylene and polystyrene containers. Almost all materials that are incorporated into AB prefabricated hall are recyclable. Therefore the hall is rated “very good” according to the criterion of durability and possibility of recycling.

– Prefabricated FC hall;

The entire hall is based on reinforced concrete and insulation made from polystyrene. Plastered façade does not exist so the durability of the object is as long as durability of reinforced concrete which is more that 100 years. All the materials used in this hall are recyclable, but due to the unique method of concrete reinforcement process of recycling has to be done in several phases. Due to the more complicated process of recycling this hall is rated as “good”.

4.6 Values used to analyze energy needed for production of construction materials

This criterion will be calculated based on values given in table 3.

Table 3. Energy needed for production of construction materials

Type of material	Energy needed for production kWh/t	kWh/m^3
Limestone	1,200	1,600
Cement	1,400	1,900
Aluminum	15,300	40,650
Wood	190	100
Laminated wood (PVA adhesive 120kg/m^3)	2,300	1,560
Steel	2,200	35,500
Steel profiles	4,100	82,000
Copper	8,000	71,000
Sand	9	15
Glass	5,700	1,500
Clay blocks	832	574
Ceramics	6,200	14,900
Adobe	1,200	2,200
Mineral wool	6,000	720
Polystyrene	24,600	490
Plastic	11,000	11,000
PVC material	21,440	6,400

4.7 Values used to analyze energy needed for exploitation of sports halls

Since we assume that the analyzed objects will be heated with the same or similar power source that has the same degree of efficiency, the CO_2 emissions ratio for the energy used for heating, is the same as the ratio of heat loss which are creating that need.

4.8 Numerical interpretation of the problem ranking of the action

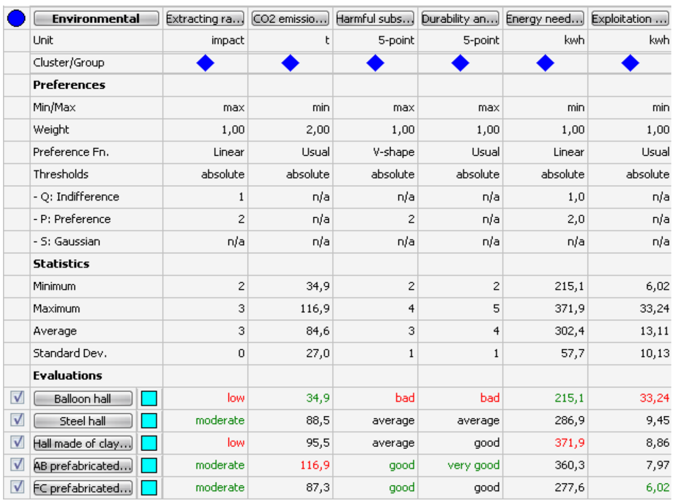
Analyzing the problem of selecting the best among several types of the sports hall from the environmental perspective, for three criteria numerical values have been defined with appropriate physical unit. As CO_2 emitted during the production of material from which sport hall have been made has an immediate effect on the environment this criterion will be allocated weight ratio 2. Emission of CO_2 has twice bigger impact on the environment then other criteria; therefore all the other criteria will be allocated weight ratio 1. Criteria which cannot be measured with numerical values were measured on the descriptive scale from 1 to 5.

Table 4. Total energy needed for production of sport halls

Type of sport hall	Total energy needed for production of materials
“Balloon” hall with wooden structure	215.13
Steel hall with “sandwich” panels	286.85
Hall made of clay blocks with steel roof	371.85
Prefabricated AB hall	360.30
Prefabricated FC hall	277.63

4.9 Analysis of obtained results

For each criterion desirable value has been defined, or in other words if decision-maker prefers higher or lower value for the analyzed criterion. All criteria which appear has direct environmental impacts, were analyzed linearly.



Environmental		Extracting ra...	CO2 emissio...	Harmful subs...	Durability an...	Energy need...	Exploitation ...
Unit		impact	t	5-point	5-point	kwh	kwh
Cluster/Group		◆	◆	◆	◆	◆	◆
Preferences							
Min/Max		max	min	max	max	min	min
Weight		1,00	2,00	1,00	1,00	1,00	1,00
Preference Fn.		Linear	Usual	V-shape	Usual	Linear	Usual
Thresholds		absolute	absolute	absolute	absolute	absolute	absolute
- Q: Indifference		1	n/a	n/a	n/a	1,0	n/a
- P: Preference		2	n/a	2	n/a	2,0	n/a
- S: Gaussian		n/a	n/a	n/a	n/a	n/a	n/a
Statistics							
Minimum		2	34,9	2	2	215,1	6,02
Maximum		3	116,9	4	5	371,9	33,24
Average		3	84,6	3	4	302,4	13,11
Standard Dev.		0	27,0	1	1	57,7	10,13
Evaluations							
Balloon hall		low	34,9	bad	bad	215,1	33,24
Steel hall		moderate	88,5	average	average	286,9	9,45
Hall made of clay...		low	95,5	average	good	371,9	8,86
AB prefabricated...		moderate	116,9	good	very good	360,3	7,97
FC prefabricated...		moderate	87,3	good	good	277,6	6,02

Fig.6 “Promethee” software basic window

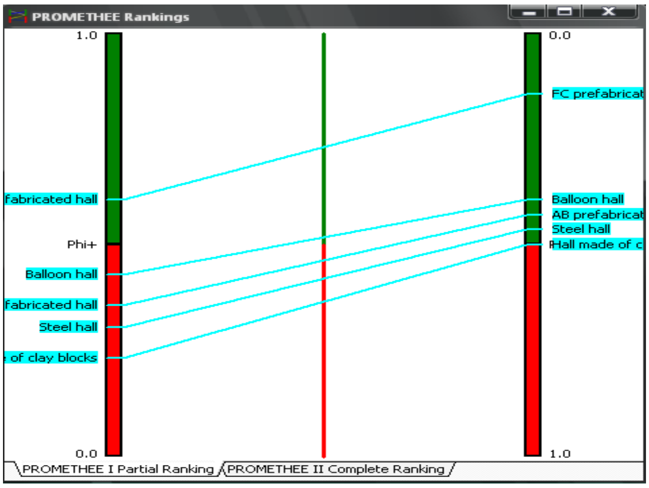


Fig. 7 “Promethee”software rankings

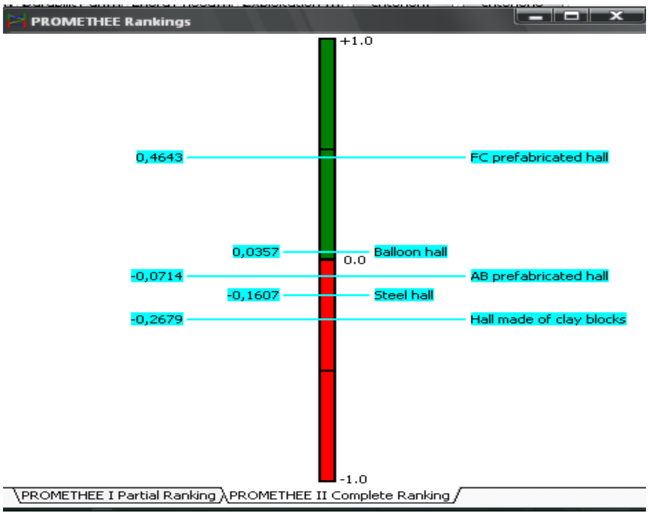


Fig. 8 “Promethee” software rankings

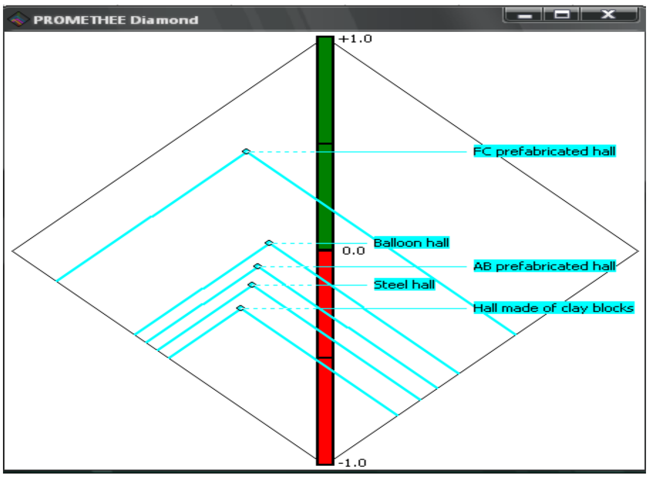
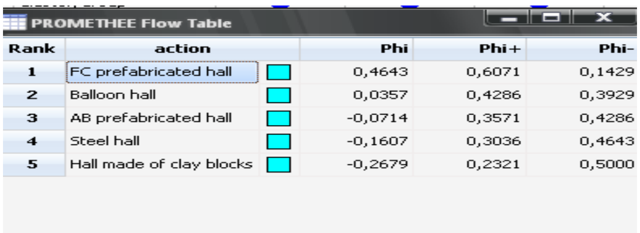


Fig 9. “Promethee” software –Diamond



PROMETHEE Flow Table

Rank	action	Phi	Phi+	Phi-
1	FC prefabricated hall	0,4643	0,6071	0,1429
2	Balloon hall	0,0357	0,4286	0,3929
3	AB prefabricated hall	-0,0714	0,3571	0,4286
4	Steel hall	-0,1607	0,3036	0,4643
5	Hall made of clay blocks	-0,2679	0,2321	0,5000

Fig. 10 "Promethee" software - Table

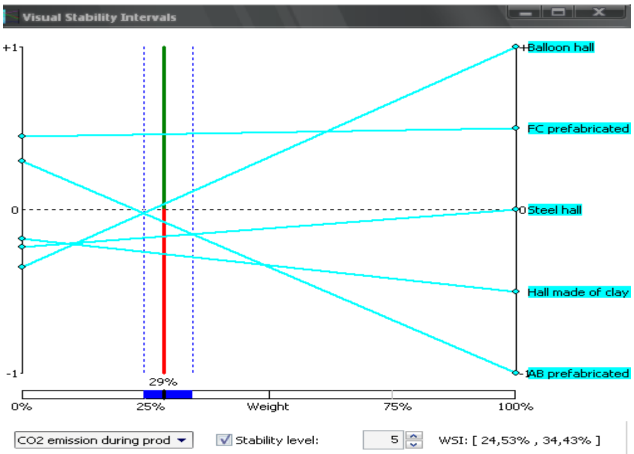


Fig.11. "Promethee" software – Stability interwals

From the graphic 7 to 11 descriptions and analysis of the problem we can see that all the solutions are comparable and the subsidiary. Area occupied by the highest-ranked sport hall covers the surface of all the others. We can see that the solutions are comparable and the subsidiary. Based on the given criteria best ranked is FC halls while the second ranked is balloon hall. Best ranked solution is stable and linear in the requested domain.

5 CONCLUSIONS

Using the "Visual Promethee" method following sport halls have been analyzed : "balloon" hall with wooden frame, steel hall with sandwich panels, hall made of clay blocks with steel roof, prefabricated hall of reinforced concrete elements and prefabricated hall of ferrocement sandwich elements. The analysis is carried out according to the environmental criteria. Data used in the analysis are realistic and calculated on the materials used in real life. According to the environmental perspective the best sport hall to build is prefabricated hall made of ferrocement sandwich elements. Applying the multi- criteria decision making model made it possible to evaluate different materials, systems of constructions on the practical example of choosing best among several commonly built sports halls from the environmental perspective following vision of sustainable development and environmental protection.

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MANAGING CUSTOMER LOYALTY IN THE AUTOMOTIVE INDUSTRY USING SIX SIGMA AND “THE TOYOTA WAY” METHODOLOGY

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JEL Category: M11

Abstract

In times of economic crisis and dropped sales, automotive manufacturers spending their resources wisely and focus on areas with bottom-line impact. Such a focus is the customer loyalty, which is a “must” for automakers that compete in present environment. The average replacement cycle for auto buyers is usually three or four years…or even longer, unlike other consumer products with more frequent replacement cycles. Therefore, loyalty needs to be in the focus of automotive manufacturers and help building customer retention.

While many automotive manufacturers have started customer satisfaction programs, most of them don’t realize that the customer train has left the station without them. Here are some facts on the negative influence of customer satisfaction. More than 90 percent of the Fortune 200 companies are convinced that maximizing customer satisfaction maximizes profitability and market share. Yet fewer than 2 percent are able to measure bottom-line improvements from documented increases in levels of customer satisfaction. There are 15 to 40 percent of customers who say that they are satisfied defect from a company each year. In the European auto industry, the average repurchase rate of satisfied customers from the same car company is less than 30 percent. The corresponding figure for the appliance industry is below 45 percent. The defection rate of people over age 65 is 40 percent; for those over age 35 it is 60 percent; for those between ages 20 to 35 it is more than 85 percent.

***Keywords**: research, customer, loyalty, retention, satisfaction, process, deflection, Six Sigma, DMAIC*

1 RESEARCH METHODOLOGY

This research is made for the purposes of the dealership Auto House Skopje, a GM – Opel and Chevrolet dealership in Macedonia, analyzing customer loyalty for a period of 10 years, but an impact is made for the whole automotive industry in Macedonia, Europe, USA and Asian models.

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Six Sigma is a disciplined approach to improving product, process and service quality. Since its inception at Motorola in the 80’es, Six Sigma has evolved significantly and continues to expand to improve process performance, enhance business profitability and increase customer satisfaction.

This research presents experiences of practitioners on Six Sigma, followed by the application of the Define, Measure, Analyze, Improve, and Control (DMAIC) problem-solving methodology to identify the parameters causing casting defects and to control these parameters. The results of the study are based on the application of tools and techniques in the DMAIC methodology, i.e. Pareto Analysis, Measurement System Analysis, Regression Analysis and Design of Experiment. (Jiju, 2007) The results of this research show that the application of the Six Sigma methodology increase customer loyalty and customer retention.

In the Toyota Way, it's the people who bring the system to life: working, communicating, resolving issues, and growing together. (Liker & Meier, 2006) The Toyota Way goes well beyond this; it encourages, supports, and in fact demands employee involvement. It's a culture, more than a set of efficiency and improvement techniques. The employees will reduce inventory, identify hidden problems, and fix them. The employees have a sense of urgency, purpose, and team work because if they don't fix it there will be an inventory outage. This effort requires a combination of committed management, proper training, and a culture that makes sustaining improvement a habitual behavior from the shop floor to management.

How managers can dramatically improve their business process and improve to customer loyalty and increase retention using Six Sigma and The Toyota system: eliminating wasted time and process, building quality into workplace systems, finding low-cost but reliable alternatives to expensive new technology and perfecting business processes, all in purpose increasing customer loyalty, customer retention and satisfaction.

2 INTRODUCTION

Currently, companies are in increasingly competitive environment in which customer's satisfaction and loyalty are vital factors in the success of any organization. This requires the use of continuous improvement methodologies, such as Six Sigma, which enable companies to improve customer satisfaction and meet their expectations. (George, Rowlands, Price, & Maxey, 2005)

This research describes a case study carried out in a company from the automotive industry that has selected a Six Sigma project to respond to increasing in customer loyalty above customer satisfaction and buildup retention. The objective of the project was to improve the process of analysis of customer behavior through the identification of the variables that influence the customer behavior concerning loyalty and satisfaction and proposes several improvements and eliminate potential hazards and bad influences. Results are positive and can encourage managers from other industry sectors or even services to improve their customer loyalty and customer retention handling process using Six Sigma methodology.

Empirical evidence suggest that it costs significantly less to retain an existing customer than to acquire a new one, making loyalty very important in times when marketing budgets are decreased. While customer retention is necessary to maintain market share and sales volumes, loyalty alone won't grow these figures. Now the OEM's need to find the balance for spending money and resources to customer loyalty vs customer acquisition.

Clearly, there is little correlation between customer satisfaction and customer loyalty.

By contrast, here are the facts on the enormous positives of customer loyalty:

Fact 1 - There is a very close correlation between customer loyalty and profitability.

Fact 2 - A 5% reduction in customer defection can result in profit increases from 30% to 85%

Fact 3 - If customers increase their customer retention by 2%, it is the equivalent of cutting their operating costs by 10%.

Fact 4 - Loyal customers provide higher profits, more repeat business, higher market share, and more referrals than do "just satisfied" customers.

Fact 5 - It costs five to seven times more to find new customers than to retain customers.

Fact 6 - One lifetime customer is worth more than 500,000 EUR to a car company

There are shining examples of companies that have put customer loyalty on a pedestal and as a result have an amazing financial success. Each of them exceeds 95 percent customer retention per year. They include John Deere, Lexus, among others.

For any company, large or small, the emphasis must be on the practical and the doable, and there are several essential topics or principles noted in this research:

1. Measure the Right Repurchase Behaviors
2. Highlights evolving changes in owner loyalty trends
3. Reduction of the Customer Base and Differentiation
4. Measurement/Quantification of Core Customer Defections
5. Make Owner Loyalty a Cross Functional Focus

6. “Taking the Customer’s Skin Temperature Every Day”
7. Assessment of Customer “Wow!”
8. Establishment of the Company Infrastructure for Customer Loyalty
9. Understand (and Act on) Key Drivers of Loyalty

3 MEASURE THE RIGHT REPURCHASE BEHAVIORS

It’s a cliché, but it’s true: you can’t manage or improve what you don’t measure. The first step in building and maintaining owner loyalty is to ensure that you have an accurate approach to measuring it. A holistic household approach is recommended to track owner loyalty since, unlike other approaches, this method captures both vehicle disposal and fleet additions made by consumers.

Once a measurement system is in place, an organization should establish a baseline measurement of owner loyalty. From there, automakers have the foundation to track and trend loyalty over time and assess the impact of communications, incentives and other aspects of the owner experience on loyalty. It is important to avoid using campaign-specific metrics as a proxy for the company’s overall loyalty score. While these are often more accessible due to the prevalence of marketing campaigns, these “micro-loyalty metrics” do not take a comprehensive view of all efforts exhibited by the automaker and its dealer network.

In the auto industry, customer satisfaction and loyalty are sometimes confused with each other. While customer satisfaction is an important metric, it is a means to an end, not a desired end result. Therefore, the industry should challenge dealer incentives paid for high satisfaction. After all, a customer may rate the experience as “highly satisfactory” but not go on to buy another vehicle from the manufacturer next time. Satisfaction, especially when it is self-reported, is not a reliable indicator of repurchase.

We have observed a positive trend in the industry: an increasing number of our clients are using dealer loyalty scorecards as a factor in determining dealer compensation. Since loyalty is a strategic and long term goal, we feel that compensating dealership personnel based on consumer loyalty will yield far better results than paying for customer satisfaction.

Loyalty is especially important today with certain auto brands disappearing (e.g., SAAB, Rover, Hammer, Pontiac, Saturn), the imminent threat of these owners abandoning a corporate portfolio is high. My research found a steady decline of corporate loyalty among Chevrolet owners once the decision was announced in autumn 2013 that this GM brand will stop sales in EU countries effective from year 2015. This trend shows the timely importance of building and creating loyalty to the manufacturer when confronted with losses to rival brands. In the case of Saturn, owner defections were wins for Toyota and Honda. In the case of Chevrolet the winners probably will be the Asian brands like Kia, Hyundai etc.

4 HIGHLIGHTS EVOLVING CHANGES IN OWNER LOYALTY TRENDS

As shown in Figure 1, make and corporate loyalty for the industry was fairly consistent from 2001 to 2008. Even as US sales were shrinking from 17.4 million in 2001 to 13.2 million in 2008, automakers and brands were able to maintain a fairly consistent level of repeat sales with their customers. On the other hand, you will agree that automotive manufacturers missed an opportunity to increase loyalty at a time when sales were shrinking and the retention of each customer assumed critical importance. Some makes and corporations have been able to achieve above-average levels of loyalty. For example, owner loyalty to Toyota Motor Sales has grown as the manufacturer has increased its share of the US

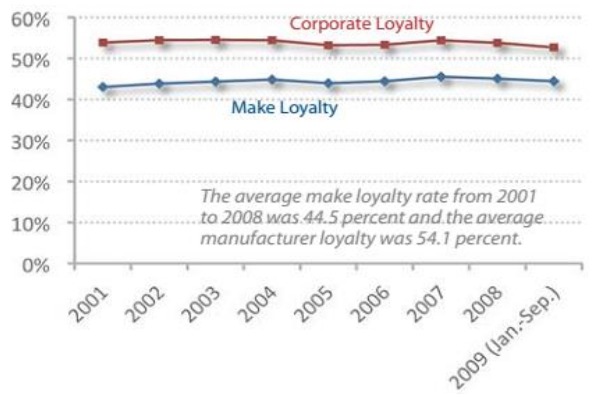

Fig. 1 Industry average make and corporate loyalty
Source: (Zetu & Miller, 2010)

retail market. In fact, the 2009 model year represents the first time since I started measuring manufacturer loyalty that Toyota has surpassed General Motors, reflecting the momentum Toyota has achieved among its customer base.

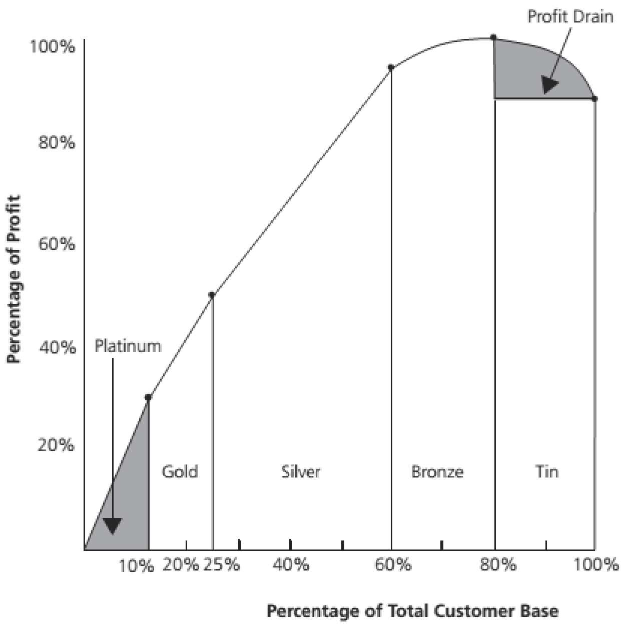

Fig. 2 Platinum, gold, silver, bronze, and tin customers: their differentiation and contribution to profitability Source: *(Bhote, 2003)*

The month-long "Cash for Clunkers" incentive, which ran from late July to late August 2009, had a positive effect on industry sales. Under this program, August auto sales for the US exceeded one million units, the first time monthly sales exceeded one million in over a year. However, the effect on loyalty was profoundly negative, showing that consumers can sometimes be incented by generous discounts to switch from one vehicle, brand or manufacturer to another. During this incentive program, some manufacturers saw their corporate loyalty rates fall by as much as 13 percentage points in one month. These statistics indicate that loyalty can be "bought," although some experts might argue that loyalty that can be purchased is not true loyalty.

Loyalty can be measured at different levels: to the model, to the make (i.e., brand) and to the manufacturer. For purposes of this research, loyalty is measured on a scale of 0 to 100 % and reflects the proportion of owners who return to the market to acquire another vehicle of the same model, make or knowing that customers can be fickle, what can automakers do to manage and build owner loyalty?

5 REDUCTION OF THE CUSTOMER BASE AND DIFFERENTIATION

The traditional approach means: **"**The more customers, the better." Growth becomes a mantra.

The Ultimate Six Sigma Discipline means. "Not all customers are worth keeping, just as not all suppliers, distributors, or product lines are worth keeping."

During a consultation with a company that was losing money, we asked the CEO how many of his 800 customers were profitable. "About 200," he replied. "Then why do you keep most of the rest?" His straight-faced answer: "To keep the plant busy!"

Unless a company is in the charity business for its customers, the indiscriminate pursuit of all customers is plain dumb.

Figure 2 illustrates a metal analogy to differentiate and segment a customer base into four categories:

– Platinum customers constitute 10% of the total customer volume of a company but constitute 30% of its profit. They are the most loyal of customers and the most difficult for competition to steal.
– Gold customers span 15% of the company's customer volume and provide 20% of its profits. They are almost as important as the platinum customers, but are not part of the strategic alliances. Together, the platinum and gold customers are labeled core customers who require continuous, never-ending attention and care.
– Silver customers account for 35% of the customer base and about 40% of the company's profits. Maintain relationships with these customers, but there is no need for assiduous cultivation.
– Bronze customers number 20% by customer volume but barely 5% of the company's profits. For these customers, the company is on a slippery slope from black ink to red ink. Be prepared to cut loose from them.
– Tin customers total 20% by customer volume and actually drain profits by 15%. Dump them. (Often, sentimental ties or the future potential

of converting them into profitable customers may hold a company back from terminating them. At the very least, an attempt should be made to increase prices to facilitate their exit or enhance profitability.)

It is estimated that a customer base reduction of 30-40% can be accompanied by a 20-30% improvement in profits.

defector has forty years of adult life left; that the average cost of the car is €20,000; and that the customer will buy ten such cars in his working life. He is likely to tell twenty of his friends and relatives about his unhappiness with the company. Assume that three of the twenty people he tells heed his advice and won't buy another car from the company, either!

The loss to the company, therefore, is not €30,000

Fig. 3 Loyalty, conquest, and defection relationship Source: *(Zetu & Miller, 2010)*

6 QUANTIFICATION OF CORE CUSTOMER DEFECTIONS

The traditional approach means: "More than 99 percent of companies do not measure the cost impact of the defection of their core customers." Even worse, their accounting departments, which continue to live in the nineteenth century, do not even know how to estimate the financial loss from such defections. The stark result is that these companies miss the boat on the most prolific technique, bar none, to improve their profits.

The Ultimate Six Sigma Discipline means: "Contrary to the conventional wisdom, customer defection is actually easy to quantify. The loss need not be 100 percent accurate with accounting certitude."

What is the cost to a car company of a single defector who is so turned off that he will never buy from that company again? Assume that the but 10 x €20,000 x 3 - or €600,000. Add the loss of servicing, parts, and financing and the costs may exceed €1 million.

The previous example can be replicated for any company, any industry. The numbers may not pass a strict accounting muster, but the multiplier effect of the loss of a single core customer cannot be denied. It must be measured. It must be quantified.

With a typical customer defection rate of 15 percent to 40 percent, the potential loss of such defections run into millions for a large company.

It is for this reason that warranty costs are just the tip of the huge iceberg of profit loss. The cost of a potential defecting customer is often at least hundred times the paid out costs of a warranty claim.

7 MAKE OWNER LOYALTY A CROSS FUNCTIONAL FOCUS

As sales have dropped for nearly every automaker, senior leadership has begun to focus on maintaining current customer assets. Manufacturers and dealers are finally starting to realize that loyalty is not just a metric that measures the success of a single marketing campaign.

Experience tells us that manufacturers are most successful at building and maintaining loyalty when multiple parts of the organization are focused on customer retention. Also, dealers tend to take loyalty much more seriously when it's a cross functional corporate focus that is endorsed by senior leadership. Beyond the traditional brand and marketing management owners, automakers should involve these parts of the organization:

- *Captive finance* – The lease termination process is a classic example of a part of the ownership experience that can be used to improve loyalty. Many times, customers are negatively surprised near the end of their lease term when they find out that they were paying only interest in the first year or they will be penalized if they don't invest in vehicle repairs before the end of leasing period. Therefore, the lease-end process often has a negative effect on the impression that customers have of the dealership and the automaker in their final days of owning a product.
  Our client engagements identified an opportunity for front-line call center staff to more proactively talk to customers and make sure that requirements for receiving their lease deposit are understood earlier in the process. This investment in communication and training leads to a more favorable impression of the lease turn-in process, and can result in higher repurchase of an automaker's product.
- *Certified pre-owned/certified used* – In most cases, the primary objective of CPO operations is to convert used buyers into new vehicle buyers. Therefore, OEMs should track the experience of buying a CPO unit to understand what drives loyalty, and what will result in an up sell to a new vehicle.
- *Dealer training/regional field staff* – I mention before, manufacturer field staff are increasingly relying on dealer loyalty scorecards to help coach dealers on how to keep current customers. A customer's experience with any brand or specific vehicle starts with a dealership; therefore, improvement objectives should be established at the retail level. Based on my experience in designing and delivering dealer loyalty programs, I've observed that dealer buy-in into these programs is critical. Unless dealers support the loyalty program, field and corporate personnel will have a very tough time getting scores and improvement plans embraced by the dealer management.
- *Parts & Service (P&S)* – We continue to see significant gaps in the strategic collaboration between staff managing P&S and new vehicle sales operations. This is a huge mistake, as good service can drive new sales and contribute to owner loyalty. In one case for European OEM, the loyalty to the company was twice as high among customers having service done by the franchised dealer network than for owners not visiting the dealer network for customer pay services.

In prior client discussions, I was surprised to hear that some in the industry don't agree that sales and service business unit objectives need to be aligned and that there seems to be a lack of understanding of the fixed operations factors that drive new vehicle sales.

Also, analysis of repair order data, which appears to be underutilized based on regular discussions with our client base, reveals that service incentives may be a worthwhile investment in repurchase loyalty. For one automaker, every euro that the dealer or manufacturer spent on service incentives had the potential to increase customer loyalty by 0.45% points, which equates to €575,000 in additional profits on 338 extra new vehicles sold.

Product Planning/Product Development - What does a major launch, product refresh or product enhancement have to do with owner loyalty? Answers to this question should provide direct input to product planners who support goals held by vehicle line executives or other brand managers. My customer analysis was based on 12 different models showed that, on average, model loyalty increased by 24% after a major product redesign. And, the positive impact on loyalty lasts approximately 15 months after the quarter during which the redesign was launched. These results show that product development or product planners should have input to cross-functional loyalty teams so they understand which product attributes may influence repeat sales.

8 "TAKING THE CUSTOMER'S SKIN TEMPERATURE EVERY DAY"

Traditional Approach. There are undoubtedly companies that believe that this would be a better world if there were no customers! But even good companies do not cultivate customers. Close personal relationships are rare. Top management visits to customers are rarer still, and after the sale is made the customer is relegated to history.

By contrast, in the Ultimate Six Sigma, the relationship is guided by the famous founder of the Matsushita empire, Konosuke Matsushita, who insisted that his sales force "take the customer's skin temperature every day!" This entails:

- Creating a firm win-win partnership with core customers, based on ethics, mutual trust, and mutual help
- Keeping a finger on the pulse of every core customer-his requirements, hopes, concerns, and irritations-not once, and not through a routine survey or associated statistics, but in a continuum of time
- Building close personal relationships and bridges with key customer personnel, not in a fawning manner, but in terms of building a ladder of mutual trust
- Having top management visit customers to get firsthand and direct feedback without the distorting filter of a protective bureaucracy.
- Never forgetting about the customer after the sale is consummated. It costs five to seven times more to find new customers than to retain present customers. Even if future sales are not generated, these customers can be an invaluable source of referrals and word-of-mouth advertising.

Bob Galvin, Motorola's retired chairman, would visit each of his top-ten customers, spending a whole day not with his counterpart CEOs, but with the troops that were the real users of Motorola products. One of the key points they stressed was that Motorola was good at telling customers what they needed, but poor at listening to what they wanted. As a result, each Motorola executive is now required to meet regularly with ten of his top customers-an invaluable source of customer input. (Bhote, 2003)

A survey looked into why customers don't go back to the same dealer that they bought their last car from. The survey revealed that: one percent had died; 3 percent had moved to another town; 5 percent shifted because of price; 9 percent bought another car brand; 14 percent switched because of poor service. What happened to the remaining 68 percent? They switched because "the dealer didn't give a damn after the sale!"

9 ASSESSMENT OF CUSTOMER "WOW!"

The traditional approach means: "In assessing what the customer wants, it is not the *voice of the customer* that is heard, but the *voice of the engineer* who thinks he knows more about the customer's needs than the customer."

The Ultimate Six Sigma Discipline means: "Two disciplines are used to capture the *voice of the customer* - mass customization and quality function deployment."

Briefly, mass customization recognizes that each customer is unique and has highly individualized requirements. Each customer today wants exactly what he wants, where he wants it, when he wants it, at the price he wants. It turns topsy-turvy Henry

Ford's famous choice of "any color you want as long as it is black!"

Quality function deployment (QFD) is more suited when there are a large number of core customers with common requirements. The specific discipline is the House of Quality, where customer attributes and competitor perceptions are translated into engineering specifications. If done correctly, QFD can perform a new design in half the time, at half the cost, with half the defects and half the manpower required in older designs. After ten years, however, the bloom is off the QFD rose because of the lower and lower commonality of customers and their higher and higher individualization.

Concentration on All Elements of Customer "Wow" Traditional approaches focus on performance and/or quality as customer priorities. However, there are twenty characteristics of a product or service that are of interest to customers. For products, Figure 4 depicts a network of elements that combine to create "wow" in the customer's mind. Two factors are most important to customer "wow." First, the design should introduce features unanticipated by the customer, but whose creation results in a rush of customer delight. The second states: "It is that element missing from a product or service which is important to a customer that a company must pursue with laser like precision and intensity." With the constant desire for quantification and a scoring system, on the one hand, and a complex array of parameters to assess performance on the other, how can a single numeric score say, from 1 to 100 points, be assigned to subjective evaluations of companies by core customers, or of company leadership by its employees, or of internal suppliers by internal customers within a company?

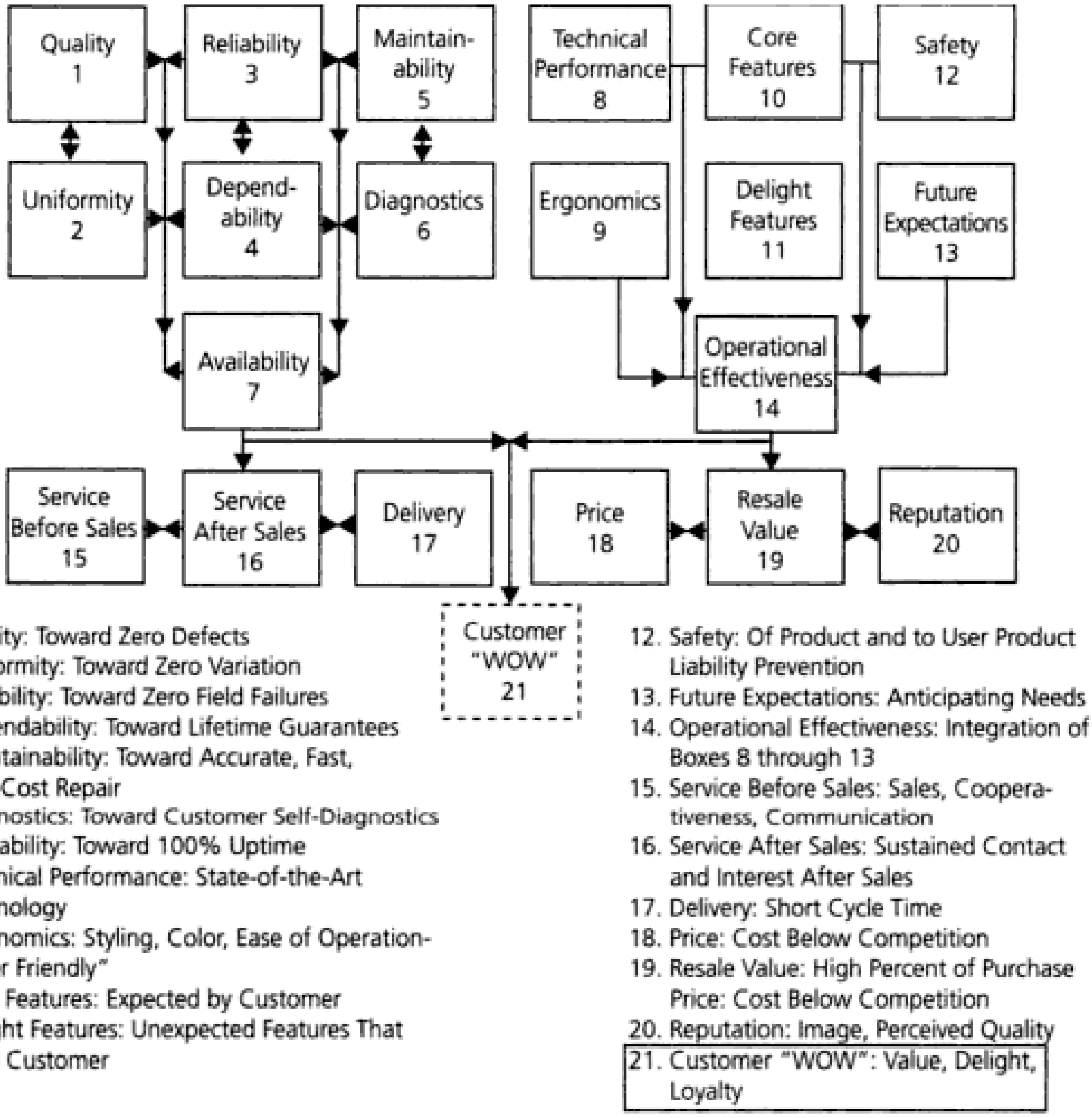

Fig. 4 A network of elements of customer "wow" for products

Source: (Bhote, 2003)

The same principles and type of index can be used for any subjective evaluation, such as leadership and for the service industry, support services in the manufacturing industry, and internal customer/supplier links. The elegance of the company effectiveness index is the remarkable way in which it simultaneously analyzes:

– The relative importance customers attach to their priority requirements

– The strength and weakness of the company for each requirement as determined by the customer
– The strength and weakness of the company for each requirement vs best competitor, again as determined by the customer

10 ESTABLISHMENT OF THE COMPANY INFRASTRUCTURE FOR CUSTOMER LOYALTY

Traditional Approach. Since most companies are not even aware that customer loyalty is such a prolific profit generator, they have no organizational structure to address it. In fact, a survey conducted by the CMS Consultancy Group on customer retention revealed these shocking findings:

– Sixty-one percent of companies surveyed felt that customer defections would have an insignificant impact on sales.
– Over 33 percent made no attempt to identify defecting customers.
– Twenty-five percent did not ask defecting customers their reasons for leaving.
– Thirty-three percent took no action on defecting customers.

The Ultimate Six Sigma Discipline. In order to sustain a customer loyalty culture, it is necessary to build a viable company infrastructure: This requires four disciplines meaningful metrics, a top-level steering committee, a chief customer officer, and a customer defection management SWAT team.

Metrics are the essential starting point to establish a customer loyalty baseline. Among the most important are:

– Reduction of total customer base (with retention of primarily platinum and gold customers)
– Defection rate (i.e., defecting customers as a percent of the total number of customers)
– Amount and continuity of core customers (e.g., by number, by dollars, by time)
– Repeat purchases by core customers
– Referrals by core customers
– Correlation of customer retention and profitability

There is no business purpose more important than customers and no parameter more profitable than customer loyalty. This makes a top management steering committee essential. It should consist of the CEO as chairman and his direct reports as members. The steering committee's tasks include:

– Establishing targets for minimum retention rates and longevity of core customers
– Appointing a customer czar and a customer defection SWAT team
– Reviewing progress against targets
– Tying senior management incentives to increasing retention rates
– Promoting synergy between the customer, employees, and the supply chain

11 TO UNDERSTAND (AND ACT ON) KEY DRIVERS OF LOYALTY-RESEARCH CONCLUSION

Understanding that customer loyalty is important (and organizing staff around this objective) is the first step; knowing what to do to build and maintain it is the critical second step.

A number of factors, including product attributes, customer relations and financial issues, affect customer loyalty. Which of these drivers of repurchase are most important to customers? Where should OEMs focus their efforts to improve customer loyalty and stop defection to the competition?In 2009, I made an analysis to determine how customer perception with a number of product-related, customer relations and monetary factors shown in Figure 5 affects repurchase intent, a proxy for loyalty. I looked at which factors were most important in driving loyalty for automotive consumers overall, as well as for two sub-groups: luxury vs. non-luxury vehicle owners and vehicle owners by brand origin (Asian, USA and European).

To quantify the impact of each factor on customer loyalty, I looked at how an increase of 5 percent in favorable customer perception of a specific factor, e.g., fuel economy, would positively affect repurchase intent. The findings of this study provide strategic input for sales, marketing and communication strategies geared toward creating and maintaining loyalty based on what is most important to specific customer groups. Product Quality, Fuel Economy and the Customer Experience Are Consumer "Hot Buttons". My analysis showed that the number one driver of consumer repurchase is perception of product quality. A 5 percent improvement in customer perception of the vehicle's quality would result in a 1 percentage point increase in repurchase intent, the highest of any measured loyalty driver.

Product-Related	Customer Relations	Financial
• Product Quality • Quality of Workmanship • Fuel Economy • Safety • Comfort & Convenience • Performance • Ride & Handling	• Sales Process • Communications • Maintenance Service at Dealership (where applicable)	• Purchase Price • Availability of Incentives • Finance Options • Monthly Payment (where applicable) • Cost of Ownership (not including monthly payment)

Fig. 5 Factors affecting loyalty *Source:* (Zetu & Miller, 2010)

Consumers' perception of fuel economy is almost as important as how they feel about product quality in terms of driving repurchase. These findings show that messages about product quality and fuel economy should be part of communication to existing vehicle owners before they are in market to buy their next car or truck. An increasing number of product messages have centered on fuel economy and efficiency, so our recent findings likely reflect the heightened awareness, and arguably "trained behavior", of new vehicle shoppers to evaluate this attribute. Loyalty is not influenced by communication and marketing alone. The customer experience is also a key driver. Improving the customer experience – beginning with the sales process and continuing throughout the customer relationship – will go a long way toward building loyalty. Monetary factors are less important to customer loyalty than many other attributes, indicating that focus on cost savings and deals is not going to lead to higher loyalty of existing customers. Figure 5 shows the relative impact of all measured drivers on repurchase intent, a proxy for loyalty. Manufacturers that sell both luxury and non-luxury vehicles need to understand the differences in what's important to each group of customers. Taking a loyalty strategy that works with non-luxury owners will probably not work with luxury owners based on the results of our analysis. For instance, a company like Toyota may not be able to rely on a "one size fits all" approach and transfer knowledge about what drives loyalty to the Lexus brand to the mainstream Toyota brand.

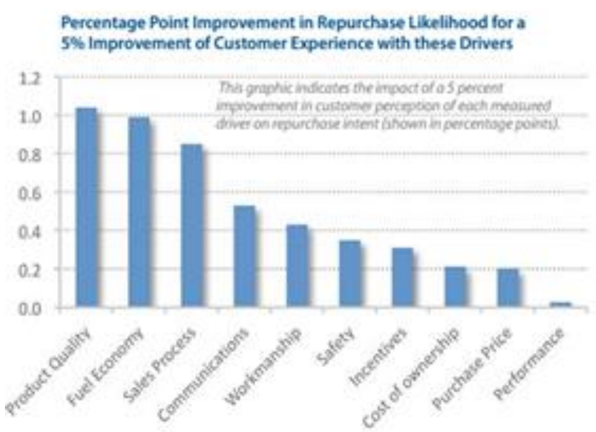

Fig. 6 Impact of measured loyalty drivers
Source: (Zetu & Miller, 2010)

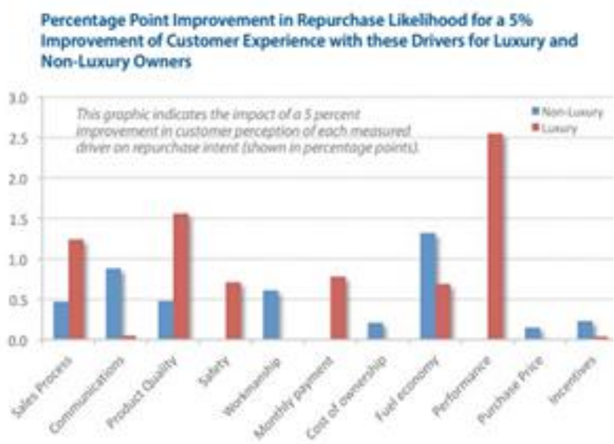

Fig. 7 Key drivers of loyalty for luxury and non-luxury vehicle owners
Source: (Zetu & Miller, 2010)

Luxury owners care most about the performance of their vehicles, which makes sense since several luxury vehicles tend to sell based on promises of performance (e.g., for over 30 years, BMW used “The Ultimate Driving Machine” as its core tagline). A 5 percent increase in favorable customer perception of vehicle performance would cause repurchase intent to go up by 2.55 percentage points. Perception of product quality is another key driver of loyalty for luxury vehicle owners, who expect high quality for their investment in a higher-end car or truck. These findings show that communication to existing luxury vehicle owners (and to non-luxury owners who might be ready to move up to a luxury vehicle) should include messages about performance and product quality.

Auto manufacturers and dealerships should pay special attention to the sales process for owners of luxury vehicles as it is a significant driver of repurchase. Given the relatively higher price-points commanded by premium or luxury brands, these brands need to cater to their unique set of buyers with customer service that’s far above average.

Luxury owners have the highest level of loyalty among vehicle segments, regardless of model, brand or corporation. While the average owner loyalty for any given vehicle segment is 37 to 38 percent, 47 percent of returning luxury owners stay with the luxury vehicle segment. In one way, they demonstrate an “I’ve made it and I’m not moving down” attitude.

In the current competitive market, sometimes building loyalty of existing owners isn’t enough. A concurrent area of focus is conquesting. This analysis provides some insights that illustrate how the factors that contribute to repurchase vary by consumer group as defined by the brand origin of their vehicle: USA, Asian and European. Therefore, USA OEMs wanting to conquest current owners of Asian brands, for example, would be wise to understand what is most important to this consumer segment so that they can target them appropriately.

Current owners of Asian brands: As compared to owners of USA and European brands, owners of Asian brands are much more concerned with fuel economy. Therefore, non-Asian OEMs wanting to win over these customers should emphasize this attribute. Interestingly, other factors linked to value are not that important to drivers of Asian brands. Incentives and the monthly payment are two drivers with negligible impact on loyalty.

Additionally, for owners of Asian brands, the customer relationship is of critical importance, as evidenced by the importance that vehicle owners place on both the sales process and ongoing communications. Fuel economy and product quality are the primary driver of loyalty for owners of USA brands. Another product-related quality with a high impact on loyalty is workmanship.

Incentives are a primary driver of repurchase intent, something not seen with either owners of Asian or European brands. Owners of USA brands may have become conditioned to generous incentives because they have been so commonly used by the American manufacturers. One implication is that other brands hoping to conquest current owners of USA brands will need to emphasize pricing and value in order to make these buyers feel they are receiving a great deal.

How managers can dramatically improve their business process and improve to customer loyalty and increase retention using Six Sigma and The Toyota system: eliminating wasted time and process, building quality into workplace systems, finding low-cost but reliable alternatives to expensive new technology and perfecting business processes, all in purpose increasing customer loyalty, customer retention and satisfaction.

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RESEARCH VECTORS IN GENDER COMPONENT OF CORRUPTION

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Abstract

Research of problems of corruption in the modern world is made from different perspectives, such as sociological, economic, legal, psychological, and others. However, the study of the corruption phenomenon requires a comprehensive and multidisciplinary approach. Opportunity to construct gender examination of corruption represents an interest for the Russian sociological community. In particular, answers to questions regarding correlation of corruption and gender based on the fact that in recent years Russia had major corruption scandals associated with women (for example, Evgenya Vasilyeva, Elena Skrynnik, and others). Adopted in gender studies, "gender pyramid" describes the structure of government in society and defines approach, which operates such regularity as "the higher and more powerful position, the fewer women in such positions." There is a possibility that mentioned "gender pyramid" could be transformed into a "gender-corruption pyramid". However, number of current research on anti-corruption issues indicates that the more tolerant the society is to gender, the less it is prone to corruption. When investigating gender dimension of corruption in the modern world, it is necessary to distinguish three main accents, which are revealed in the article: correlation of corruption and gender peculiarity of the society in general, peculiarities of "female" corruption based on the structure of "gender pyramid", and "family" corruption. These problems arise from the analysis of information on incomes provided to government employees. The main vectors of gender study of corruption are presented in the article, the research of which will devise additional mechanisms to resist this deviation.

Keywords: *research vectors, gender, management, corruption*

1 INTRODUCTION

The corruption problem in the modern world is investigated from various positions – sociological, economic, legal, psychological, etc. However, studying of a phenomenon of corruption demands integrated, interdisciplinary approach.

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The opportunity making a gender analysis of corruption is of interest; to answer a question: whether there is a correlation of corruption and a sex? Whether it is a contingency that in recent years in Russia large corruption scandals are connected with names of women (Evgenia Vasilyeva, Elena Skrynnik, etc.).

Historically it is developed so, that corruption is directly connected with the state, level of its political and economic development. The patriarchal (masculine) society, always nominated men to key roles in a society and the existing exceptions in the history only confirmed the rules. Accepted in the gender researches "gender pyramid", characterizing the structure of management in a society and defining that approach at which, so the position is higher and "more powerful", as there are less women at such positions, can also become "a gender - corruption pyramid". Anyway, in the masculine-oriented society and the state.

At the same time a number of modern researches on questions of counteraction of corruption specifies that the gender society is more tolerant and the level of its development is higher, therein is less corruption. For example, the researchers analyze the minimization of corruption manifestations in the Scandinavian countries, where about a half of the leading political posts are held by women. That is, the more women in power, the less is the corruption.

2 GENDER COMPONENT OF CORRUPTION

Investigating a gender component of corruption in the modern world, it is necessary to mark out the following features:

- correlation of corruption and gender relations of society in general;
- examining the peculiarities of "female" corruption taking into account the structure of "a gender pyramid". So, in the conditions of the Russian reality there are certain positions of authority structures which are traditionally held by women. These positions include executive managers and employees of financial, economic, property sections, personnel departments and some other subdivisions. Corruption in these positions has their own specifics, which are very different from the "male" corruption. Corruption in these positions has their own specifics, which are very different from the "male" corruption.
- "Family" corruption. This problem arises from the analysis of information on incomes provided to government employees. Opening own business for state employees is prohibited by the law so male state employees formalize the necessary documentation on their wives. Currently, no interdiction of these actions is formulated. De facto, there is a merging of state employee and business; de jure, there is a legal procedure. Recently, there is a necessity to formulate effective methods to terminate such actions when by the fact spouses are not involved in the businesses that are registered on them, but these businesses managed by state employees.

Thereby, the main vectors of gender study of corruption are presented; the research of the question will help to develop additional mechanisms for counteraction of this deviation.

For formation the methods of counteraction of "female" corruption it is necessary to analyze the following features: at what positions of the women are mostly subjected to corruption-factors, what types of women are inclined to corruption manifestations.

In modern gender studies are widely put the problem of gender construction company behavior in society in general and in individual areas, including in the field of power relations.

As a rule, publications raises the question of the role of gender in a ratio of private and public, reflecting the distribution of power, prestige and property through the political, cultural, and economic institutions. (Repina, 2000)

Thus researchers mark out that traditional society can't be described in terms of opposition of public and private spheres. This division arises only in the course of society entering into a modern style of life and carries bright gender differences. Women were forced out in the private sphere, and the public field of action became the sphere of men. The women were expelled from the public sphere as the main historical arena of the modern society. However, it is women who have begun infrastructural revolution that is far from complete. (Kozlova, 1999)

On the other hand, at present, a number of studies on the issue of gender in the economy (as part of the public sphere) appeared. It is noted that the latent asymmetry of masculine and feminine is the basis of economic knowledge: public (market, state) opposed to private (family), men's activities (science, business) – women's (services, care and education), rationality, objectivity and autonomy - emotionality, subjectivity, dependence. (Repina, 2000) Therefore, under the problematization of "economic approach" raises the question: can the "Femina economicus" as a woman, overcomes the binary (male and female) the structure of modern society, transforming society toward a new environmental (and economic) thinking.

Overall, researchers note that the problem of a serious attitude towards women's participation in governance at all levels is undoubtedly overdue. It is indicated that it is hardly appropriate to extrapolate, on the one hand, the general theoretical concepts of social control on the specific characteristics of women's management style, and the other - a female leadership style - on all activities at all. (Zhurzhenko, 1999, str. 175)

Proceeding from the above we note that modern processes of integration of women to the public sphere (to the sphere of economy and policy) raise on the agenda a question of identification the sociological sense of the category "female manager", classification of sociological types of women – managers and, respectively the characteristic of each of them. It is possible, being guided by a structurally functional method.

First of all, it is necessary to specify the definition of the concept "business woman". In spite of the fact that this concept is widely used in gender researches, it unambiguously isn't defined. As a rule, sociologists use descriptive characteristics: "women in the management sphere (policy, business, management)", "the women focused on professional career", "career women", etc.

So, G. V. Turetskaya gives a general characteristic of a phenomenon of the business woman, specifying, as the necessary features, the following qualities: high economic motivation, implementation of economic leadership in a family, personal propensity for entrepreneurship, orientation to the activity, existence of a role overload, personal tendency to business activity, a high realization in business sphere, egalitarian sex-role installations. (Turetskaya, 2000)

V.I. Kurbatov (1995, p. 544), highlights, among other types of women type of business woman, as the most striking sign of emancipation, as a woman, firm place in the world of business relationships that boldly takes decisions, risks, successfully competing with men. And the argument about the role of a business woman V.I. Kurbatov, like most authors studying similar problems, begins with the problem of the value of a business career woman. Such approach is caused by the fact that initially the researchers singled out common types of women, characterized by, on the one hand, historically specific place and role of women in a given society, on the other hand, the corresponding behavior.

The western sociologists allocate three main models of female behavior: orientation to the house (traditional), on professional career, on sex ("play-girl"). We have the same types and in Russia, though of course with some differences. (Repina, 2000) E. Zdravomyslova and A. Temkina in the article "Transformation of Gender Nationality in Modern Russia" (2003) point to the following non-traditional projects (models) of female nationality: the working mother, the housewife and sexual feminity. Equal-sign between category of the women focused on career (and furthermore the model of "the working mother") and the category "business woman", certainly, can't be put. (Anon, 2003, p. 33) The concept of "business woman" more narrowly associated with a specific behavior of women, career-oriented and have achieved certain results in the implementation of their professional activities to take decisions managerial level. (Mitina, 1999) This category of women is to be analyzed in terms of the exposure of corruption factors.

It is represented that from category of the women focused on career it is possible to allocate the generalizing type of "business women", it is a type of the women who are carrying out the activity in this or that sphere of the public relations at the level of adoption of "imperious" decisions (that is at a higher level than the level of the profession). Activities of women allocated to this type associated with managing people, resources, processes, etc. Therefore, these women are most likely able to get into corrupt relations.

The closest to the semantic meaning of the categories in relation to the concept of "business woman" - "authoritative woman", "woman – leader", "business lady". (Babayevo & Chirikova, 1996) Each of these concepts, despite the fact that they are often used as synonyms, has certain semantic nuances and thus reflects the specificity of a group of women managers defined by each of them.

Along with this, it should be noted that the analysis of the activities of "business women" researchers also used the following characteristics: "elite women's business", "women - leaders." (Sillaste G. G., 1994, p. 20) These concepts are used in the work undertaken within the framework of the methodology of the theory of elites.

The Russian researchers on issues of common gender relations attempted to classify "business women", although there is no special literature on this subject.

One of the first G. Sillaste on the basis of the secondary analysis of the results of the All-Russian public opinion polls - public opinion monitoring, conduction of poles were in 1995-1997, described the social structure of the female population of Russia. Along with other status groups of women, she identified the following groups of women-related business areas (Sillaste G. , 1998):

1. A group of owners of enterprises and firms, usually professionally engaged in business: women are represented in this group poorly.
2. Small entrepreneurs. About 25% of them - women. This is in most cases (four fifths) proprietors" of own business. "Their social status is significantly lower than women's - big entrepreneurs. Half of the group is engaged in trade, the financial sector and only 20% - in industry. Up to 20% of women engaged in small business have to combine it with the administrative work for hire. This combination is explained by objective reasons.
3. Semi-businessmen. Among them women make about 40%. These are generally young women aged till 30 years. The group which is most benefited from liberalization of economy.
4. Production Managers (managers). The ratio of women and men in the group: 40 to 60. They are employed. Every second member of the group has a high level of welfare.
5. Administrators in social sphere. This is the most feminized socio-professional group: female to male ratio is 5 to 1 in favor of women. In a group there are the heads of science institutions, culture, education, medicine, middle managers. 80% of women-leaders are the chairwomen of public institutions, 12% - privatized, 6% - private organizations. The welfare of the group is low: two-thirds of its members undergo financial difficulties.

Women from this (fifth) group as show statistical data, and also the carried-out analysis of the criminal cases about corruption crimes for the last 20 years investigated by bodies of prosecutor's office (till 2007) and Investigative committee of the Russian Federation (since 2007) most often commit the crimes connected with taking of bribes, excess and abuse of power, misappropriation of property, etc.

It seems that the problem of typology "business women" can be partially removed in the methodology of analysis of social stratification, which was developed by Max Weber. (Gaydenko & Davydov, 2001, p. 267) According to Weber, the differences in the possession of the property and the level of material well-being generate economic classes; differences related to power - political parties finally prestigious distinction given status groups or strata. (Repina, 2000) Looking from this perspective, the problem of determining the overall social status of an individual or a social group, E. Mezentceva analyzing the socio-economic status of women in modern Russia, said that it (status) will be composed of three independent evaluations: economic status, power status and evaluation of social prestige. (Kozlova, 1999)

Using as a basis the classification of types of "business women" criteria (independent evaluation) proposed by E. Mezentseva (1998), in our view, we can distinguish the following types of women (Table 1).

Table 1 Sociological types of "business women"

Criterion	Specific type									
	Woman - politician			Woman - businessman			Woman - manager			
Scope of activities (evaluation of social prestige)	Woman member of the Party	Woman member of the parliament	Woman leader in the executive branch	Small business	Medium business	Large business	State organizations	Banking	Science, education	Other areas of activity
Level of management (assessment of the authority status)	Woman- senior manager									
	Woman - middle management									
	Woman - supervisors									
Level of income (assessment of the economic status)	Women - managers with higher income									
	Women - managers of middle-income									
	Women - managers of low-income									

Thus, it appears that, depending on the scope, you can define the following types of "business women".

Women - politicians – the women who are carrying out administrative activity in the political sphere, holding the senior positions in legislative and executive bodies of the government conducting the positions in political parties influencing policy of the state in general, policy of regions, policy of local governments (female deputies, female ministers, female political leaders).

Women - businessmen. These are the women occupied in the sphere of business and having their own business. This type of women not monolithic and considerably varies depending on the amount of business (business) in which the woman – the businessman is occupied. Today, women entrepreneurs in Russia among all employed only about 0.6%. And that is in the areas of production, which are inefficient and low profit.

In Russia, for the last 5-7 years there has been a transformation of sex-role stereotypes, however, and today women's entrepreneurship is perceived as something forced and does not require support and development. Noted difficulties favor to that in business there are those women who are capable to work and win difficult conditions of the Russian reality. Gradually, in Russian formed special layer of women entrepreneurial elite, daily breaking stereotypes of mass consciousness.

Women - managers, characterized by the following category - female managers in the "true" sense of the word, women in managerial positions in various levels of government and non-government organizations. From the category of women - entrepreneurs, this type is characterized by the fact that women - managers are employed, as opposed to women - entrepreneurs who have their own business. As a rule, women - managers are predominantly belonged to lower and middle levels of management. This is because the professional careers of women develop discretely: to give birth to children and to bring them up it is necessary to take a break of several years, and sometimes more than once. Very rarely, women managers are found on the boards and the boards of directors in the large companies, banks and other commercial organizations.

It should also be noted that in all spheres of activity, depending on the level of management, it is necessary to differ women of senior, middle and lower levels. A distinction is made according to the amount the exercise of power, the number of employees, the level of the position in the hierarchy of an organization.

And finally, you can select the types of women managers, depending on the level of income: women managers with high, middle and low income.

3 CONCLUSIONS

In current changing of Russian society there are different types of women managers, "business" women. In general, it should be noted that women in the society are subjected to the same negative social factors, as well as men. The same conclusion applies to the gender dimension of corruption. However, as in the world, and in Russia there are much less women in power structures that control people, resources, and processes, than men. Therefore, it is significantly less women subjected to corruption. And women politicians, women top managers with the high level of the income, top managers are, as a rule, not subjected to corruption factors (it is caused by their "publicity", the high income, psychological factors, etc.), at the same time the most often corruption offenses among women are made by female heads (managers) of an average link in traditionally "female" field of activity – education, health care, social and financial services. Such specific variant of corruption is typical for women.

Anti-corruption policy should become a permanent part of the state policy in the formation of civil society, the fight for transparency in the management sphere. The study of gender component will allow developing the additional mechanisms for corruption counteraction.

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SMART TECHNOLOGIES FOR E-SURVEILLANCE IN FIGHT AGAINST FRAUD AND CRIME

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ABSTRACT

The paper deals with application of the above smart technologies in the area of e-Surveillance and in this respect as a result of the so far achieved in our ongoing research under the European Union funded project EU/7FP/Sec./SMART. The more information on this and other of our related EU funded projects viz. CONSENT and RESPECT can be found at our web: http://erdc.fm.uniba.sk.The main so far achieved results from our above ongoing research are the following ones. It has been evident that application of the latest smart ICT in e-surveillance has had a very positive impact on achieving more secure and safe environment not only in the so-called cyberspace but also in many application areas of these ICT. The first such area of a very positive impact has been achieved in the area of the contemporary system of the border controls of the d Schengen external borders of the EU that have been protected by the several mutually linked and integrated systems of e-surveillance viz. CCTV cameras, automated border checks, automated targeting systems, biometric matching systems, etc. Very similar systems have been used for the protection of the external borders also in case of all airports in combination with general security controls. The other most widely utilized application areas of these smart ICT have been various areas of public life, various cultural and other social events in the forms of so-called crowd controlling, the same also regarding phone and Internet communications, financial transactions, etc.

Keywords: *fraud, crime, surveillance*

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1. INTRODUCTION

It is already an integral part of our daily life that practically all of our activities have been under the permanent 24 hrs. surveillance. It is just enough if one has been using any of the current achievements in the consumer electronics and using its most common applications like e.g. a mobile phone, various banking debit or credit cards, Internet, social networks, GPS system for orientation while driving a car, visiting any of the public places, sport or cultural or any other public events, but even such electronic systems like electronic security systems in peoples‘ homes, etc. and the whole life has been under the permanent all the day 24 hrs. uninterrupted surveillance.

In many practical situations it brings to people a lot of potential benefits but on the other hand there is also a growing number of various cases of misuses of such data collected about us by those all various types of e-monitoring, surveillance and recording systems. In the next parts of this paper we will try at least very briefly state and analyze some of the most typical positive but also negative aspects of such permanent monitoring and surveillance system.

2. THE TWO OF THE MOST WIDELY USED APPLICATION AREAS OF SMART E-SURVEILLANCE

Unfortunately the limited scope and size of this paper does not allow us to deal with all the potential benefits of application of the smart ITC e-surveillance systems and their utilization hence we focus further at least on two of the most widely and important ones as follows:

The e-surveillance on the external borders of the EU

The surveillance by the CCTV cameras and by some related e-surveillance smart technologies

2.1 E-surveillance on the external borders of the EU in fight against international fraud and crime

It is quite clear that in spite of some evident negative aspects of application of the latest e-surveillance systems there are existing many positives in this respect. In the following parts of this chapter we will try to present some of the most evident benefits achieved in the application of the smart e-surveillance applications that have become an integral part of our daily life. In this respect according to our ongoing research under the particular EU funded SMART Project the e-surveillance of the so-called Schengen border system has consisted of the following main features. (Soltes & at al, April 2013)

The entire Schengen external border of the EU has been protected by an integrated system that consists of several subsystems that are to the large extent relying also on the application of the smart ICT technologies:

- ABC - Automated Border Checks that have been applied on all border crossing of the Schengen border system. The most important advantage of the entire system in this respect has been that the results of all these checking have been becoming a part of the Schengen information system (SIS) so any violations of the particular rules and regulations in this respect have automatically become a part of the entire system so there is not left any space for any calculations and/or speculations to use some other entry point to the EU through the checking points in other EU member state and its border control as this integrated SIS has been linking all border controls and checking points of the Schengen border what altogether makes the entire system more consistent and reliable
- ATS The second integral part on the external border protection of the EU has been an Automated Targeting System that is serving as an automatic tool for all persons who are passing through the particular checking points. On the basis of the particular personal data collected from the passport as well as from other related sources like e.g. from the recordings of the previous visits it is possible to create a relatively complex and comprehensive „picture“ and/or description of every person and thus to categorize or „profiling“ that person. On the basis of that such a person in some cases could be placed into some of the risk categories like e.g. potential terrorists, smugglers, etc. For example due to the relatively big difference in the price but also salaries levels between the Slovak republic and Ukraine that are sharing the common Schengen border they are creating among others also a very attractive and profitable smuggling business especially regarding car fuels, alcoholic beverages, cigarettes, etc. Hence thanks to this system it is very easy now to identify, record and then taking any actions against those „travelers“ who are able to cross the border even several times during one day as regarding the visa

regimes there is existing a non-symmetric system i.e. the Slovak citizens do not need visas for entering Ukraine while in opposite the citizens of Ukraine need so-called Schengen visas. Thus it used to be quite a wide spread business for Slovak „tourists“ to cross even several times a day the border in order to import those commodities and goods we have mentioned above and of course also many more of them. But with introduction and implementation of the Schengen border control system it meant also the end of these kind of widely used “tourism” between both countries. After several border crossings the system has been automatically reporting that this or other person has been too active in the border crossings irrespective if they were conducted only through the Slovak – Ukrainian border or some of them tried to minimize their border crossing in such a way they have been trying to cross the border to Ukraine via neighboring Poland or Hungary

- AVT – Automated Vehicle Tracking is another smart technology being applied on the Schengen border controls. It substance is based on the utilization of a small electronic unit – chip that has been stowed discretely somewhere in the bowels of a vehicle. Then through the GPS satellites it is possible to monitor a movement of such vehicle even in case if that vehicle has managed to cross the border without any evident suspicious activities and/or features. The advantage of this smart system has been that the system is not directly limited just by the area of the border control points but it is possible to trace such a vehicle also in the wider and more distant areas and/or territories from the border area. In this respect it has already been possible to detect and take action against such e.g. smuggling activities where the vehicle has crossed border checks without any problems but then being further from the border it has been recorded that the vehicle has been doing some suspicious movements and/or direction in their further moving in the inland of the country being quite far from the particular border controls, etc. This system is quite efficiently applied against such vehicles that have been involved not directly in smuggling only but also in other criminal activities like e.g. in the case of bogus exports that are used for avoiding the tax duties regarding VAT, etc. It has been quite a common practice that the goods have been declared like destined for an export and then after crossing the border the same vehicle has returned back but with the same merchandise that was as being „exported“ so in such a case having possibility for the return of the VAT as well as to sell the particular merchandise again back in the home country, etc.

- ANPR – Automated Number Plate Reader that is not yet widely applied on the Schengen border checking points e.g. in the case of the Slovak republic but in the very near future it is supposed to be implemented there as well. The main advantage is that in difference to the above AVT that requires some kind of special, secret and confidential activities linked to the placement of the particular chips on the vehicle this system is automatically recording the id number of every vehicle crossing the border checking points. And again as in the case of the above ABC or ATS systems it is possible also in this case to achieve the same targeting of the vehicle as in previous cases it was with the persons crossing the bored too frequently or with some suspicious activities like again smuggling some goods or commodities, etc.

- UGS – Unattended ground sensors has been also applied on the external borders within the Schengen border. It is other smart ICT based technology that is helping in the border areas especially in the harsh mountain terrain and for access or movements by vehicles the difficult border areas and thus being too difficult for any other possible border control systems. The UGS has been based on the combination of various sensor modalities like e.g. seismic, acoustic, magnetic, pyro-electric, transducers, daylight imagers and/or passive infrared imagers that are enabling to detect and record any presence or movements of persons, vehicles or other moving objects in the particular area of surveillance. In case that such objects and/or movements have been detected in the particular area, then the particular activities have been reported via RFID or satellite communications to remote

PED – Processing, Exploitation and Dissemination stations and the necessary actions then are taken by suitable means and ways e.g. by helicopters directly on the spot and in the real time exactly in the place and location where such an unauthorized activity has taken place and/or was carried out.

- CCTV – Of course as anywhere also in the border controls are widely used CCTV cameras as one of the most efficient and also not so expensive smart ICT based technologies. The problem is like in all application areas for the CCTV i.e. that particular system is meeting some of its most desired objectives such as:
  - The cameras have to enable not only to capture the particular object or person but also to enable the necessary recognition either face or number plate and/or any other relevant features of the particular recorded object
  - The camera has to be properly focused or be able to follow the particular object of surveillance
  - The camera has to have a proper angle of surveillance and monitoring i.e. it has to be properly installed in order not to be obscured by some other objects or not being too low and/or too high focused
  - One of the most important aspects for efficiency of CCTV cameras is that the entire automated system is properly and manned and operated by an experienced staff that is trained properly in order be able to immediately utilize and take action on the bases of the recorded images in the real time and not only ex post e.g. sometime after the particular images have been recorded when already the momentum of an active and immediate action has already been substantially lower than if it is carried out on the spot in the real time of the particular action, movement themselves.

In addition to this most common and also practically applied ICT based smart e-surveillance technologies there has already been existing a relatively long list of this kind of smart e-surveillance systems but that have not yet been applied on the external borders of the Schengen border system we have been researching and analyzing like e.g.:

- BMS – a computerized Bio Metric System using the comparison of the particular biometric data from the passport, ID cards etc. with those collected on the spot from the particular person and also with those stored already in the particular data base
- AFR - again a computerized Automated facial recognition that is able to identify a person on the bases of her/his face and its comparison with its digital image again in a passport, ID card and/or data base from the previous border crossings and controls
- AVR – a Computerized Automated Voice Recognition that is able to make voice recognition through voice as recorded by microphones or other simile equipment e.g. mobile phones that are considered as being able to recording voice and/or any other simile signals even in case if the mobile phone has been switched off chat is sometimes quite important and beneficial in the border or customs controls areas
- AXRS – Automated X-ray Scanners i.e. devices that are able automatically detect any illicit substances if being imide the body. This e-surveillance technology has been already experimentally tested at some airports but has been received by a generally widely negative reactions from x-rayed people as t is too invasive and of course also represents also some health risks. But it looks like that sooner or later it will become one of the e-surveillance systems especially at airports
- RDD – a Radio Detection Device that is able to detect automatically a presence of any radioactive substances that are from time to time also a part of the smuggling activities at border crossings, etc.
- GDD – is a simile device like RDD just the object of detection has been gunshot that could be automatically detected on the base of sound sensors
- Thermo-Camera – it is an automated camera that is able to identify any human or other objects that are emitting any temperature

higher than of the environment. Thanks to its functions i tis one of the very promising e-surveillance device that especially at the borders could find a very wide and efficient application

– AMPT - Automated Mobile Phone Tracing is one of the most promising e-surveillance systems as more and more people have been using this modern communication obsession". It has been based on the same basis as the mobile phones have been functioning i.e. using radio signals via GPS and thus enabling not only the particular communication but also localization where from the particular mobile phone has been locate.

In conclusion to this part on e-surveillance technologies being already applied at the border controlling or will be sooner or later applied we could state that all these latest automated e-surveillance system cannot protect borders absolutely perfectly. They all are contributing very positively to border protection and security but there is a certain paradox existing not only in case of the EU Schengen border but also in case of other otherwise very much protected borders like between Mexico and the USA, between Palestine territories and Israel, etc. While this e-surveillance is really protecting the particular borders very efficiently, there are always ways and means that are almost negating these benefits. For example in case of the Schengen border i tis really difficult to become a part of that area mainly due to the problems of all these required aspects of border controls and protection like e.g. it is still in case of Romania or Bulgaria whose applications to join Schengen has been already several times rejected on the grounds that they are not yet ready to protect that border as required although the numbers of illegal entrants are relatively very low e.g.in comparison with the Schengen area on the southern borders of the EU i.e. its Mediterranean shores that have been the main entrance for boat people illegally entering the Schengen area in the so-called PIGS states i.e. Portugal, Italy, Greece and Spain but also Malta and Cyprus thus making of the particular Schengen border nothing more than "Emmental cheese" i.e. cheese being famous for its big and many holes! And in order not to blame only this southern border, many „holes" in the Schengen borders are various underground tunnels that are then and again discovered anywhere where there is existing any possible extra profits being large than potential risks, etc.

In view of this we could conclude this part by stating that even the most sophisticated e-surveillance systems cannot be efficient if they are not supported also the whole range of legal, political, organizational, staffing and other supporting measures and activities.

2.2 Smart e-surveillance by the CCTV cameras and some other related e-surveillance smart technologies in fight against fraud and crime

The second selected application area of ICT based e-surveillance systems but also one of the most controversial once has been the application and probably the most widely applied one i.e. the CCTV cameras systems that have already been almost permanently monitoring not only the public spaces but also private ones. In the following part of this paper we are at least briefly characterizing at some of the most typical features of these e-surveillance smart systems:

Our survey and research in general in this respect as carried out under the EU/7FP/SMART (Soltes & at al, March 2013) and RESPECT projects has clearly demonstrated that the video camera surveillance has become an integral part of our daily lives practically in all its parts. It could be stated in this connection that practically for the whole 24 hour long day period, people have been monitored and recorded by the various kinds of surveillance CCTV cameras systems:

– in their houses and their residences during the nights as well as in connection with their leaving and/or arriving from/to their houses, etc. It is just enough to have installed any kind of security system linked directly to some security service and it is then immediately clear when one is switching on or off that security system including its cameras and thus also indirectly reporting when one is home or leaving or arriving, etc.

– then, during their transport, they have been monitored by the camera system currently practically being installed in all means of the public transport, on stations, platforms, etc. Even of course also utilization of own cars has not been totally free from all various kinds of camera or various other e-surveillance systems either on almost every road/street crossings, highways, parking lots, petrol stations, rest places, etc. and of course not to mention if drivers have been using the GPS or any other such devices including hands-free mobile phone, etc. All of them have been monitoring and recording any movements of any car, etc.

– in connection with transport it has to be mentioned especially the air but also ship transport that is not only related to extra controls and e-surveillance but we could even say the passengers are directly forced into literally enforced body controls not only by various hands-on or e-monitoring gates but even to the hands touching by the security staff. One has to admit that in many cases for unknown reasons sometimes they prefer their hands for direct touching bodies of passengers than to use those hands-on devices. One then cannot help not to think that many members of that security staff are doing these jobs exactly for the same reasons like various pedophiles are usually working in various areas that are for children e.g.in scout clubs, sport clubs, kids dancing clubs, religious youth clubs, etc.

– people during their shopping as well as all their other daily common duties, activities, movements and visits at post offices, banks, various other offices and places of the public services have permanently been monitored and recorded by various camera surveillance systems and in addition of course by various other e-surveillance systems especially if using e.g. credit/debit cards, various customers/clients benefit cards, ID cards, etc.

– the same being the case at the people's working places where also in the most such places there have already been installed various types of CCTV camera system especially and at least at entrances and exit gates, activities areas, parking lots, canteens, etc. as well as again also in connection again with various entry ID cards, passwords, biometric identifications, etc.

– any visits of cultural, social and especially sport events where it is possible to expect some higher number of visitors or attendees have been nowadays mandatory under the surveillance by various camera systems. Without these CCTV camera installations e.g. some sport or other cultural or social events cannot be even organized at all

– even during an ordinary strolling, walking along the city streets, parks and/or playing at children playgrounds and being at other places of otherwise commonly free access have been nowadays under the permanent surveillance by various camera or other e-surveillance systems

– all galleries, exhibitions but also hotels, restaurants and other similar places of public attendance and visits have been as well under the permanent camera surveillance

– especially carefully and under the permanent e-surveillance have been all transport related facilities where as a rule a lot of people have been moving around like it is in the case of airports, bus and train stations, etc. but also again the particular public parking lots, etc.

From all the above examples it is clear that tall of them are in many cases of them it is a clear violation of the fundamental human rights as guaranteed by the UN, EU (EC, 2010) and national legislation. Moreover it has to be underlined that all these camera installations are in operation without any explicit consent of the people to be recorded. In addition in many cases like e.g. in the City Transport Company of Bratislava it is in their transport facilities announcement that the place has been under the surveillance but there are installed no cameras but the announcement has to be legal justification for controllers to make recordings of passengers in case they do not have a valid ticket, etc.?!

However, one of the biggest shortcomings of ever growing application areas of all the CCTV and related e-surveillance smart technologies have been the attitude of all their operators towards the objects of their smart e-surveillance i.e. towards the citizens as the objects of all their particular activities. From our research we have found out that if something happens to people – not to operator and/or owner of the camera system - like e.g. being customers, clients, etc. and they become victims of some robbery, physical or psychical abuse and they would like to use the particular camera recording to help them in identifying what and how those abuses have happened they as a rule are rejected as the particular recording are not available to them as the objects of that e-surveillance but only for the owners or security staff of the particular company or institution, etc. The only way how to get such help through particular recording s is through approaching the police but in most cases due to the character of such incident it is viewed by police as a minor case and not belonging under their competence. That all in case of victims that are involuntary without their consent recorded and stored, etc. Although the particular legislation on the protection of personal data clearly states that the owner of that data i.e. that person has a primary right to handle own personal data and without his/her consent nobody has the right to handle such data without that.

In conclusion to this part on the e-surveillance by various CCTV cameras and other related e-surveillance smart technologies we could state that people have been not only monitored by these various cameras but their faces, bodies, movements, activities sometimes even in the most intimate situations have also been recorded and as such being available for any subsequent analyses, evaluation, profiling, searching and of course unfortunately also for a still growing misuse of such recordings for various and not only positive activities regarding the particular persons, etc. Although, the legislation e.g. on the Fundamental human rights of the citizens of the EU is strictly stating that such recorded data can be stored and used only for a time period being absolutely necessary for the reason that such data have been recorded, the practice is completely different. It is quite a common practice that all these various camera recordings are stored for an unlimited time period together also with various other similarly recorded data like e.g.it is in case of telephone conversations especially those through mobile phones but also by various other communication devices related e.g. to social networks, Internet, e-mail communications, etc. And there are almost unlimited numbers of examples how these fundamental human rights have been violated by many stake holders, operators, various security services but also police and governmental services, etc. It is a practical experience of also this author that coming back to certain hotels after several months or even after a longer periods of time, at the reception he was often told that his name is enough for identification as all other necessary data the hotel has kept in its database of guests from previous visits?!

In view of this we could only state again that all this modern e-surveillance not only by CCTV cameras we have been dealing with in this part, are in a strict violation of any fundamental human rights on protection of personal data, on the protection of integrity of personality, its dignity, etc. However, the main paradox of all these e-surveillance by the CCTV cameras and related other smart e-surveillance technologies has been the fact that more and more of these camera installations have not at all been accompanied by the more security in such surveillance areas. For example the statistics on the CCTV camera installations in all the banks in the Slovak Republic for last five years are clearly demonstrating that the more camera systems installations have not led towards less bank robberies but on the contrary there has been even some growth not only in the number of such bank robberies but also there has been a growing number of unresolved cases in that respect.. The only benefit of all this by the law mandatory CCTV installations in banks, sport facilities, etc. has been that in a case that such a camera system has been in place, then e.g. the particular robbed banks can be compensated through their insurance policies as without such policies that is impossible.

3. MAIN CONCLUSIONS AND RECOMMENDATIONS

In conclusion we would like to summarize at least very briefly some main findings of our ongoing research under the EU/7FP/SMART, CONSENT (Cannataci & et al, 2009) (Cannataci & et al, 2010), RESPECT projects. One of the main findings in this respect has been the fact that the modern life is fully and permanently monitored and under a surveillance by the latest e-surveillance technologies like we have some of them identified and described in the previous parts of this paper regarding e-surveillance on the EU Schengen borders and in connection with applications of the CCTV systems

This e-surveillance has definitely brought to some application areas more security, more responsible behavior of people especially due to the fact that if people are aware of being monitored and under a permanent surveillance they use to behave more responsibly, etc. but on the other hands there are still many questions regarding the potential misuse of such data from these sources

All these surveillances have led to a wide spread disrespect towards some of the fundamental human rights especially regarding human dignity, protection of personal data, integrity of personality, protection against any kind of discrimination, etc. Some of these e-surveillance and accompanying activities by the security staff especially at airports could be characterized as totally unacceptable discrimination of people as e.g. in many airports among others are also warnings that any conversation with security staff during controls are strictly prohibited and punishable by law as it there is no such a fundamental human right as freedom of speech, right to use his/her rights to petitions, etc. and that all for our money we pay for these "our" security through enormously expensive air tickets

For the future it will be necessary also on the basis of our ongoing research under the EU CONSENT, SMART and RESPECT projects to achieve a more balanced relation and being supported directly e.g. also by the particular and strong EU legislation that would guarantee a needed balance between three important concepts of the contemporary life i.e.

- between threads of terrorism or any other criminal activity
- application of the latest e-surveillance technologies
- and last but not least all that with full respect for fundamental human rights, people's dignity in order they would not be victims of various bureaucratic or even deviants' sexually motivated misconducts.

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SELECTED ISSUES ASSOCIATED WITH POLAND'S COMMUNE ORGANIZATIONAL UNITS AND THEIR MANAGEMENT

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Abstract

This paper addresses issues pertaining to the management of Poland's commune organizational units and the difficulties of their establishment. This matter is especially important because of the range of public tasks performed at this fundamental level by local commune units. Poland's legislature is introducing various legal structures which will expedite performing these tasks in order to satisfy basic community needs i.e. the needs of the commune residents. Entrusting these tasks to units formed by commune authorities and external, independent organizations should have one over-riding objective, that of public benefit. Commune management should be understood as certain knowledge and skill in the supervision of specified resources. The commune, as the fundamental unit of local government, enjoys full control of the establishment's activity, and as a result also incurs full responsibility for said establishment's liabilities. In forming an organizational unit without legal status, the commune furnishes same with specific assets such as (but not limited to) land and moveable property.

Keywords: *community, organizational unit, management in the municipality,*

1 INTRODUCTION

This paper addresses issues pertaining to the management of Poland's commune organizational units and the difficulties of their establishment. This matter is especially important because of the range of public tasks performed at this fundamental level by local commune units. Poland's legislature is introducing various legal structures which will expedite performing these tasks in order to satisfy basic community needs i.e. the needs of the commune residents. Entrusting these tasks to units formed by commune authorities and external, independent organizations should have one over-riding objective, that of public benefit.

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2 BASIC PREMISES

The entry point for further consideration can be found in the Constitution of the Republic of Poland of April 2, 1997, in Articles 163 to 166 (Dz. U. [Journal of Laws] No. 78, item 483). These regulations provide for local governments to provide public administration (see Niewiadomski, 2001). The authority given by the constitutional regulations indicate the range of public administration assigned to local governmental units, performed on their authority and responsibility (Chochowski, 2011, pp. 61-74). The impact of such legal solutions is the obligation of performing public services by local governmental entities which now become active participants in community, economic and political life. In the currently applicable legal system, local units possess a catalog of public services to be performed, as mentioned, on their authority and responsibility, resulting in a variety of tasks sanctioned through various legal forms for their execution. These particular local governmental units are budgetary units, local administrative units and commercial entities. Besides the listed organizational forms, communes may sub-contract their tasks to private concerns or non-governmental organizations (Zacharko, 2000; e.g. Zacharko, 1996, pp. 57-61). Furthermore, in the case where a commune is unable to single-handedly perform a given task, the law provides for cooperative efforts among communes.

The range of entrusted tasks to communes, as listed in Article 7, is rather extensive and includes maintenance of education and culture, health services, social welfare, public order, zoning, recreational areas and sports equipment, communal bazaars, communal cemeteries, environmental protection, physical fitness, and tourism (Tabernacka, 2005, pp. 409-422).

The municipal economy cannot be excluded (Rakoczy, 2010), as it is regulated by the Legislation of December 20, 1996 (Dz. U. z 2011 r., No. 45, item 236) which lists local mass transit, public water, sewerage, cleanliness, utilities (power and heating), public housing, and maintenance of public structures and equipment for public service (Gonet, 2006).

It should be noted that the method(s) chosen for the performance of said tasks is determined by the policies established exclusively by local and regional authorities based on constitutional and legislative mandates, and conversely, can only be restricted through legislative regulation (see Czarnow, 2009, pp. 19-29).

3 ORGANIZATIONAL AND LEGAL FORMS

The majority of Poland’s communes generally, actively manage their assets through various departments. Public services are provided by such entities as budgetary units, local administrative units or utility companies. Municipal organizational units can be formed by the commune on the basis of Article 9, Paragraph 1, of the Law of March 8, 1990, regarding Commune Government (Dz. U. of 2015, item 1515) and performance of public tasks. The most common commune units are those formed in accordance with Article 9 of the law from August 27, 2009, regarding public finance (Dz. U. of 2013, item 885) i.e. budgetary units and local administrative units. As defined in Article 11, Paragraphs 1 and 2 of the aforesaid Law, budgetary units are those public finance units which don’t have legal status, cover their costs directly from the governmental budget, and any revenues gained are deposited in appropriate local governmental accounts i.e. the commune’s (Bohdan, 2008, pp. 147-161). They function on the basis of standardized statutes pertaining to name, head office and core activity. As the above regulations indicate, these entities have no legal status but all civil law activities are carried out in the name of said unit by specific managers. The basis for financing budgetary units are annual budgets i.e. registers of revenues and expenditures.

The second group, local administrative units (Article 15, Paragraph 1 – Public Finance Law), performs those public services which are paid for additionally, covering their operating cost from revenues. These entities may have surplus, deficit or zero financial results. When the annual results show a surplus, the establishment settles with the commune depositing the profits minus the growth factor i.e. the normative current assets as established by the commune council. Whether the funds in question return to the establishment or not, is determined by the founding authority which in the case of communes is the commune council. A local administrative unit - established or liquidated upon an act of the commune council – is in effect an independent organization; however, during its functioning it remains a part of the commune infrastructure; it has no legal status and all its activity is in the name of the commune with the commune’s mandate establishing the establishment's competence. The commune, as the fundamental unit of local government, enjoys full control of the establishment's activity, and as a result also incurs full responsibility for said establishment's liabilities. In the case of an administrative unit's liquidation, the commune is also liable for debt incurred by said entity. The absence of full independent activity by an administrative unit makes it a so-called handicapped legal entity which, on the one hand, enjoys independent business activity, but on the other, is restricted by the limits imposed by the commune mandate.

A good number of communes, in accordance with the regulations of the Legislation of December 20, 1996, regarding communal economic activity (Dz. U. z 2011, No. 45, item 236), have transformed budgetary units into communal single-share companies i.e. commercialization of certain units (e.g. Wasniewski, 2001, pp. 42-52; Szostak, 2006, pp. 139-145). In accordance with Article 12, Paragraph 2, of the above legislation, in the single-share company units of local governments, the functions of the general shareholders' meetings are fulfilled by the executives of these units – mayors and commune executives (see Dziarski, 1993). Practically speaking, commercialization does not separate the functions of ownership from those of operation which consequently may result in a lack of quality management of communal assets.

4 COMMUNE ORGANIZATIONAL UNITS

As was earlier indicated, the commune may establish appropriate organizational units in order to perform its various tasks. These units generally comprise of three elements:

- personnel (employees),
- organizational (unit structure), and
- assets (e.g. land or moveable property).

In forming an organizational unit without legal status, the commune furnishes same with specific assets such as (but not limited to) land and moveable property. Establishing such a unit, upon analysis of appropriate legal regulation, obviously exceeds the authority of common executive boards (Adamus, 2011, pp. 118-130; Uliasz, 2002, pp. 825-831; Uliasz, 2002a, pp. 883-888). The consequence of such a premise is the reservation of this authority expressly for the commune council (Article 18, Paragraph 2, Sub-paragraph 9, item 'h', Commune Government Legislation). The commune council, undertaking the initiative of forming such a unit and equipping it as such, passes a resolution. In the case where such a unit is already functioning and its development presents additional assets, the transfer of land should be accompanied by the establishment of permanent management. Permanent management is established through an administrative decision which incorporates the following:

- the name and head office location of the unit for the benefit of the permanent management,
- the identification of land in accordance with notes incorporated in the permanent land registry and according to the real estate cadaster,
- area and plat description,
- objective in transferring land and its intended utilization,
- land value and charges resulting from permanent management,
- possibility of updating charges resulting from permanent management, and
- the permanent management's term of service.

Upon the presentation of the above analysis, an effort should be made to detail the concept of the organizational unit: a group lawfully separated with listed assets and competent personnel authorized to function within a defined scope.

5 MANAGEMENT IN THE COMMUNE

The commune is an independent economic entity in a contemporary society based on a market economy. Each commune endeavors to promote local development, one of its fundamental objectives. It is a developing process of the local condition taking into account local needs and the importance of specific components. Proper task management of a commune – and its organizational units – should be based on economy, efficiency and effectiveness. Commune management involves a number of basic components, such as (Kuznik, 2005, p. 71):

- administrating – overseeing current affairs, performing property management,
- performing owner obligations e.g. purchasing or selling,

- allocating public funds,
- monitoring and evaluating the functioning of local governmental units.

Commune management should be understood as certain knowledge and skill in the supervision of specified resources, which for the contemporary commune are:

- human,
- financial,
- spatial, and
- natural.

It is also a developing process having as its objective maximum advantage for an identified goal i.e. satisfying the needs of the community. The public character of a commune's activity demands openness on the part of leaders which is demonstrated through citizen participation in the decision making process and enabling community monitoring. Local officials should create authentic channels of communication and cooperate with residents as may be seen in various forms of consultation and feedback (Wojciechowski, 2003, p. 23).

Analyzing the issues of lawful solutions, as well as the concepts of commune management, it is prudent to indicate a number of characteristics (see Kozuch, Stych, 2011):

- the identification of local problems especially those whose primary significance in regard to the level of satisfying community needs – proper identification ties into the ideals of ecological or sustainable development,
- a multi-effort, or a matrix for solving problems which also takes into account opportunities and dangers for development,
- progress in commune government performance, and
- reaching decided goals in a systematic, efficient and effective way.

6 CONCLUSIONS

The practice of commune functioning allows the observation that not one commune in the Republic of Poland serves its community exclusively through its subordinate units or offices. In effect, the communes function according to the so-called mixed model, the market/regulatory model. The communes purchase certain services from the private sector on the basis of agreements and contracts as defined by the law governing public contracting. The division of tasks, competence, assets and finances between municipal authorities puts into motion the process of forming the legal and institutional framework for performing public tasks by local government units. For creating organizational units, communes have the influence for determining their various forms e.g. legal, political, economic and social. In accordance with the analyzed legal regulations, communes are able to execute tasks of public service on their own authority, either through their own units and offices, or through contracted services from the private sector. In the former case, communes fulfill the role of regulator and operator, in the latter, they become the regulator and organizer of the market for certain services.

The analysis of the mentioned regulations allows the conclusion that the choice of how public tasks are accomplished decides the management and basically depends of the character of the local government unit and the specificity and dimension of activity in the name of the community.

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