



ISSN 2334-7171

DOI 10.12709/issn.2334-7058

MEST Journal

Management
Education
Science & Society
Technologies

**Edited by
Zoran Čekerevac**

MESTE

Vol. 1

No. 2

July 2013

CIP – Каталогizacija u publikaciji
Narodna biblioteka Srbije, Beograd
005+37+3+66

MEST Journal : Management, Education,
Science & Society, Technologies /
editor-in-chief Zoran P. Čekerevac. –
[Štampano izd.]. – Vol. 1, no. 1 (2013) –
– Belgrade : MESTE NGO : Faculty of Business
and Industrial Management of the “Union”
University Belgrade ; Toronto : SZ &
Associates, 2013- (Belgrade : ICIM+). – 30 cm

Polugodišnje. - Drugo izdanje na drugom
medijumu: MEST Journal (Online) = ISSN
2334-7058
ISSN 2334-7171 = MEST Journal (Štampano Izd.)
COBISS.SR- ID 196182028



MEST Journal

DOI 10.12709/issn.2334-7058



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Two issues of journal are published annually

ISSN 2334-7058 (Online)

ISSN 2334-7171

Printed by **ICIM+**, Belgrade-Mladenovac, Serbia

www.mest.meste.org

Address:

MESTE MEST Journal

Faculty of Business and Industrial Management – "Union" University Belgrade

Kneza Višeslava 27, 11000 Belgrade, Serbia





Belgrade
July 15, 2013

Dear readers,

Welcome to the second issue of the MEST Journal, an international peer-referred academic journal, official journal of the non-profit organization MESTE. This issue is published online, as well as print (subscription).

Between the two issues MEST Journal was registered in DOI system by CrossRef with **DOI 10.12709/issn.2334-7058**. Also, all articles published in the previous issue of MEST Journal got their own DOIs, which can be seen in the **MEST Archive & DOIs** at:

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In the meantime we have introduced the practice that articles that have undergone peer review, and will be published in the next issues, we make available to readers in the form of preview - early reading at: http://www.mest.meste.org/MEST_Najava_clanaka.html

The focal point of the journal remained at international level, with the view on matters from a global perspective. Also, some papers concerning some local specific events are published in this issue.

We follow the mission and vision of the journal and help authors to publish their works and present their achievements in the most convenient way.

With its broad scope MEST Journal welcomes high quality, original research articles and reviews from scientists and professionals, professors and PhD students in the areas covered by its thematic, as it is shown in the [Thematic areas](#), but these are not exclusive themed areas.

I wish you all success in your future endeavors, and invite you to publish your works with our motto: "If you wish to be quoted, people first have to hear for you".

We will help you!

Zoran Čekerevac

Zoran Čekerevac
Editor-in-chief



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These are basic, but not exclusive themed areas.



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EFFICACY VERIFICATION OF SOME MOTIVATION STRATEGIES ON CLOTHING COMPANY EXAMPLE

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JEL category: **L60, M11, M12, M54**

Abstract

The goal of this study was to research the effects of different motivation strategies on the productivity of workers in a clothing industry. For this purpose an experimental research was conducted, which included 138 workers in clothing company, divided into three experimental groups. Standard productivity before research was used as a control group. The efficacy of motivation strategies was checked with regard to two basic questions: 1) differences in productivity of workers measured in natural form in regard to three different motivation strategies; 2) differences in profitability of researched motivation strategies calculated in money (currency EUR). As a matter of fact, it is stated that the best productivity results are obtained by means of material motivation strategy with stimulating pay (411.24 jackets produced per day), followed by motivation strategy of new job contracts and new job challenges (training and control of new workers') (407.10 jackets produced per day), and motivation strategy of new machines with job rotation (405.78 jackets produced per day), while the worst results were found in the control group used as standard comparison measure (without special motivation strategy, which means strategy of motivation according to the Labour Law), where the productivity was 400.20 jackets produced per day. The most profitable motivation strategy for the researched company were new job contracts and new job challenges, followed by the motivation strategy of new machines with job rotation, and economically the worst (in terms of profit) was the motivation strategy of stimulating pay.

Keywords: efficacy, motivation, motivation strategy, productivity, profitability, textile (clothing) industry

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1 INTRODUCTION

Motivation is an important subject area for researchers and practitioners of management all over the world, and the ability to motivate employees is a fundamental requirement of effective management in the workplace. According to the definition of motivation in organizational context, motivation concerns those psychological processes that arouse, direct and sustain the behaviour and performance (Greenberg & Baron, 1994). Work motivation is also one of the fundamental problems in the area of maximising the productivity and profitability, strengthening the feeling of job satisfaction, work involvement and in energizing the working people. On the question why people work hard Robertson, Smith & Cooper, 1992 clearly answered that effort and performance at work are determined by ability, temperament and motivation. In this sense work motivation is an important problem in the construction of effective motivation system by means of establishing an effective motivation strategy. Motivation strategies can be very stimulative for work and productivity so they can strengthen the total organizational success and competitiveness. Namely, the goal of specific motivation strategy is to accomplish individual and group work motivation so that the workers, by accomplishing their own interests, at the same time accomplish the organizational goals (Buble, 2006). If management does not ensure the perception of workers about realisation of their personal goals, the accomplishment of organizational goals cannot be fully expected. It is therefore important for management to establish the harmony between organizational expectations and the expectations of workers. This is not simple because effective implementation of motivation strategy means creation of combined material and nonmaterial motivators, which is a complex matter because of several important aspects:

A. In practice there are numerous motivation theories and practical suggestions by which work motivation can be explained. Literature cites at least tens of relevant motivation theories and several techniques by which work motivation can be explained and practically implemented, such as: material

rewarding, workdesign, work enrichment, work enlargement, management style, goal setting, flexible worktime, recognition, congratulation, perfection, career development and similar techniques (Schultz & Schultz, 1990; McCormik & Ilgen, 1996; Greenberg & Baron, 1997; Beck, 2003; Gagne & Deci; 2005; Buble, 2006);

- B. Work motivation is also a variable rather than constant human characteristic, which needs various motivational adjustments through the time (Galetić & Pavić, 1996);
- C. In an organization there is quite wide spectrum of motivation possibilities in the strategy formulation context, which opens up the question of optimal motivation strategy choice for each of real organizations (Milkovic & Boudreau, 1988; Bahtijarević-Šiber, 1999; Noe & all, 2006; Milkovic & Newman, 2006).;
- D. Rational choice of motivation strategy does not depend only on its efficiency measured in natural measures (productivity) but also on real cost of its implementation and conduction.

Therefore there is no universal effective solution in implementing motivation system/strategy, yet it depends on policies of each company and its specific solutions as answers to specific organizational needs. In the creation of effective motivation strategies material and nonmaterial compensations are usually used (also called motivation compensations) which can basically include (Marušić, 2006, 343; Buble, 2003, 149-152; Bahtijarević-Šiber, 1999, 614):

A. Material motivation compensations (salary, bonus, stimulating pay, benefit for innovations and improvements, benefit for knowledge spread and flexibility, benefit connected with organizational results and profit, other material benefits (stimulii), profit share, ownership share (distribution of stocks), fees, travel costs, representation costs - as direct material compensations; and social duty, pension fund, social assurance, life assurance, compensations for life and health improvements, payed holidays, payed annual leave and shorter

leave, sick-leave pay, material flat credit, nutrition on the job - as indirect material compensations);

- B. Nonmaterial motivation compensations (challenging job, interesting tasks, responsibility on the job, self affirmation, education, promotion, achievement, social connections on the job, impact on company's policies, leading, partners on the job, status, condensed work week, flexible working time, work share, job rotation, job enlargement, job enrichment, ergonomical organization of the workplace (biosociopsycho arrangement of the workplace), specific job contracts and others techniques connected with the working conditions.

The basic question in the area of work motivation is to establish how the motivation system (material and nonmaterial motivation methods) can help in achieving economic success of certain enterprise. One of the ways is to research the motives of workers and according to them establish rewarding practice for achieving good motivation. According to the research of Croatian Economic Institute (2000) on the sample of 10 Croatian companies in different area of activity the main motivational factors were ranked as follows: 1. salary 83,5% (was on the top of workmotives); 2. good managers 82,2%; 3. interpersonal relationships 78,5%; 4. acceptance of fellow 75,4%; 5. continuity and security of jobs 72,8%; 6. interesting job 68,7%; 7. responsibility 68,6%; 8. work condition 67,3%; 9. ability affirmation 66,9%; 10. promotion 64,5%; 11. education besides work 62,2%; 12. company image 62,1%; 13. profitshare 60,4% (Marušić, 2006, 329-332). "Good wages", "job security" and opportunity for advancement were top three work motivation factors in hotel industry research (Simmons & Enz, 1995 according Suliman & Al-Sabri, 2009, 87). Because of salient role of salary (money pay) this material motivation strategy should be included in every research on performance because of its compensation role (recovery of human organism) and motivation role (stimulation for better work). Since money is the oldest and generic factor of work motivation, its strong motivation effect is expected (Noe & all., 2006, Buble, 2006, 442). Also, in some

research, salary was a superior motivation tool, it increased the performance for 30%, goal setting for 16% while job enrichment and workers' participaton were even lower (Locke, Feren, McCaleb, Shaw & Denny, 1980, according to Schultz & Schultz, 1990, 349). The following nonmaterial motivation factors and their motivation strength can be interesting for the purpose of research: job contracts (for a determinate or an indeterminate period of time, where the motivation comes from work stability and safety), job challenges (work enrichment), new working machines (in terms of their ergonomic adjustment to workers), job rotation (changes of working operations which are routine and monotonous by nature, by which this monotony can be reduced). Work stability and safety can be important motivation factor (on the fifth place of motivation factors in Croatian enterprises according to Marušić, 2006), especially in times of recession and economic crisis, when canceling job contracts (firing) is unavoidable. In this sense, workers prefer the job contracts on an indeterminate period of time, because they would come later on the firing list. In some researches, workers with job contracts on an indeterminate period of time showed statistically better efficacy than the workers with job contracts on a detereminate period of time (Žugaj & Bogdanović, 2009). Job enrichment and job rotation are standard techniques of job redesigning for motivation purposes (Schultz & Schultz, 1990, 359, Buble, 2006, 499-500). Also, good working conditions (good machines, temperature, humidity, airing, lighting, noise, vibrations, radiation, cleanliness, colours, tidiness and organization of the workplace, and other important conditions lead to good work attitude and regularly result in numerous benefits: higher productivity, better capacity utilization, higher coefficient of inventory turnover, shorter inventories period, reduced scrap, shorter production cycle, shorter delivery time, shorter delays, minimized idle run in production process, improved work energy and health in workers, lower rate of absenteeism, lower costs due to injuries at work and occupational diseases, lower rate of sick leaves, reduced fluctuation costs, and better work satisfaction and motivation in general (Bieneck, 2006; Bogdanović & Mateljak, 2011).

So, new machines can also be treated as techniques for designing the work conditions (effect of job enrichment) because they contribute to the biomechanic efficacy of work with motivation effects (Kroemer & Grandjean, 2000, Žaja, 1991). On this basis it can also be assumed that nonmaterial motivation strategies can show some good production effects and good effects on company profit. Motivation strategies can also have some efficacy limitations such as (Schultz & Schultz, 1990, Greenberg & Baron 1997, Gagne & Deci, 2005):

- A. Some workers do not want to work to their full capacity (regardless to the motivation strategy) because there is a lack of trust in management. Namely, there can exist the fear that the production standards will be set too high, so they would be coerced to a very hard work for small bonuses;
- B. Some working groups set their own working standards which represent "good daily work" and will not produce more regardless of the motivation strategy. Rather, they will nicely arrange their work in daily working time;
- C. Efficacy of motivation strategy can vary in time. What was a good motivating strategy at the beginning time, could be less good by time passing. Therefore, to maintain the efficacy of motivation through the time, according to Adams's theory of justice underpaying and overpaying should be avoided (Greenberg & Baron, 1997);
- D. According to the expectancy theory (Porter & Lawler, 1968 according to Gagne & Deci, 2005, 331) optimal motivation means the combination of extrinsic and intrinsic motivators (material and nonmaterial). Also, extrinsic motivation can harm intrinsic motivation, so, for example, managerial pay must not discriminate high from low performance manager. So, extrinsic motivators (high pay) must not be the only ones that lead to higher performance and this also applies vice versa; namely, intrinsic motivators sometimes must not be the only ones leading to higher performance.

In this study, experimental research was conducted to see the effects of three introduced

motivation strategies on the productivity of workers' in clothing industry. Specifically, the impact of one material strategy (stimulating pay) and two nonmaterial motivation strategies (new machines plus job rotation and new job contracts plus new job challenges) on productivity of workers' was measured. The following problems were identified:

- 1P - What is the impact of introduced motivation strategies on productivity of workers' in clothing industry?
- 2P - What kind of motivation strategies will result in the highest productivity?
- 3P - Which motivation strategy will result in the highest profit?
- 4P - What type of motivation strategy/strategies should be recommended according to the obtained results?

Hypothetical answers are offered for these problems:

- 1H - Just the introduction of motivation strategies (no matter of what kind) will have the impact on increased productivity of workers' in clothing industry;
- 2H - Stimulating pay as motivation strategy will have the strongest impact on productivity;
- 3H - Nonmaterial strategies will be economically better (result in greater profit) than material stimulating pay strategy;
- 4H - For optimizing the long-term company utility it is desirable to use the combination of researched nonmaterial and material motivation strategies (stimulating pay).

2 RESEARCH METHOD

For the purpose of establishing the effects of introduced motivation strategies on the productivity of workers' in clothing industry, experimental method with one control group (without special motivation strategy, apropos the strategy of compensations and working conditions according to the Labour Law) and three experimental groups, was adopted:

- A) First experimental group – implementing the material motivation strategy (stimulating pay). The workers gained stimulating pay of 30% of their basic salary for a job well done;
- B) Second experimental group – the workers were provided with new machines (machines for sewing and abrading) together with the weekly job rotation;
- C) Third experimental group – the workers' signed new job contracts (for an indeterminate period of time), and they were given greater responsibility by means of job enrichment in the sense of training and control (monitoring) of new workers';
- D) Control group/standard productivity – was a group used to compare standards, which means the productivity before introducing any motivation strategies (material compensations according to the existing Labour Law).
- Thus, for each experimental group a different motivation strategy is chosen (different motivation elements) which is shown in table 1.

Table 1. Experimental groups and motivation strategies

Experimental group	Motivation strategy
I	Stimulating pay
II	New machines and job rotation
III	New job contracts and new job challenges

Source: Documentation of the researched company

The basic material strategies prescribed by the existing Labour Law were used as a control group (standard measure needed for the comparison with experimental groups). According to this Law the workers in the control group were entitled to receive salary for their work, consisting of:

- Basic salary of the working place on which workers' work (the lowest basic salary for the lowest level of work complexity was approximately 146 EUR), for the full time work of 40 working hours per week, including break of 30 minutes per working day which was counted in total working hours);
- Additional pay for working internship;
- Additional pay for particular (heavier) work conditions;
- Stimulating pay – additional pay for the work which is greater than average (normal) in quality and quantity.

In the control group, except the minimum conditions prescribed by the Labour Law other forms/strategies of work motivation were not present. Because of this it can be expected that the implementation of new motivation strategies will reflect on work productivity in the researched company. The experiment was conducted in the

time interval of two months and seven days, apropos 66 days (between 24 April 2010 and 01 July 2010) in the hall for sewing jackets where the work was divided into:

- Work on machines, the workers' work with normal machines (OS), sewing machine or special machine (SS);
- Work with iron box, steam iron box and press (GL);
- Manual work (RR), work of cutting, knitting, cleaning the fibre and
- Work on opening packages of sewing material, work on opening and distribution of material from a tailor room (this work was not included in the experiment).

2.1 Research participants

The experiment was conducted in the hall for sewing jackets with 138 participants (workers') divided into 3 experimental groups. Out of 138 workers', 131 or 94.92% were female and 7 or 5.08% were male. 57 workers' who worked with machines (36 workers' who worked with normal machines and 21 workers' who worked with special machines), together with 33 workers' who worked with iron box and 48 manual workers' directly participated in the experiment. For the

need of experiment record keeping, 10 additional workers' called "registers" were engaged in the period of two months. Their job was to keep record of time spent for doing some specific operations needed for the production of a standard jacket. Because the company produces different models of jackets, for the need of

experiment they measured only the time needed for making a standard jacket. Each experimental group consisted of 19 workers' who worked with machines (12 with normal ones and 7 with special ones), 11 workers' who worked with iron box and 16 manual workers' (table 2).

Table 2. Research experimental groups

	Work with normal machine	Work with special machine	Work with iron box	Manual work	TOTAL
Experimental group I	N=12	N=7	N=11	N=16	N=46
Experimental group II	N=12	N=7	N=11	N=16	N=46
Experimental group III	N=12	N=7	N=11	N=16	N=46
Total	N=36	N=21	N=33	N=48	N=138

Source: Documentation of the company

2.2 Research instruments

For the purpose of measuring time needed for the production of a standard jacket, stopwatch clocks were used. Time for performing specific working operations (there are 187 specific technological working operations needed to produce one standard jacket) is registered in the protocol (diary of working operations) specially designed for this purpose. Measuring was conducted by hired and for that purpose paid "registers" (N=10).

2.3 Research procedure

Due to simplification of administration, production of one standard jacket is reduced from 187 specific operations to 9 major operations. All three experimental groups worked at the same time on the jobs which together constitute the final product – standard jacket. The time schedule in the experiment is shown in table 3.

Thus, for example, from 26 April 2010 until 17 May 2010 the first experimental group worked only on the following jobs: handling the coating, handling the collar and cigar batten.

Table 3. Time schedule of experiment executing

	Time of experiment conduction		
	26 April to 17 May 2010	17 May to 07 June 2010	07 June to 01 July 2010
Group I	1. Handling the coating 2. Handling the collar 3. Handling the cigar batten	4. Handling the bottom pocket 5. Handling the shoulder 6. Handling the sleeves with slit	7. Handling the obverse of the jacket 8. Handling the buckram 9. Montage of the jacket
Group II	4. Handling the bottom pocket 5. Handling the shoulder 6. Handling the sleeves with slit	7. Handling the obverse of the jacket 8. Handling the buckram 9. Montage of the jacket	1. Handling the coating 2. Handling the collar 3. Handling the cigar batten
Group III	7. Handling the obverse of the jacket 8. Handling the buckram 9. Montage of the jacket	1. Handling the coating 2. Handling the collar 3. Handling the cigar batten	4. Handling the bottom pocket 5. Handling the shoulder 6. Handling the sleeves with slit

Source: Documentation of the company

From 17 May until 07 June 2010 the same experimental group worked on the following jobs: handling the bottom pocket, handling the shoulder and handling the sleeves with slit. From 07 June until 01 July 2010 the same

experimental group worked on the following jobs: handling the obverse of the jacket, handling the buckram and montage of the jacket. Each experimental group worked according to the schedule presented in table 3, on every operation

needed for the production of the standard jacket, so each group worked in the same total time duration. During the performance of each operation, every single operation time (in seconds) was measured and registered, so in the end of each period the average time for each operation was calculated. Every three weeks the groups changed their work duties, so each group worked on all operations needed to produce a jacket in equal period of time. Times of experimental groups for each operation were added so the new time for producing the jacket according to impact of motivation strategy was obtained. New time for producing the jacket according to the experimental group served as comparison to the control group/standard. So, the impact of independent variable (motivation strategy) on the dependant variable (productivity in the production of one standard jacket) was established.

3 RESEARCH RESULTS

3.1 Research results of control group/standard: analysis of existing work productivity

On 138 clothing workers' in one sewing hall involved in the experiment, one technologist was also hired. His work was to establish the time of each operation and then the time of all operations (sum in seconds) needed to finish one standard

jacket. The document which was made by technologist was called manufacturing catalogue. The manufacturing catalogue describes one kind of jacket that is to be made, describes all manufacturing operations, and tells the time needed for each specific operation. All the manufacturing times were measured in seconds, than summarized in a way that the total time needed for manufacturing of one jacket is clear. The time of manufacturing of one jacket is divided by the number of effective working hours (7 hours per day) which results in the number of jackets produced per day and per worker. The mentioned manufacturing catalogue is, according to the working theory of value (the value of a product is a function of needed working time for its production), expressed in seconds as needed working time, which is presented in table 4. In the table 4 it can be seen that the production of one standard jacket needed 8693 seconds or app. 145 minutes (144.72 minutes is rounded to 145 minutes and this is so called standard time of manufacturing). Effective working time of the company is 7 hours or 420 minutes per working day. When we divide effective minutes (working time of one worker) with 145 minutes of work needed for the production of one jacket, we get 2.90 jackets per worker, which is the productivity of one worker. Thus, one worker from control group (standard production) in his working day produces in average 2.90 jackets.

Table 4. Manufacturing catalogue for manufacturing the standard jacket expressed in seconds

Number of operation	OPERATION DESCRIPTION	OS	SS	GL	RR	
1.	Handling the coating	658	252	93	167	
2.	Handling the collar	242	229	180	101	
3.	Handling the cigar batten	11	0	69	30	
4.	Handling the bottom pocket	14	64	66	136	
5.	Handling the shoulder	99	50	29	9	
6.	Handling the sleeves with slit	559	200	281	165	
7.	Handling the obverse of the jacket	517	226	449	318	
8.	Handling the buckram	0	169	26	29	
9.	Montage of the jacket	485	1051	614	1105	
	TOTAL	2585	2241	1807	2060	Σ=8693

Source: Research results

Bookmark: OS-work on the normal machine; SS-work on the special machine;
GL-work with iron box; RR-manual work

When we multiply number of working hours with workers' productivity we get planned production per day ($2.90 \times 138 = 400.20$ jackets per day). So, without special motivation strategy (with respect to the Labour Law) productivity of control group was at the level of 400.20 jackets per day.

3.2 Research results of the Experimental group I

After nine weeks of measuring and registering the results the manufacturing time needed for each operation and the difference between the new and standard manufacturing time were established. This is shown in table 5.

The material motivation strategy (stimulating pay) was implemented on the first experimental group. This is the strategy in which the workers for a job

well done received stimulating pay of 30% of the basic salary. The greatest decline in manufacturing time was 47 seconds and it was registered during the operation of montage of the jacket, and the lowest decline in manufacturing time was 10 seconds and it was registered during the operations of handling of shoulder and handling the cigar batten. The horizontal analysis showed us that the manufacturing time of one jacket declined for 2.82%, so for the production of one jacket we needed 245 seconds less than in the conditions of standard manufacturing time (without any special motivation strategy). The productivity of a worker after the application of this motivation strategy was 2.98 jackets per day or $2.98 \times 138 = 411.24$ jackets per day, which is more than the standard jacket production per day (400.20 jackets).

Table 5. Manufacturing time for standard jacket expressed in second for Experimental group I

GROUP I OPERATION DESCRIPTION	Standard time for manufacturing (SV)				New time for manufacturing (NV)				Difference between SV and NV
	OS	SS	GL	RR	OS	SS	GL	RR	
Handling the coating	658	252	93	167	644	239	88	158	-41
Handling the collar	242	229	180	101	232	220	174	91	-35
Handling the cigar batten	11	0	69	30	9	0	66	25	-10
Handling the bottom pocket	14	64	66	136	12	60	63	127	-18
Handling the shoulder	99	50	29	9	93	47	28	9	-10
Handling the sleeves with slit	559	200	281	165	545	190	272	160	-38
Handling the obverse of the jacket	517	226	449	318	505	219	440	311	-35
Handling the buckram	0	169	26	29	0	161	25	27	-11
Montage of the jacket	485	1051	614	1105	473	1035	609	1091	-47
TOTAL	2585	2241	1807	2060	2513	2171	1765	1999	$\Sigma = -245$

Source: Research results

Table 6. Manufacturing time for standard jacket expressed in second for Experimental group II

GROUP II OPERATION DESCRIPTION	Standard time for manufacturing (SV)				New time for manufacturing (NV)				Difference between SV and NV
	OS	SS	GL	RR	OS	SS	GL	RR	
Handling the coating	658	252	93	167	650	247	91	165	-17
Handling the collar	242	229	180	101	229	218	179	100	-26
Handling the cigar batten	11	0	69	30	8	0	68	30	-4
Handling the bottom pocket	14	64	66	136	10	59	66	136	-9
Handling the shoulder	99	50	29	9	95	46	29	9	-8
Handling the sleeves with slit	559	200	281	165	550	194	280	165	-16
Handling the obverse of the jacket	517	226	449	318	510	220	448	317	-15
Handling the buckram	0	169	26	29	0	164	25	29	-6
Montage of the jacket	485	1051	614	1105	476	1038	612	1100	-29
TOTAL	2585	2241	1807	2060	2529	2183	1798	2050	$\Sigma = -130$

Source: Research results

Table 7. Manufacturing time for standard jacket expressed in second for Experimental group III

GROUP III OPERATION DESCRIPTION	Standard time for manufacturing (SV)				New time for manufacturing (NV)				Difference between SV and NV
	OS	SS	GL	RR	OS	SS	GL	RR	
Handling the coating	658	252	93	167	654	247	88	160	-21
Handling the collar	242	229	180	101	238	225	177	95	-17
Handling the cigar batten	11	0	69	30	9	0	66	25	-10
Handling the bottom pocket	14	64	66	136	12	60	63	134	-11
Handling the shoulder	99	50	29	9	93	47	28	9	-10
Handling the sleeves with slit	559	200	281	165	555	190	276	161	-23
Handling the obverse of the jacket	517	226	449	318	510	219	446	314	-21
Handling the buckram	0	169	26	29	0	161	25	29	-9
Montage of the jacket	485	1051	614	1105	478	1039	609	1092	-37
TOTAL	2585	2241	1807	2060	2549	2188	1778	2019	Σ=-159

Source: Research results

3.3 Research results of the Experimental group II

For the second experimental group new sewing machines (of the same sort as in standard control conditions) were provided, as well as other special machines with job rotation. The manufacturing times in these motivation conditions are shown in table 6. It can be noted from table 6 that the manufacturing time is usually declining when machines are used, while the time of manual work remains identical. The greatest decline in manufacturing time is noted in the operation which greatly uses machines such as montage of the jacket. The horizontal analysis shows that the total decline for the jacket production time was about 1.49%. The new productivity was 2.94 jackets per worker. By means of this motivation strategy 2.94 x 138=405.78 jackets per day were produced, which was also better than standard (400.20 jackets).

3.4 Research results of the Experimental group III

The third experimental group consisted of workers with whom new job contracts were signed and new job challenges settled. The manufacturing time for each operation in the implementation of this motivation strategy is shown in table 7.

After signing new job contracts and settling new job challenges (techniques of job enrichment), the third experimental group recorded 159 seconds better performance in comparison to standard jacket manufacturing time. The greatest decline in manufacturing time is noted during the operation of montage of the jacket. Here the new manufacturing time was 37 seconds better than in the standard conditions. The lowest manufacturing time decline was noted during the operation of the handling the buckram (9 seconds).

Table 8. Total results of experiment by experimental groups

GROUP	Percent of diminishing time of manufacturing	Productivity of work (produced jackets per worker)	Production per day (productivity per worker x number of workers)
CONTROL (standard production)	0.00%	2.90	400.2
Experimental group I	2.82%	2.98	411.24
Experimental group II	1.49%	2.94	405.78
Experimental group III	1.86%	2.95	407.10

Source: Research results

The horizontal analysis showed that the jacket production time declined for 1.86%. The new working productivity was 2.95 jackets per worker per day, which was also better than the standard (407.10 vs. 400.20 jackets). In the table 8 all experiment results are presented. What can be clearly seen from the obtained results is that the implementation of both, material or nonmaterial motivation strategy, has had the impact on the increase of workers' productivity.

In all three experimental groups the positive increase of workers' productivity is registered and therefore the total production of jackets per day. This proves the main **first hypothesis** that only the introduction of the motivation strategies has the impact on the workers' productivity level in the company. The greatest growth of work productivity was registered by using the material motivation strategy (stimulating pay) with 411.24 jackets produced per day. It is clear that nonmaterial motivation strategies were lower in productivity so there was lower number of produced jackets. So, by using the second experimental motivation strategy (new machines and job rotation) the produced amount of jackets was N=405.78 per day, and by using the third experimental motivation strategy (new job contract and job challenges) the produced amount of jackets was N=407.10 per day which

was somewhat lower than the material motivation strategy in the first experimental group N=411.24. This result proves the **second hypothesis**, which confirmed that the greatest productivity was measured by using the stimulating pay motivation strategy. The **third hypothesis** about economic value of each strategy is discussed in chapter below under economic consideration of each motivation strategy, and the **forth hypothesis** that tells about needed combination of material and nonmaterial motivation strategies for optimizing the future productivity is affirmed in the discussion part.

3.5 Economic consideration of implemented motivation strategies

For the practical implementation of motivation strategies a very important question is which strategy is economically better. For example, is the strategy of stimulating pay (whose costs amount to 30% on basic salary) reasonable or is it better for the company to implement other economically more profitable motivation strategies (other nonmaterial motivation strategies)?

By doing the calculation we come to the results of economic effectiveness (profitability) for each of the motivation strategies.

Table 9. The projected enlarged economic benefit of clothing company by the means of the three implemented different motivation strategies on monthly level

Experimental Group	Enlarged number of produced jackets in comparison with control group –standard (X–400.20)	Enlarged revenue	Enlarged costs (stimulating pay)	Financial balance/profit (Total enlarged revenue – total enlarged cost)
Group I	11.02	6303.44 EUR	6072.00 EUR	231.44 EUR
Group II	5.58	3191.76 EUR	0 EUR	3191.76 EUR
Group III	6.90	3946.80 EUR	0 EUR	3946.80 EUR

Source: authors' calculation

Remark: For all the calculations it is assumed that in one month there are in average 22 working days and that a wholesale trade price of one standard jacket is on the level of 26 EUR.

3.5.1 Motivation strategy of stimulating pay

On the revenue side (TR= Q x P)¹ : 11.02 (produced jackets more in comparison to standard) x 22 working days per month (average) = 242.44 jackets per month (more) x 26 EUR

(estimated price per jacket) = 6303.44 EUR (monthly more).

¹ Total revenue of applied motivation strategy = greater produced quantity than the standard x wholesale trade price of one jacket (estimation).

On the cost side (TC = stimulating part of pay x number of workers) = 44 EUR per month of stimulating pay x 138 workers = 6072 EUR (monthly more).

Financial balance/profit of motivation strategy
= Total increased revenue - total increased costs
= (6303.44 – 6072 = 231.44 EUR).

So, by introducing the material stimulating pay it is calculated that the company will achieve the positive financial balance/profit of 231.44 EUR per month per working group of 138 clothing workers.

3.5.2 Motivation strategy of new machines plus job rotation

With the motivation strategy of experimental group 2 (new machines and job rotation) the enlarged financial balance in comparison with standard (400.20 jackets per day) would be 5.58 (produced jackets more per day) x 22 (average working days in one month) = 122.76 (produced jackets more in one month) x 26 EUR=3191.76 EUR (because the cost of stimulating pay is not present). So, the company would by means of this motivation strategy achieve the economic benefit/profit of 3191.76 EUR, which is better than the strategy of stimulating pay.¹

3.5.3 Motivation strategy of new machines plus job rotation

With the motivation strategy of experimental group 3 (new job contracts and new challenges) the enlarged financial balance in comparison with standard would be 6.90 (produced jackets more per day) x 22 (average working days in one month) = 151.80 (produced jackets more in one month x 26 EUR = 3946.8 EUR (because the cost of stimulating pay is not present). The company would by means of this motivation strategy achieve the economic benefit/profit of 3946.8 EUR which is the best motivation strategy for the company regarding the achieved

economic benefit. Summary of all economic repercussions of three different motivation strategies implemented is shown in table 9.

On the basis of presented calculations it can be summarized that in economic sense (profit) third motivation strategy (new job contracts and new job challenges) is the best one. Also, the second nonmaterial motivation strategy (new machines and weekly job rotation) was more profitable strategy than the strategy of stimulating pay. Reason for this was that nonmaterial motivation strategies did not have enlarged costs of their implementation. This result confirmed the **third hypothesis**.

4 DISCUSSION OF RESEARCH RESULTS

Only the implementation of motivation strategies has resulted in better productivity. Namely, the control group had 400.20 jackets produced per day, and other experimental groups were better (E1=411.24; E2=405.78; E3=407.10), which proved the **first hypothesis**. This effect is known since the time of Hawthorn studies in the Western Electric Company in the USA where the productivity of workers increases regardless of independent variable impact, such as illumination, temperature, humidity (McCormick & Ilgen, 1996). According to this fact, only the introduction of new work techniques and increased dealing with the workers (psychosocial component of working conditions) by means of communication, human relationships, moral and motivation can increase the performance, which probably happened in the conducted experiment. The differences in the productivity in different experimental situations can be at least partly attributed to the effect of such non-systematic variable, and not only to the effect of independent variables. In such a context it would be interesting to follow and examine if after the elimination of all the changes (motivation strategies) the performance of the groups would

1 In the researched company the costs of machinery replacement were not included because they were treated as amortizations costs. This real amortizations costs (for machinery replacement purpose) are included in accounting system as monthly costs of amortization (deminished monthly value of machinery calculated by time method). Amortizations costs calculated by time method, were payed every month, and this sum of money by time (for example in 10 year or 120 month what is for example duration of machinery) create a fund from which was financed the machinery replacement in this research. Therefore this costs should not be connected with costs of motivation strategy.

remain the same, decline or grow, as was the case in the original Hawthorne research (Schultz & Schultz, 1990, 13). Material motivation strategy (stimulating pay) showed the production growth from 2.90 to 2.98 jackets per worker per day, while the nonmaterial motivation strategies showed lower growth of productivity from 2.90 to 2.94 jackets per worker per day, which was registered in the second experimental group, and the growth from 2.90 to 2.95 jackets per worker per day which was registered in the experimental group III. These results proved the **second hypothesis**, so the material motivation strategy (stimulating pay) in comparison with nonmaterial motivation strategy had stronger effect on the productivity growth in the researched company. According to the results from the Economic Institute from Zagreb, Croatia, the salary (material compensation) was the first ranked motivation factor (Marušić, 2006, 332; Simons & Enz, 1995 according to Suliman & Al-Sabri, 2009, 87), so the highest motivation engagement could be expected as a fact of increased motivation by means of money stimulation, measured by productivity. Material motivation factor in the research was stimulating pay, while nonmaterial motivation factors were new job contracts and new job challenges as well as the work on new machines and job rotation. When we compare the effect of material factor (stimulating pay) in regard with nonmaterial factors, then we can calculate the work productivity which is higher in the material motivation factor than in the nonmaterial motivation factors. Namely, material motivation factor in regard of nonmaterial motivation factors had stronger effect on the productivity (411.24 jackets produced per day) in comparison with nonmaterial motivation factors (405.78 apropos 407.10 jackets produced per day). These findings can be expected because the clothing workers' are in general lower-paid category of workers' (this is the characteristic of work intensive industry, to which the clothing industry belongs), so material motivation incentives can have stronger effect on the motivation. It is also an interesting finding that motivation strategy of job enrichment and giving greater responsibility (experimental group III) showed somewhat more effective than new machines plus job rotation (407.10 to 405.78 jackets produced). Thus, if we discuss the

individual economic adequacy, apropos the use of individual strategies, the motivation strategy of the experimental group III can be considered as better than strategy of the experimental group II (new machines plus job rotation). The shortage of this research, when it comes to the effects of new machines and job rotation is that their individual effects cannot be separated so it is still unclear what would be the effect of job rotation alone on the work productivity. Of course, in practical implementation in the context of productivity growth it would be good to combine these two nonmaterial motivation strategies, because they do not require additional financial load to the company. Analysis of economic benefit/profit of each of motivation strategy confirmed the **third hypothesis**. This analysis showed that strategy III is the most profitable for the company (3946.80 EUR), followed by strategy II (3191.76 EUR) while the least profitable strategy was strategy I (231.44 EUR), because of relatively high costs related to the stimulating pay. What also needs to be discussed is that the obtained experimental results could degenerate in time during practical application, if the salary stays low, which could lead to dissatisfaction (according to Herzberg theory where the salary is the basic hygienic factor, so if it is perceived low it could provoke dissatisfaction) so the production can be returned to the standard level or even below it. The effect of group norms and group standardization on the productivity level below maximum effort is not an insignificant factor, because of distrust towards management and possible belief that management can request maximum working effort for minimum bonus (Schultz & Schultz, 1990, 351). This possibility was not additionally measured in the experiment, although this could have a significant effect on the results obtained, and also on the implementation of an optimal motivation strategy. Namely, since the Hawthorne experiment, the social nature of work is often crucial for productivity (Baron & Birne, 1997). If we take into account the economic crisis and the recession in the Balkans and EU economies, and the fact that there is a lack of financial resources in companies, the choice of the best motivation strategy could be the most profitable option in the short term, but this could not be the best strategy in the long term. Because of the lack of financial

resources and relatively high costs of work related to the material motivation strategy it could be expected that the company management decides to implement nonmaterial motivation strategies, which means new job contracts and job enrichment by new challenges, job rotation and eventually new machines in the context of their regular change, which could be simultaneously effective in the motivation sense. Such nonmaterial motivation strategies cause minimal financial cost, but make the job interesting, heterogeneous and challenging. Also, the above mentioned nonmaterial strategies can be good supplement to the regular change of depreciated machines. Although the implementation of material motivation strategy with stimulating pay cannot be considered as optimal strategy (due to high costs of stimulating pay), in order to prevent dissatisfaction it is recommended to incorporate this material strategy as well. If this strategy is financially not completely applicable, then perhaps it is possible to create somewhat smaller stimulating pay in order to establish confidence between workers and management. For example, it is possible to introduce premium system of stimulation instead of linear proportional stimulation system for all good performances (for example, 20% greater performance gives 40 EUR of stimulation pay, 25% of greater performance gives 60 EUR, and so on). Such system would stimulate only very high performance optimizing the cost effectiveness of this motivation strategy. The **forth hypothesis** can be approved by this explication, so it is advisable to use the combination of material and nonmaterial motivation strategies for the optimization of long-term efficacy.

CONCLUSIONS

The purpose of this work was to establish the impact of motivation strategies on the work productivity in a clothing company (1683 workers), and to choose the best one. The basic motivation strategy before the beginning of the experiment was the one prescribed by the Labour Law which basically defined compensations, so no other motivation strategy for stimulating the workers was implemented. The results of the experiment discovered that all three experimental

groups showed positive influence of motivation strategies measured by the work productivity, which proved the **first hypothesis**. So all implemented motivation strategies showed greater impact on work productivity. Anyway, the effective motivation strategy in the sense of productivity was material motivation strategy (stimulating pay) which was better in productivity than nonmaterial strategies, and nonmaterial strategies were better than control group/standard which proved the **second hypothesis**. Specifically, the implementation of material motivation strategy by stimulating pay resulted in 411.24 jackets produced per day, followed by nonmaterial motivation strategies: a) new job contracts and new job challenges with 405.78 jackets produced per day; b) new machines plus job rotation with 407.10 jackets produced per day. The lowest production was in the control group (without special motivation strategy, apropos the motivation strategy according to the Labour Law) with 400.20 jackets produced per day. Analysis of the financial effects (profit) of each motivation strategy showed that the most profitable one was the nonmaterial strategy of new job contracts plus new job challenges with the enlarged economic benefit of 3946.50 EUR per month. It was followed by the motivation strategy of new machines plus job rotation with enlarged benefit/profit of 3191.76 EUR per month, and economically the worst motivation strategy was the strategy of stimulating pay (the best strategy when it comes to the productivity) with enlarged benefit/profit of 231.44 EUR because of relatively high cost of work related to the stimulating pay. This result gave us the answer on the **third hypothesis**. If we discuss the acceptability of each individual motivation strategy we can conclude that nonmaterial motivation strategy of new job contracts and new job challenges together with the strategy of new machines plus job rotation was good in the context of productivity growth, especially in the context of cost-effectiveness (because they do not cause any additional costs). Because of that fact (not increasing the working costs) these strategies are attractive for management, and the work with new machines can be used as motivating strategy (without any financial costs) by the ordinary change of depreciated machines. The

conclusion which can be made on the basis of presented research results is that the productivity growth in work intensive industry such as clothing industry can be achieved in the fastest possible way by the implementation of material motivation strategy. Because of the higher working costs needed to compensate the stimulating pay, it may be cost-effective for the company and management to choose nonmaterial motivation strategies, although their sole implementation, if material needs of workers are not taken into consideration, can produce dissatisfaction and motivation decline, so the optimal motivation strategy should require their combination. Because of the complexity of work motivation and its broader connection with more complex factors (individual characteristics, social characteristics, job characteristics and organizational characteristics), in the context of preventing the possible dissatisfaction of workers (low salary

and inappropriate stimulating motivation strategies) it is suggested that the motivation package should also include the material motivation strategy. If such stimulating pay represents temporary financing and is not completely applicable then it is perhaps possible, instead of the linear proportional stimulation system for all good performances, to introduce the premium system of stimulation (for example 20% greater performance gives 30 EUR stimulation pay, 25% greater performance gives 60 EUR, and so on). Such system would stimulate only very high performance and so could optimize the cost effectiveness of this motivation strategy. The **forth hypothesis** can be approved by this explication, so it is advisable to use the combination of material and nonmaterial motivation strategies for the optimization of long-term efficacy.

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Received for publication: 24.04.2013

Revision received: 06.06.2013

Accepted for publication: 21.06.2013

How to cite this article?

Style – APA Sixth Edition:

Bogdanović, M., & Filipović, I. (2013, 07 15). Efficacy verification of some motivation strategies on clothing company example. (Z. Čekerevac, Ed.) *MEST Journal*, 1(2), 1-15. doi:10.12709/mest.01.01.02.01

Style – Chicago Fifteenth Edition:

Bogdanović, Mario, and Ivan Filipović. "Efficacy verification of some motivation strategies on clothing company example." Edited by Zoran Čekerevac. *MEST Journal* (MESTE) 1, no. 2 (07 2013): 1-15.

Style – GOST Name Sort:

Bogdanović Mario and Filipović Ivan Efficacy verification of some motivation strategies on clothing company example [Journal] = Efficacy verification of some motivation strategies // MEST Journal / ed. Čekerevac Zoran. - Belgrade : MESTE, 07 15, 2013. - 2 : Vol. 1. - pp. 1-15.

Style – Harvard Anglia:

Bogdanović, M. & Filipović, I., 2013. Efficacy verification of some motivation strategies on clothing company example. *MEST Journal*, 15 07, 1(2), pp. 1-15.

Style – ISO 690 Numerical Reference:

Efficacy verification of some motivation strategies on clothing company example. Bogdanović, Mario and Filipović, Ivan. [ed.] Zoran Čekerevac. 2, Belgrade : MESTE, 07 15, 2013, MEST Journal, Vol. 1, pp. 1-15.



KNOWLEDGE ASSESSMENT AND APPLICATION OF COMPUTER ADAPTIVE TESTING

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JEL category: **D8, D81, C1, C12**

Abstract

Assessment of knowledge and skills of students, and people at all, are everyday practice in today's world. It is implemented in different ways and for that purpose many methods are used. It is impossible to find one general method, the best in all circumstances. The first part of this paper deals with the problems that arise in the evaluation, and the second part analyzes the possibility of using of computer adaptive testing to determine the grades of students' knowledge. Special attention is paid to the objectivity of evaluation and to the impact of assessors on the final mark. Here are reconsidered examples of grading of the students' papers presented and defended in an international student's competition, as well as defending of several students' term papers in the frame of regular university classes. The results were compared, and it was pointed to many of aspects of establishing the objectivity of the obtained scores. In the section dealing with the presentation of the application of computer adaptive testing in the evaluation, there are presented algorithm of testing, research methods and results of the research on concrete examples from practice. Here is, also, made the comparison of the scores that the same students had achieved in two testing modes: classical testing and computerized adaptive testing. In addition to this comparison, this paper presents the results of a survey of the impressions of tested students. In doing so, the questions were focused on the appropriateness of computer adaptive testing and the other impressions that students had gained during testing, satisfaction with the earned mark and so on. The results achieved by applying computer adaptive testing are summarized in the conclusions, and also some advantages and disadvantages of

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such testing are discussed. At the end, the paper answers the question about the usefulness of evaluations and, also, some questions about the objectivity of the assessment.

Keywords: Knowledge assessment, CAT, computer adaptive testing, estimation of knowledge, Bayes' theorem, MAP approach, spearman rank-order correlation coefficient, grading system

1 INTRODUCTION

Assessment of knowledge and skills has always been an important activity in teachers' and students' life and work. Even not enrolled in a college, prospective students meet the challenges of exam which should show whether the high school graduates are able to attend classes at the university. Based on the presented results the lists are formed, and they are the basis for the selection of candidates. Since universities are aware that the exams are not sufficiently reliable criterion for measuring of the quality of incoming students, they introduce the other criteria which should throw more light on the abilities of candidates, for example, success in previous high school. However, when all factors are analyzed, it is not difficult to conclude that a major influential factor for admission to a college is the result on the entrance exam.

When a candidate becomes a student, during the study, he has to expect a series of examinations that should indicate to what extent the student mastered the skills in certain fields.

And here, universities are aware that only the test passing need not to be a real measure of student knowledge and skills, and they, mostly for themselves, are looking for ways to objectify grades. This independence has created a great diversity in assessments, and also a lot of difficulties during the comparison of the results achieved of graduates. At the contests the reputation of the university is usually taken as the first criterion, and then, as the second criterion, the results of students' work. It is therefore important to find an answer to questions of expediency and accuracy of assessment and evaluation personalization.

In the last fifteen years, primarily due to the formation of the European Union, in order to equalize the quality of study and assessments, the EU states acceded to the change of the studying system. The results of these activities

are the Joint declaration of the European Ministers of Education convened in Bologna on the 19th of June 1999 (EU, The Bologna Declaration, 1999), as the main guiding document of the Bologna process, and the Prague communiqué from the year (2001), the Berlin communiqué (2003), the Bergen communiqué (Bergen, 2005), the London communiqué (2007) the Leuven & Louvain-la-Neuve communiqué (2009), as well as the Budapest-Vienna Declaration (2010) and many others. Many additional criteria were introduced in order to improve the quality of studying and the results achieved. However, the examination remained the most important measure of achievements and acquired knowledge and skills.

Considering that the final score is authoritative, on the basis of the obtained scores students gain their starting positions in their future work which undoubtedly affects their future development and their future life at all. Students who have received better grades for their work can also expect better jobs at the beginning of their careers. However, one can always ask the question: How real and how exact is the grade of gained knowledge? During the examination, student answers to the several questions that cover some parts from the studied subject's program. Has the student mastered the complete subject matter on the same level, and it does not matter on which question student gives his answers, or maybe, student has mastered some parts better than others? Has the student got questions from the matter he mastered better, or, maybe, from the matter he mastered poorly? That is not known to anyone, except maybe, to the student, who possibly, in case that he thinks that the grade he got is low, may cancel the exam.

2 THE OBJECTIVITY OF MARKS IN THE CLASSICAL EVALUATION

While analyzing student marks that have been given on the classical exams, some hypotheses can be set:

Working hypothesis #1

H₀ The score that the student gets on the exam depends on examiner.

Alternative hypothesis #1

H₁ All assessors under the same conditions for the same work give the same marks.

In the case of assessing of students by use of written exams, arithmetic problems or test, all students receive the same questions, so the student may answer to the question well, wrong, or to partially good. Based on the given responses, teacher forms the final mark that defines the level of achieved student knowledge. Taking into account that, for checking of the null hypothesis #1, non-parametric correlation should be considered, the conclusion imposes, that for verification of the hypothesis it is necessary to calculate Spearman Rank-Order Correlation Coefficient. To calculate this coefficient it is not necessary that the data are normally distributed and linear correlated, while the sample size may be smaller than 35. (Dawson & Trapp, 2004).

In classical testing, as a material for the assessment, the teacher uses a written document. Also, the teacher himself may affect to the final mark. The teacher, as well as any other person, can be affected by factors such as

fatigue, mood - bad mood, previous experience with the student and so on.

In addition to that, the teacher alone may have a different relationship to the different parts of the matter that he taught. He can consider some parts as significant, and some parts as less important. Issues from some parts of the subject can be more interesting to him, and asked about more frequently, while some parts of the curriculum he can consider less important, and, consequently, does not ask these questions. If students have such experiences with the teacher, they can avoid certain parts of the subject matter, and give greater attention to other parts of the curriculum. Finally, different teachers have different criteria, so it can be assumed, that, for the same level of student's knowledge, the marks may be different by different examiners.

As an illustration may serve the results of a students' competition, held in Bratislava on VSEMVS in spring 2012. The competition was attended by 13 students of master studies, and their papers were assessed by an international jury of five renowned professors. The objective of the assessment was to rank papers and their presentations by the quality, and to award the five best papers. The results of evaluation are shown in the Table 1.

Table 1 The results of evaluation

	Paper	Grader #1	Grader #2	Grader #3	Grader #4	Grader #5	Sum	Final positions of papers
1	Paper #01	35	53	52	41	38	219	4
2	Paper #02	33	38	55	44	33	203	7
3	Paper #03	40	52	51	40	34	217	5
4	Paper #04	41	41	49	48	34	213	6
5	Paper #05	41	41	40	35	32	189	10
6	Paper #06	38	45	55	53	36	227	3
7	Paper #07	30	38	30	31	32	161	13
8	Paper #08	33	40	46	47	34	200	8
9	Paper #09	56	57	60	56	37	266	1
10	Paper #10	34	52	56	43	35	220	2
11	Paper #11	34	52	35	32	38	191	9
12	Paper #12	18	51	35	32	36	172	11
13	Paper #13	42	44	40	37	37	200	8
14	Paper #14	27	39	29	35	32	162	12

Table 1 shows the grades that five assessors gave, in points, for each paper. The scores are then added and the totals for each of the papers were ranked in the column „Final positions of papers“.

Looking at the ratings by assessors, it can be observed that the average score of all the papers of different assessors is different and ranges from 34.9 (the assessor #5) to 45.9 assessor #2). Figure 1 shows average marks of all papers by assessors.

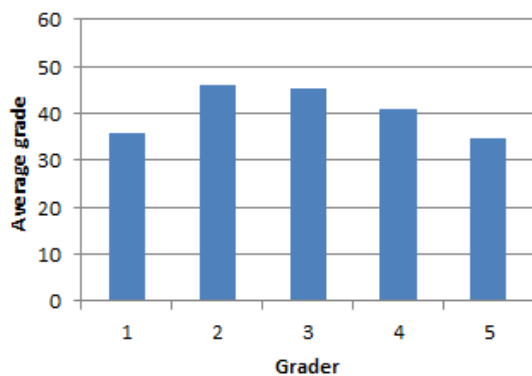


Fig. 1 Average grade per grader

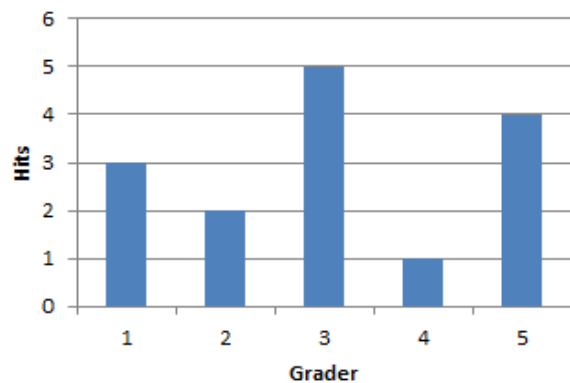


Fig. 2 Number of grader's hits

Comparing rankings of the papers based on evaluations of individual graders with the order of papers in the final ranking, one can observe that the graders' rankings differ considerably from the final ranking. Thus, the first grader's ranking in three positions coincides with the final ranking. Rankings of other assessors are consistent with the final ranking list in 2, 5, 1, 4 positions, as shown on Figure 2. In addition, different assessors gave to the same work and to the same oral presentation a very different numbers of points. It is possible to see for the five best ranked papers in Figure 3, and for all papers in Table 2. Mean interval of variation for all fourteen

papers was 17.14, which would correspond, in 10-grades rating system, to the span of two grades. The maximal interval of variation was 33 points, at paper #12, which would correspond, at the same system, to the range of more than three grades. Even greater differences arise when comparing intervals of variations with the average grades of papers. The smallest deviation is in the case of the paper #13 in the amount of 17.50%, and highest, in the case of paper #12, that amounts 95.93%.

Based on the sample used there is no reason to reject the null hypothesis.

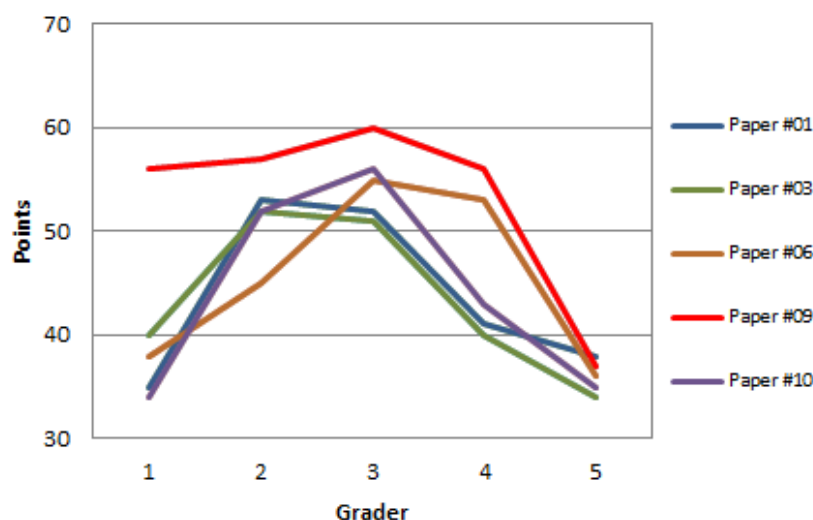


Fig. 3 Points of the first five works

Table 2 Statistical analysis of the results of the competition in MSc category

No.	Paper	Average	Interval of variation (max-min)	Interval of variation / Average	Average of absolute deviation	Variance	Standard deviation
1	Paper #01	43.8	18	41.10%	6.96	54.16	7.36
2	Paper #02	40.6	22	54.19%	7.12	68.24	8.26
3	Paper #03	43.4	18	41.47%	6.48	48.64	6.97
4	Paper #04	42.6	15	35.21%	4.72	29.84	5.46
5	Paper #05	37.8	9	23.81%	3.44	13.36	3.66
6	Paper #06	45.4	19	41.85%	6.88	58.64	7.66
7	Paper #07	32.2	8	24.84%	2.32	8.96	2.99
8	Paper #08	40.0	14	35.00%	5.20	34.00	5.83
9	Paper #09	53.2	23	43.23%	6.48	67.76	8.23
10	Paper #10	44.0	22	50.00%	8.00	78.00	8.83
11	Paper #11	38.2	20	52.36%	5.52	51.36	7.17
12	Paper #12	34.4	33	95.93%	7.52	110.64	10.52
13	Paper #13	40.0	7	17.50%	2.40	7.60	2.76
14	Paper #14	32.4	12	37.04%	3.68	18.24	4.27

Table 3 The results of the evaluation on students' term papers

Work	Students-graders																	Teacher				
	Grader #1	Grader #2	Grader #3	Grader #4	Grader #5	Grader #6	Grader #7	Grader #8	Grader #9	Grader #10	Grader #11	Grader #12	Sum	Ranking Position	Average	max-min	Variance interval / Average	Average of absolute deviation	Variance	Standard deviation	Grades given by teacher	Ranking Position
#S01	66	57	75	70	70	68	74	71	75	61	74	73	840	3	69.50	18	25.90%	4.33	29.92	5.58	60	3
#S02	73	71	73	74	74	45	57	75	74	60	65	74	815	4	67.92	30	44.17%	7.44	81.24	9.01	53	5
#S03	62	66	74	68	68	62	70	60	70	68	59	74	801	6	66.75	15	22.47%	4.13	23.52	4.85	45	6
#S04	67	70	75	73	75	65	73	70	73	68	68	74	851	2	70.92	10	14.10%	2.92	10.41	3.23	61	2
#S05	75	69	75	75	75	68	74	75	75	70	75	64	870	1	72.50	11	15.17%	3.17	13.08	3.62	68	1
#S06	67	70	70	69	69	52	75	63	72	63	70	73	813	5	67.75	23	33.95%	4.33	34.19	5.85	59	4

This analysis used a relatively small sample. In such contests more numerous commissions rarely appear, and a further analysis of the hypotheses was made on the example of assessing students' term papers. The testing was conducted at the Business school Čačak. The six works (seminar papers), that the students exhibited and defended as part of their regular duties, were a subject to assessment. The evaluation committee consisted of twelve

students plus a teacher who evaluated works independently. The results are shown in Table 3

It should be noted that the students-assessors got the auditor's forms with defined grades structure and the span of points for each criterion. This has significantly objectivized ranking and reduced dissipation in the assessment. Such approach was necessary because of assessors' inexperience.

For each work the median was calculated on the basis of evaluations of all assessors. These values are taken as the y variable to calculate the Spearman's rank correlation coefficient on the way described by Weisstein (2012). Individual assessments of each evaluator for the given work are taken for the x variables.

After entering all pairs, a calculation was performed to provide the values of $r_{s(\text{calculated})}$. This gave $r_{s(\text{calculated})} = 0.371$. Since $r_{s(\text{table})} = 0.306$, it is easy to conclude that the $r_{s(\text{table})} < r_{s(\text{calculated})}$. On that basis, according to a Mann-Whitney test (anon, 1999), it is to be concluded that x and y are in correlation. The results were expected because the median is calculated based on the evaluations of all graders.

Grades are matched in only $r_s^2(\text{calculated}) = 13.73\%$, which further indicates that the assessors, the same works under the same conditions, assessed with different grades in the most cases.

This evaluation showed that there were significant differences in scores of individual works. Differences between maximum and minimum of marks awarded to one of works ranged from 10 to 30 points, or one to three grades. However and here it turned out that a group of assessors separated clearly the best and worst work. The best placed work was best placed in nine rankings, and on the remained three lists took the second, fourth and sixth position. The least ranked work was rated on six rankings as the least work, and twice was ranked as the third, fourth or fifth.

The teacher evaluated each work according to the same form that was used by students-graders. Individual grades of papers, which the teacher gave, differed from grades mean values that students-graders assigned to the works, but the overall order of works coincided almost completely. Four works were ranked in the same order in both rankings, but the fourth and the fifth works on the lists had alternate positions. The reason may lie in the fact that the difference between these works on the ranking list formed by the students-graders was only 0.17 points, or 0.17%, so it could be said that these works share the fourth and fifth place. The teacher has noticed a more significant difference between these works.

3 IMPACT OF THE ASSESSMENT SYSTEM ON THE MARK

Previous research has shown that the structuring of the assessment may reduce the impact of the experience of assessors and that comparable results in terms of quality of works can be obtained, but significant differences still occur in the individual assessments of the works. However, both assessments were conducted on the way that all points, assigned by the evaluators, were added for each work, and the final order of ranking was determined by these totals. It is interesting to see if it would give different results with a different grading system.

The new hypotheses can be set. In this case:

Working hypothesis #2

H_0 The grading system may affect the evaluation results.

Alternative hypothesis #2

H_1 The grading system does not affect the evaluation results.

It can be assumed that the criteria of different graders are different, and that they will give different numbers of points to the same works. As noted, for each of the papers, scores were collected, and then, the order of works was determined. That way, the impact of graders who give lower scores, on the final grade, is less than the impact of graders who give bigger numbers of points. In extreme cases, an assessor, who makes a big difference in points between the evaluated works, can dramatically affect the final order.

It is interesting to see what would happen if, to the student competition was applied another system in which every grader had made his ranking, and the points then were tallied based on the position in the tables. Such an analysis was performed and shown in the Table 4. For the purposes of this analysis, the rankings are considered for each grader separately. First place was awarded one point and for each subsequent place one point more. For students who have achieved the same number of points here is awarded the same number of points that corresponded to the better placement.

It is interesting to note that the placement in this system differed from the placement in the original system. Only in seven of the fourteen cases, the placements would remain the same. In one case the difference was three places on the list, three

times for one and three times for two places. The students who had the same amount of points, and who shared the same position in the rankings, were assigned with the highest of the rankings among those students (e.g. 8-9 → 8).

Table 4 The results of the evaluation on students' term papers (method 2)

	Work	Grader #1	Grader #2	Grader #3	Grader #4	Grader #5	Sum	Position (way 2)	Position (original)
1	Work #09	1	1	1	1	3	7	1	1
2	Work #01	7	2	5	7	1	22	2	4
3	Work #06	6	7	3	2	5	23	3	3
4	Work #10	8	3	2	6	7	26	4	2
5	Work #04	3	9	7	3	8	30	5	6
6	Work #03	5	3	6	8	8	30	5	5
7	Work #13	2	8	9	9	3	31	7	8-9
8	Work #11	8	3	11	12	1	35	8	10
9	Work #08	10	11	8	4	8	41	9	8-9
10	Work #02	10	13	3	5	11	42	10	7
11	Work #05	3	9	9	10	12	43	11	11
12	Work #12	14	6	12	12	5	49	12	12
13	Work #14	13	12	14	11	12	62	13	13
14	Work #07	12	13	13	14	12	64	14	14

In case of use of some other method for the final rankings such as use of weighting of the rankings similar to F1 (anon, 2012), it is most likely that a ranking list will be different. Thus, for example, if

for each position on the list of each grader, the number of points as shown in Table 5 is applied, a new ranking will be established as shown in Table 6 in the column Position (pondered).

Table 5 Weights for the rank positions

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Points	25	20	16	13	11	9	8	7	6	5	4	3	2	1

In case of such a scoring system, in which the first five positions were significantly more valued, there are only five matches with the original rankings, but, also, only seven matches with the previous ranking list obtained the same way, but without weighting. Five works has achieved the same position on all three rankings!

Specific examples confirm the hypothesis, and, based on the used sample, there is no reason to reject the null hypothesis #2. For the alternative hypothesis #2, in this sample, there are observed only five confirmations, so it could be said that it is very unlikely, and that the alternative hypothesis #2 was not confirmed in this case.

What has the prior analysis shown? Roughly, one might say that the score depends largely on the impression that the student leaves on the examiner. On the other hand, it is shown that truly valuable works, which considerably deviate from the middling, are noticed and well-marked. Among the mediocre works, the scores vary considerably, probably due to different affinities, concentration and the current mood of assessors. In all this, at no time is included in the analysis neither mental nor physical condition of the student, what undoubtedly affects the results achieved on the exam.

Table 6 Comparison of possible outcomes for the three different evaluation methods

	Work	Position (pondered)	Position (method 2)	Position (original)
1	Work #09	1	1	1
2	Work #01	2	2	4
3	Work #06	3	3	3
4	Work #10	4	4	2
7	Work #13	5	7	8-9
8	Work #11	5	8	10
5	Work #04	7	5	6
6	Work #03	8	5	5
10	Work #02	9	10	7
9	Work #08	10	9	8-9
11	Work #05	10	11	11
12	Work #12	12	12	12
13	Work #14	13	13	13
14	Work #07	14	14	14

When both the previous null hypotheses were confirmed, the question about the method to get a realistic measure of knowledge and skills of the students can be justifiably brought up. A possible solution to eliminate the impact of graders on the results of the exam could be the application of computer adaptive testing (CAT).

4 APPLICATION OF THE COMPUTER ADAPTIVE TESTING (CAT) IN THE EVALUATION

Machine testing of knowledge and skills of students was proposed by many authors, and a large number of authors propose CAT as a way to eliminate subjectivity in the assessment and reduction of the time of students testing, such as Curtis (2009), Maravić-Čisar&All (2010), Clariana & Wallace (2002), and others. However, it should be noted that machine testing can be problematic in the case of blind persons testing. Some practical guidelines for carrying out of testing in these cases are presented in the TEST ACCESS: Guidelines for Computer Administered Testing (Allan, Bulla, & Goodman, 2003)

Theoretical bases of CAT applied in this research are presented in the doctoral dissertation of Svetlana Andjelic (2010). In the dissertation, the presented CAT model contains a testing that is divided into different levels of difficulty, similar to

Zenisky, Hambleton and Luecht (2010). The idea is that in the preparatory phase of the database creating, a large number of predefined questions, in all areas, were given to a large number of students. On the basis of their responses it is possible to define sets of questions for each area. Questions are grouped into groups by areas and by the severity of responses. When the questions base is formed, students can start testing in accordance with CAT model shown in Figure 4. Student, in accordance with the expected level of his knowledge, chose the level where testing begins. In this way, student can affect the length of the testing, but the selected initial level in any case does not affect the final result of testing.

4.1 Research method

The experiment, consisting of two separate phases: the classical testing and CAT testing, was conducted on a sample of 100 students.

4.1.1 Phase 1

The students took the exam using classical, paper based approach. The questions were of various difficulties and were rated accordingly, each carrying an adequate number of points. To enable an easy grade forming process, the sum of the points from all the questions was 100. All of the students were given 14 identical questions, with 8 questions carrying 5 points, and 6

questions carrying 10 points. Students did not lose points for wrong answers. The students were given one hour to complete the test. After that, the professor evaluated the tests and gave grades to the students. This part of the process

took around six hours. In addition to the evaluation of the tests, the professor had to mark each point on the paper, check the sum of points, write it into the chart, check if all the grades were filled in properly etc.

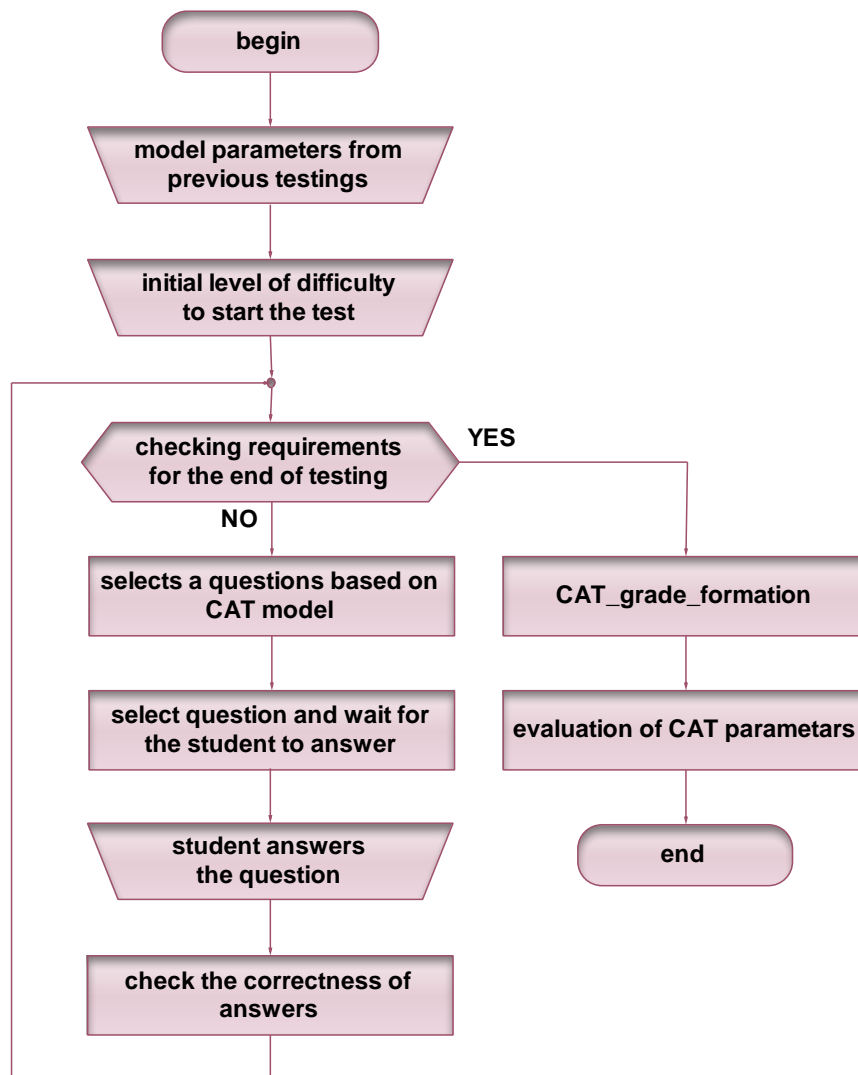


Fig. 4 Algorithm of CAT testing

4.1.2 Phase 2

The same students were tested using a computer. The testing was based on the above described CAT model and conducted in the computer lab. It is worth mentioning that the students got familiar with the software using it during lab classes. This was necessary in order to avoid stress during the testing that could have been caused due to the use of unfamiliar software. As it always happens, the

level of the familiarity with the software was not the same for all students.

4.2 The research results

In the following example, questions were divided into three levels of difficulty, and each question is followed by five answers. At the very beginning, probability for the final grade is the same for all possible outcomes because it can be presumed that at the beginning of the

testing all outcomes are equally probable. If the grading system with six different grades (5, 6, 7, 8, 9 and 10; grade 5 is failing grade) is used equal values of 0.1667 (or 1/6) are taken as starting *a priori* probabilities.

For the initial *a priori* probability of questions the calculated values based on the classic paper test can be taken (Linacre, 2000). The values used as *a priori* probabilities were arrived at on the basis of the test results from the first phase (the paper based test). After the completion of the CAT testing, a new evaluation of the model was conducted, or in other words, new *a priori* probabilities were calculated. New probabilities (*a posteriori* probabilities) are calculated based on Bayes' theorem of conditional probabilities, similar to the proposed method of Rudner (1998) and Rudner & Liang (2002), on which is then applied Maximum *a posteriori* (MAP) approach (Pavlek, 2005).

Here will be presented an example of the process of grade forming for one student (testing was conducted at the Faculty of business and industrial management – "Union" University Belgrade).

Through an application of the MAP model to the last calculated *a posteriori* probabilities (the probabilities after the last item), it can be seen that it is maximal for the event A_8^1 . Therefore, it can be concluded that the student has earned grade 8. This can be clearly seen on the Fig. 6, which shows a *a posteriori* probabilities after each item of the test. Probabilities are shown for the moment after giving answer to the question. Student answered the question, and answers were true (T) or false (F) as it is shown on the Fig. 5.

It is interesting that after only six questions, the probability of the final mark 8 was almost three times greater than the second the most probable mark, mark 7. After the third answer it

was clear that the student will earn mark 7, or mark 8.

The same student was tested by one classical test with 14 questions. He answered on nine of fourteen questions. Five answers were wrong. If *a posteriori* probabilities were calculated after each answer, the results would look like as it is shown on the figure 6.

This student got a mark 8 for his answers, the same mark in both cases. Comparison of CAT and classical marks for all students gave results as shown on the Fig. 7.

The figure 7 shows that 52% of students earned the same marks under both methods. In remained 30% of cases students earned better marks when they were tested classically, and in 18% of cases they got better grades with CAT method. In 20% of cases the difference was greater than one mark, and in 8% of cases difference was 3 grades. The later detailed analysis showed that the cause of bigger differences laid in the fact that some of students were not well prepared for CAT testing. Smaller differences mainly were consequences of the fact that the marks were rounded and given as integers. In such cases small differences in the area around the half's gave different marks.

In order to test whether there is a connection between each student's grades after the first and the second phase, the Mann – Whitney test was applied. In this particular case, the one - sided hypotheses testing the existence of correlation between two variables without getting into the type of correlation (positive or negative) were used.

Based on the results of the mentioned statistical test, it has been shown that there is a connection between the final grades that student received after each of the tests, conventional and CAT. The grades match in r_s^2 (calculated) = 82.57% of cases. The conclusion is logical because it shows that the difference in grades that each student received is small and amounts to one grade at most (which can be verified by inquiry into the grades of each student).

¹ A_i designates events (the outcomes of testing) where $i = 5$ to 10 (i.e., grades 5 through 10)

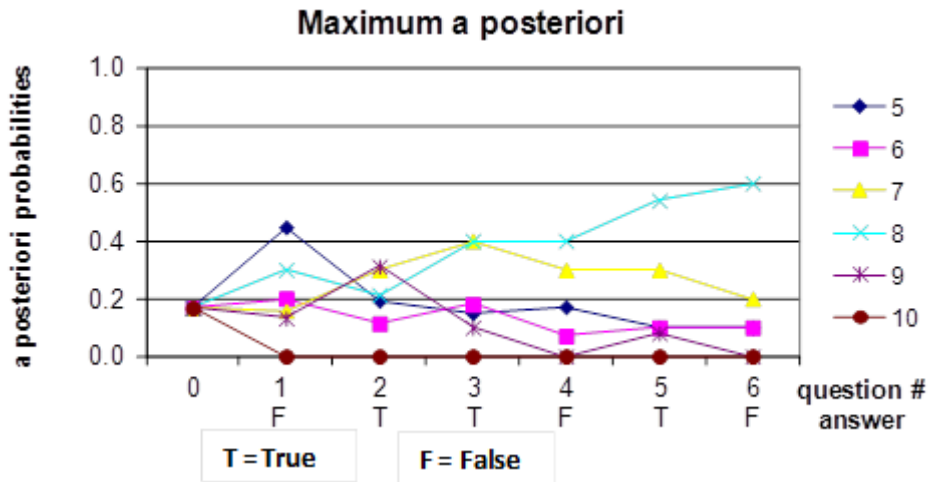


Figure 5 Determination of the mark based on CAT testing

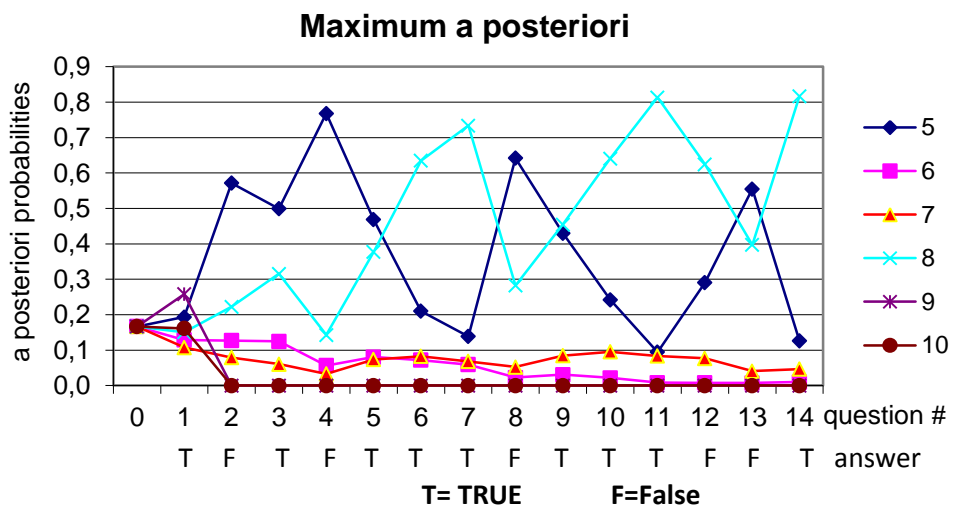


Figure 6 A posteriori probabilities of events in classical testing of student #53

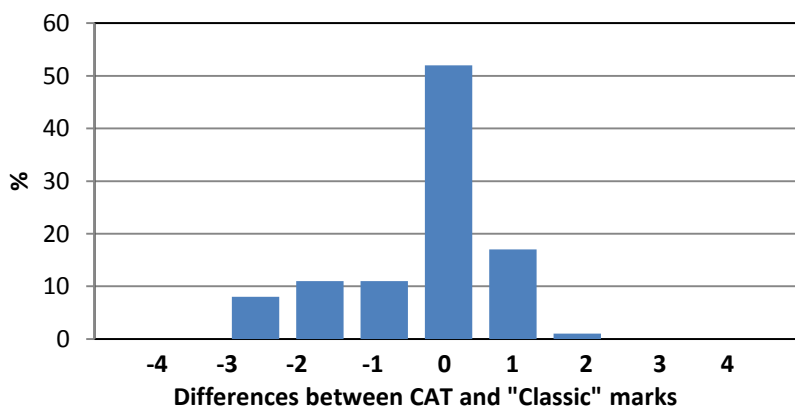


Figure 7 Comparison of CAT and classical marks of students

It is also proved that there is a correlation between the grades that each individual student received after each of the tests, or in other words, the grades are the same, or slightly different (the difference of up to one grade). There is, however, no correlation between the total numbers of specific grades at each test. The total number of specific grades (5, 6, 7...10) received at the classic test is not mutually connected with an adequate value for the CAT test. One of the main reasons for this is in possible mistakes in the choice of answers in the multiple choice questions of the classic paper based test.

After completing the CAT testings, students had to fill in a questionnaire. The survey aimed to summarize the students thoughts and suggestions on the implementation of electronic testing. Special emphasis is put on the CAT testings in education. In line with this the questions in the survey were aimed on the application of computer adaptive testings in the education. Students were reminded that survey results do not affect their grades.

When asked whether they thought that the classic test objectively evaluate their knowledge 23% of surveyed students answered affirmatively.

That traditional testing does not suit them declared 82% of surveyed students, and their answers can be summarized as follows:

- Testing is not adapted to me (35%),
- I am reluctant to answer the questions that require long answers (23%),
- The same answer to a question for different students was scored differently (25%).

Even 70% of surveyed students responded that CAT testing suits to them, with the explanation:

- It is easier to answer questions that offer answers (45%),
- I got neither too easy nor too difficult questions, and it shows that the questions were tailored to me (38% surveyed students),
- CAT testing is interesting and not monotonous (32%),
- Teacher can not affect the assessment (20%).

It is interesting that 74% of surveyed students were considered that applied CAT testing objectively reflects their knowledge (Fig. 8).

Did applied CAT testing objectively represent your knowledge?

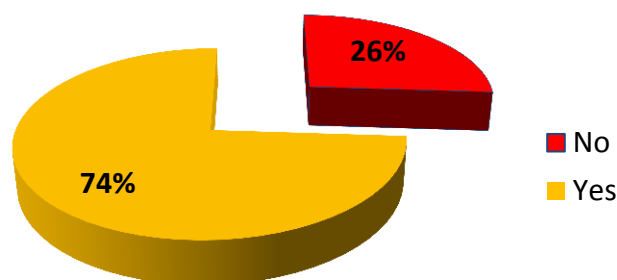


Fig 8 CAT testing and objectiveness of the assessment of knowledge

Students who have declared that they do not like CAT testings are mostly of those who have declared that they use computers rarely, and they belonged to older age (between 30 and 50 year of life). Students stated the following reasons:

- lack of familiarity with computer, even the fear of computers, (10% of students),

- not adapted to interface (5%),
- inability to self-check the obtained results (15%).

5 CONCLUSIONS

In this paper it is shown and proved that each test of knowledge and skills carries a series of

traps and that each score is subject to discussion. It also demonstrates the significant impact of examiners on the final assessment in the case of using of conventional grading system.

So, it is to be concluded that one of the main problems that teachers and students face is the objective evaluation of the level of knowledge in certain field. From the perspective of the teacher, the problem is evaluation of knowledge and description of this evaluation with a grade, as a measure of evaluation of that knowledge. From the perspective of student, it is important that he is given an objective and adequate grade that describes the level of knowledge he has.

As one of solutions that can give an objective grade it can be suggested the use of CAT *Grade forming function* which defines the grade using different approaches, such as Bayes' theorem and MAP procedure. This has been proven to be very efficient in most cases.

Use of a function for determining the conditions for the end of the test allows ending the test when the grade clearly converges toward one of the possible values.

In cases of classic testing and bigger frequency of one question, it has been noticed that students pay more attention to that question and that the percentage of the correct answers increases. This way, the questions that have been labeled as hard remain in a group of hard questions without a good reason. As a consequence the evaluation becomes less objective. CAT testing reduces the amount of these situations. It is possible to provide automatic update after each test and ensure statistically stable data.

The advantages of use of the described CAT model in practice for students and teachers are vast, and much bigger than the disadvantages. The need for mass pretesting, in order to get

relevant questions, answers, and distractors (incorrect options in a multiple choice question), is seen as the main disadvantage of the model by the authors. This disadvantage can be eliminated or minimized through a creation of databases of questions, answers, and distractors that would be common for several faculties and/or universities. The work on implementation of this model of estimation of student's knowledge as standard procedure is therefore justified. Having in mind the large number of candidates that attend the lectures from the same subject, CAT can be used as a powerful tool for evaluation of students in high school as well.

Finally, it should be given an answer to the reasonable questions, from the beginning of the paper, about the appropriateness of evaluation: Does evaluation make sense and, if so, whether the mark gives the real picture about the knowledge and skills of interrogated student? On the basis of the above, the answer can be given that assessment makes sense. In the paper conducted research has shown that the evaluation was a very efficient in selection of the best and the worst works, and that it is much harder to distinguish between works of similar quality level. If during the study, in the frame of the teaching subject, several control assessments are performed, it is very likely to get useful information about the level of students' knowledge from that subject, and the final mark for this subject can be pretty realistic. Since the student, during the study, is assessed in many different teaching subjects, it is very likely to be obtained, from all marks, usable information about his capacities. Application of CAT could remove one more problem, lack of uniformity in assessing at the various colleges and universities. This way ranking by the candidate could be done, regardless of where the student earned his degree.

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Received for publication: 15.12.2012

Revision received: 14.02.2013

Accepted for publication: 29.03.2013

How to cite this article?

Style – **APA Sixth Edition:**

Čekerevac, Z., Anđelić, S., & Čekerevac, P. (2013, 07 15). Knowledge assessment and application of computer adaptive testing. (Z. Čekerevac, Ур.) *MEST Journal*, 1(2), 16-30. doi:10.12709/mest.01.01.02.02

Style – **Chicago Fifteenth Edition:**

Čekerevac, Zoran, Svetlana Anđelić, / Petar Čekerevac. „Knowledge assessment and application of computer adaptive testing.“ Уредник Zoran Čekerevac. *MEST Journal (MESTE)* 1, бр. 2 (07 2013): 16-30.

Style – **GOST Name Sort:**

Čekerevac Zoran, Anđelić Svetlana and Čekerevac Petar Knowledge assessment and application of computer adaptive testing [Journal] = Knowledge assessment and application of CAT // *MEST Journal* / ed. Čekerevac Zoran. - Belgrade : MESTE, 07 15, 2013. - 2 : Vol. 1. - pp. 16-30. - ISSN 2334-7058 (Online); ISSN 2334-7171.

Style – **Harvard Anglia:**

Čekerevac, Z., Anđelić, S. & Čekerevac, P., 2013. Knowledge assessment and application of computer adaptive testing. *MEST Journal*, 15 07, 1(2), pp. 16-30.

Style – **ISO 690 Numerical Reference:**

Knowledge assessment and application of computer adaptive testing. **Čekerevac, Zoran, Anđelić, Svetlana and Čekerevac, Petar.** [ed.] Zoran Čekerevac. 2, Belgrade : MESTE, 07 15, 2013, *MEST Journal*, Vol. 1, pp. 16-30. ISSN 2334-7058 (Online); ISSN 2334-7171.



DETERMINING INFLUENCE OF ALLOYING ELEMENTS ON PROPERTIES OF ALLOYS BY ROBUST EXPERIMENT

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Category: **Research article**

Abstract

The paper presents an approach to determine the influence of alloying elements on the properties of iron-based alloys by a robust numerical experiment. The study is based on a database of 90 alloys with relationship between the chemical composition and mechanical and plastic properties. The limit of yield strength (R_e) and elongation (A) are assumed as optimizing parameters. The properties of the alloys used in the database are under heat-treated condition after low temperature hardening and tempering applied. In terms of the mission of any performance steels were identified nonlinear regression relationships. As a result, the proposed procedure shows how to specify the amount of alloying elements on iron alloys based on the Taguchi method. The originality of the solution lies in application of the Taguchi method for simultaneous multiple criteria within a task.

Keywords:

ferrous alloys, robust numerical experiment, *Taguchi method*, modelling and optimization properties

1. INTRODUCTION

For the past few decades the attention of many engineers and statisticians in the world has been drawn to the so-called Taguchi method. A lot of successful applications of this method have been reported in designing quality products using

modern techniques such as neural networks and genetic algorithms. A number of examples in the field of metallurgy and processing of blanks are presented in the results from the Taguchi-based research by Adem, Turgay, & Gurcan (2012), Bajic, Jozic, & Podrug (2010), and Gaitonde, Karmik, & Davim (2009) for processing metal surfaces and for machining of holes. Machining parameters are optimized to obtain higher quality surfaces. The same approach is used from Kochure & Nandurkar (2012) for selection of induction

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hardening parameters. The Taguchi approach is applied from Naveen, Maheshwari, Sharma, & Anil (2008) for powder metallurgical production of electrodes and their behavior is compared to the behavior of a copper one. The maximal strength of castings from aluminium for the Taguchi-based approach is realized by Oji, Pamtoks, Idusuyi, & Aliu (2012) and Ramesh & Suresh (2012) the same approach is examined to explore the wear of friction surfaces; an unified model of the process is elaborated.

The core of Taguchi approach consists of the method for reducing the influence of factors called noise (disturbing) that impair the quality parameters of the product/process. It is where the radical difference from the traditional technique of quality, which provides identification of existing sources and conduction of measurements that are often costly due to their control. The parametric design of Taguchi ensures non-sensitivity to (interference) noise along the way to the proper selection of certain parameters called controllable factors.

In engineering practice, when the variance of the quality index is too large, it frequently involves narrowing of the tolerance ranges of the parameter examined. However, to narrow the tolerance intervals means to buy raw materials of higher quality, which are more expensive.

Therefore, robust engineering design provides high quality with low product. It also shows that quality products can be produced even if the raw materials are not of the highest quality.

The features of processes and products quality usually depend on many parameters. It is why that more sophisticated methods are needed to find such parameters of the product that make it insensitive to interference. Experiments are conducted where both the product parameters and noise conditions are modified. The goal of these experiments is to see how the joint effects of the product parameters and noise factors influence on the quality characteristics. (Kachar, Off line quality control parameters desing and Taguchi method, 1985)

The robust design is a step forward in comparison to the traditional methods of experiment planning and analysis where only the dependence of the quality index on the factors is

studied. With robust design its dispersion is examined as well. (Kachar, 1986)

Taguchi uses plans called orthogonal arrays by the scheme shown in Fig.1.

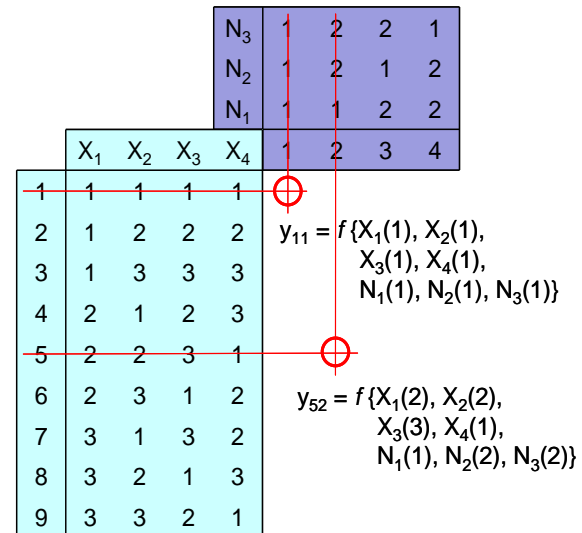


Fig.1. Orthogonal plans with four design parameters X₁ – X₄ and three noise factors N₁ - N₃.

The problem is that in this case the experimenter has to preliminarily know which interactions are significant. Usually there is no such information.

Performing experiments according to the parameter plan in Fig.1, it is obtained that N = N₉N₄ are the values of quality characteristics suitable for decision making. Taguchi uses the ratio $\frac{signal}{noise} \left(\frac{S}{N} \right)$ as a measure for statistics.

The effects of the factors are determined for each line as to minimize the performance characteristics the formula used is:

$$\frac{S}{N} = -10 \log \left(\frac{1}{n} \sum_{j=1}^n y_{ij}^2 \right),$$

and for maximizing

$$\frac{S}{N} = -10 \log \left(\frac{1}{n} \sum_{j=1}^n \frac{1}{y_{ij}^2} \right).$$

Two types of models describing the behavior of the quality characteristics can be created:

- model of the average values of quality index,
- model of dispersion of the quality index.

With these models available, robust design is reduced to an optimization problem. One of its possible formulations is the following: to select values of these product parameters to minimize the disperse of quality index provided that its average value is equal to the target value $y = Nom.$

The research from reference shows the broad spectrum of problems in which Taguchi method is applied

The aim of this study is to present an approach to determine the influence of alloying elements on the properties of ferrous alloys with multi-criteria robust numerical experiment.

The wish is to achieve results that are better than the source used to obtain the mathematical model

2. ESSENCE OF THE NUMERICAL PROCEDURE

A database of 90 alloys found at [http://www.splav.kharkov.com/choose_type.php] is used as a basis of the study. The database cited contains the relationship between the chemical composition and mechanical properties of alloys involved. It contains data on the quantities of carbon C, silicon Si, manganese Mn, nickel Ni, chromium Cr, molybdenum Mo, sulfur S and phosphorus P. These are the input variables of the model. For mathematical models based on the chemical composition it is reported by Efimychev, Mikhailov, Svyatkina & Prokhorov (1976) and Rozhkov, Vlasov & Mulk (1990).

Table 1. Minimum and maximum values of alloying components

Input parameter	Chemical symbol	min [%]	max [%]
x ₁	C	0.12	0.52
x ₂	Si	0.27	1.4
x ₃	Mn	0.35	1.75
x ₄	Ni	0	4.22
x ₅	S/P	0.025	0.035
x ₆	Cr	0.15	2.50
x ₇	Mo	0	1.5
x ₈	V	0	0.45

The properties of the alloys in this database are under heat-treated condition after applying low temperature hardening and tempering.

The optimizing parameters are: the yield strength Re and elongation A. The ranges of change of the used alloying elements of ferrous alloys are listed in Table 1.

Table 2. Coefficients of regression models of the target parameters under examination

No	Coefficient	Re [MPa]	A [%]
1	C ₀	2114.1150	46.556931
2	X ₁	7756.8407	-5162068
3	X ₂	7199.1880	-39.72085
4	X ₃	-7695.0560	-11.96989
5	X ₄	-208.3606	-6.194367
6	X ₅	-206849.10	608.78794
7	X ₆	3214.6636	-44.13384
8	X ₇	-25808.88	296.07430
9	X ₈	88806.163	-1272.128
10	X ₁ X ₂	-386.6554	-17.34393
11	X ₁ X ₃	-1070.550	4.4991108
13	X ₁ X ₅	-136396.0	-479.9262
14	X ₁ X ₆	-937.1690	10.247712
15	X ₁ X ₇	-4306.703	56.210086
16	X ₁ X ₈	28210.222	-234.0791
17	X ₂ X ₃	-2441.408	8.1761576
18	X ₂ X ₄	1139.5872	9.5115582
19	X ₂ X ₅	-136064.2	630.64368
20	X ₂ X ₆	-3798.235	24.332090
21	X ₂ X ₇	90881.356	-1331.408
22	X ₂ X ₈	-385523.8	5120.2990
23	X ₃ X ₄	461.26479	-3.247065
24	X ₃ X ₅	235316.49	-444.5946
25	X ₃ X ₆	-45.97452	11.423925
26	X ₃ X ₇	3249.6850	-13.73530
27	X ₃ X ₈	-4913.023	110.24208
28	X ₄ X ₅	-5816.934	59.110091
29	X ₄ X ₆	-159.9173	4.3070441
30	X ₄ X ₇	-6.156909	-2.088778
31	X ₄ X ₈	-105.0768	.73706332
32	X ₅ X ₆	-27149.24	187.81631

No	Coefficient	Re [MPa]	A [%]
33	X ₅ X ₇	41678.774	884.54626
34	X ₅ X ₈	300515.42	-2272.635
35	X ₆ X ₇	-1228.339	32.838349
36	X ₆ X ₈	1056.322	2.7722696
37	X ₇ X ₈	3239.252	51.757562
38	X ₁ ²	-992.3896	2.2481142
39	X ₂ ²	2493.712	-4.790038
40	X ₃ ²	184.2402	6.8702503
41	X ₄ ²	34.06016	.22590263
42	X ₅ ²	3139839.	-13811.99
43	X ₆ ²	-242.5842	3.7158944
44	X ₇ ²	891.8651	-9.448061
45	X ₈ ²	-4756.548	-356.8126
	R	0.8755	0.8632

According to Vuchkov and Stoyanov (1980), K if $F > F(\alpha, v_1, v_2)$ then the coefficient of multiple correlation R is significant and the model can be used for prediction.

In regard to the problem examined, for each of the mechanical properties of steels under examination nonlinear regression dependencies of the kind have been identified:

$$f_i(x) = b_{00}^i + \sum_{j=1}^8 b_{j0}^i x_j + \sum_{j=1}^8 \sum_{l=j+1}^8 b_{jl}^i x_j x_l + \sum_{j=1}^8 b_{jj}^i x_j^2$$

Here b_{ij} are the parameters of the regression model.

An experiment is carried out by the methodology of Taguchi modeled on orthogonal matrices developed by it. The experiment can be implemented in two ways:

- a real experiment thanks to which results for processing are obtained;
- numerical experiment with availability of adequate regression models.

The presence of coefficients of adequate models described in Table 2 makes it possible to carry out numerical simulation by the scheme presented in Fig. 1. The orthogonal matrix I with 27 rows and 13 columns given in Table 3 (27, 13) is chosen as a noise matrix. The matrix is derived with factors at three levels.

Specifically for the data of the experiment, eight pillars are used as the regression models are obtained based on eight variables.

In the matrix X_1 corresponds to carbon, X_2 corresponds to silicon, X_3 corresponds to manganese, X_4 corresponds to nickel, X_5 - corresponds to sulfur and phosphorus, X_6 corresponds to chromium, X_7 corresponds to molybdenum and X_8 corresponds to vanadium.

The methodology proposed will be used to analyze yield strength Re and elongation A. To build these two target functions, 90 measurements that form the data matrix A (90, 8 +1) have been used. Here the added column "1" is for the output target function Re or A, stored compactly in the matrix.

To optimize the computing process, the scheme in Fig. 2 is selected, which having been processed for the particular case takes the following kind.

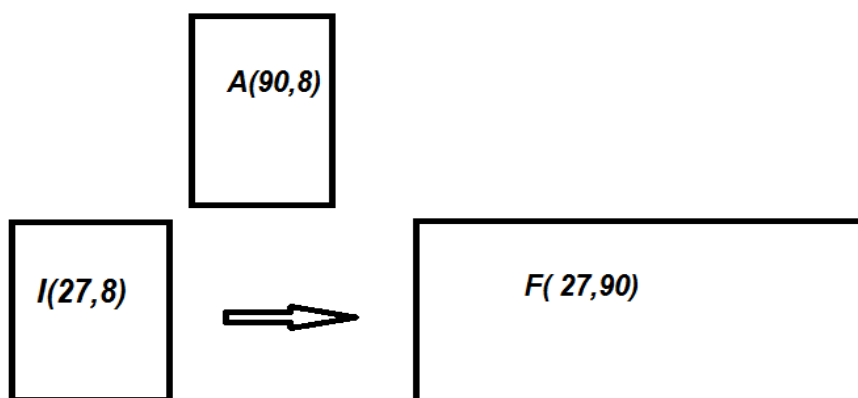


Fig. 2 Organizing experiments with parametric planning with matrices I, A and F

In numerical experiments that use models based on the chemical composition the noise can be expressed only in the change of the respective components. It is assumed to express noise Δ in the following way $\Delta_i = \frac{\bar{x}_i}{k}$ where further calculations are made for k equal to 100 and 70.

Here \bar{x}_i is the mean value of relevant variable "i".

For level "1" of I (27,8) noise is subtracted from relevant x_i taking the value of $x_i - \Delta_i$. With level "2" no correction is applied, the value of x_i is preserved. With level "3" noise is added to relevant x_i taking the value of $x_i + \Delta_i$.

Thus, noise is expressed in the change of chemical composition. The calculation process is organized as follows:

A row of matrix I (27,8) is taken (for example, row 1 - I (1,8)). In this row for each x_i level "1" is assigned, i.e. noise will be taken out from each value x_i . Using the rule expressed in this way, noise is generally formed in the first row of matrix A (90.8), calculated by the mathematical model and the result forms F (1,1) of matrix F (27,90). The same rule is applies to the next rows of the matrix A (90,8).

It is continued with the next row of matrix I (27,8) performing the following sequence. Each row of matrix I (27,8) forms a relevant row of matrix F (27,90).

If we take the first column of matrix I (27,8) relevant to X_1 , it is seen that the first nine rows correspond to level "1" of noise, the second nine lines correspond to level "2" and the third nine rows correspond to level "3" of noise. This makes possible to use the values of the first nine rows of matrix F (27,90) to calculate level "1", to use the second nine rows to calculate level of "2" and the third nine rows for calculation at level "3" for X_1 . For other columns from 2 to 8 it is necessary to sort in ascending order. After sorting the column obtains the kind of the first column. If changes are made with sorting, they are reflected also in matrix F (27,90). After sorting of the respective variable, calculations for different levels can be made.

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Table 3. $L_{27} - A 3^{13-10}$ Fractional Factorial Design Thirteen Factors at Three Levels (27 Runs)

Run	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13
1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	1	1	1	1	2	2	2	2	2	2	2	2	2
3	1	1	1	1	3	3	3	3	3	3	3	3	3
4	1	2	2	2	1	1	1	2	2	2	3	3	3
5	1	2	2	2	2	2	2	3	3	3	1	1	1
6	1	2	2	2	3	3	3	1	1	1	2	2	2
7	1	3	3	3	1	1	1	3	3	3	2	2	2
8	1	3	3	3	2	2	2	1	1	1	3	3	3
9	1	3	3	3	3	3	3	2	2	2	1	1	1
10	2	1	2	3	1	2	3	1	2	3	1	2	3
11	2	1	2	3	2	3	1	2	3	1	2	3	1

Run	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13
12	2	1	2	3	3	1	2	3	1	2	3	1	2
13	2	2	3	1	1	2	3	2	3	1	3	1	2
14	2	2	3	1	2	3	1	3	1	2	1	2	3
15	2	2	3	1	3	1	2	1	2	3	2	3	1
16	2	3	1	2	1	2	3	3	1	2	2	3	1
17	2	3	1	2	2	3	1	1	2	3	3	1	2
18	2	3	1	2	3	1	2	2	3	1	1	2	3
19	3	1	3	2	1	3	2	1	3	2	1	3	2
20	3	1	3	2	2	1	3	2	1	3	2	1	3
21	3	1	3	2	3	2	1	3	2	1	3	2	1
22	3	2	1	3	1	3	2	2	1	3	3	2	1
23	3	2	1	3	2	1	3	3	2	1	1	3	2
24	3	2	1	3	3	2	1	1	3	2	2	1	3
25	3	3	2	1	1	3	2	3	2	1	2	1	3
26	3	3	2	1	2	1	3	1	3	2	3	2	1
27	3	3	2	1	3	2	1	2	1	3	1	3	2

Thus, noise is expressed in the change of chemical composition. The calculation process is organized as follows:

A row of matrix I (27,8) is taken (for example, row 1 - I (1,8)). In this row for each x_i level "1" is assigned, i.e. noise will be taken out from each value x_i . Using the rule expressed in this way, noise is generally formed in the first row of matrix A (90,8), calculated by the mathematical model and the result forms F (1,1) of matrix F (27,90). The same rule is applies to the next rows of the matrix A (90,8).

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sort in ascending order. After sorting the column obtains the kind of the first column. If changes are made with sorting, they are reflected also in matrix F (27,90). After sorting of the respective variable, calculations for different levels can be made.

Thus 810 different values of this function are obtained for each level of noise and this ensures reliable outcomes.

Table 4. Levels of noise factors for the research parameters

Variable	Element of composition	Noise level	
		Re	A
X_1	C	3	2
X_2	Si	2	1
X_3	Mn	1	1
X_4	Ni	1	2
X_5	S/P	2	2
X_6	Cr	3	2
X_7	Mo	3	1
X_8	V	1	1

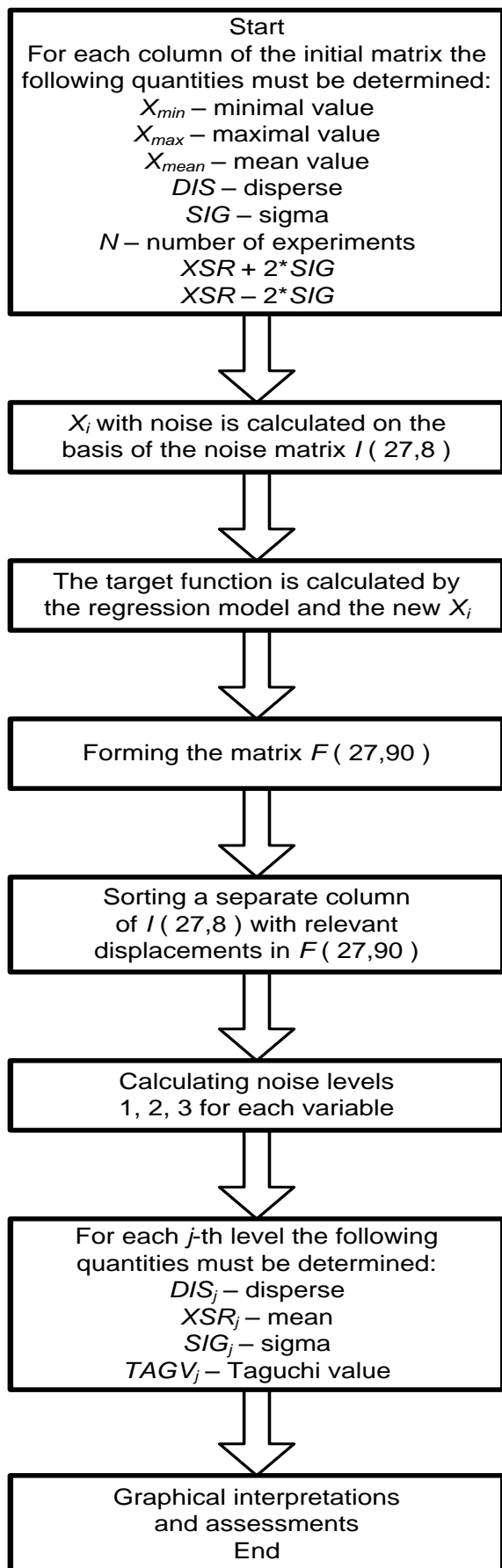


Fig. 3 Computational algorithm

In the numerical experiment noise was first determined with $k = 100$. The analysis of the graphs below shows low sensitivity for both Re and A. For this reason, an experiment with $k = 70$ has been made as well. In these calculations, as shown in the attached graphs, the results are sharper for both target functions under examination. As explained above in this section, in compliance with Taguchi, the higher evaluation is taken as the optimal value. It defines the noise level and the direction of possible further search.

After the analysis of evaluations of the respective graphics for Re and A, the generalization of the solution is shown in Table 4.

Calculations are performed according to the following algorithm.

3. CONCLUSIONS

The conclusion that can be made on yield strength Re based on the results in the table is that silicon, sulfur and phosphorus do not significantly affect the ultimate outcome within the range of variation examined. Carbon, chromium and molybdenum influence significant on Re. These elements have to be modified in direction to increase their values. Manganese, nickel and vanadium should be modified in direction to decrease their values.

The results of the relative elongation A are more interesting. The four variables, carbon, nickel, sulfur and chromium, should not be changed from their basic levels, and the other variables, silicon, manganese, molybdenum and vanadium, have to be modified in direction to reduce their values. The main conclusion of the applied methods towards the relative elongation is that none of the variables must be increased.

As a result of the procedure proposed it is possible to specify the quantity of alloying elements on ferrous alloys using Taguchi method.

It is expected to improve the respective properties of steel 35 HGSA regulated by GOST via increasing manganese. The last statement must be confirmed also by an actual experiment.

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ACKNOWLEDGEMENTS

This research is realized with the financial support of the National Fund “Scientific Research” of Bulgaria about Contract DDVU 02-11.

Received for publication: 07.02.2013
Revision received: 25.03.2013
Accepted for publication: 12.04.2013

How to cite this article?

Style – **APA Sixth Edition:**

Tontchev, N., & Kalev, Y. (2013, 07 15). Determining influence of alloying elements on properties of alloys by robust experiment. (Č. Zoran, Ed.) *MEST Journal*, 1(2), 31-39.
doi:10.12709/mest.01.01.02.03

Style – **Chicago Fifteenth Edition:**

Tontchev, Nikolay and Yordan Kalev. "Determining influence of alloying elements on properties of alloys by robust experiment." Edited by Čekerevac Zoran. *MEST Journal* (MESTE) 1, no. 2 (07 2013): 31-39.

Style – **GOST Name Sort:**

Tontchev Nikolay and Kalev Yordan Determining influence of alloying elements on properties of alloys by robust experiment [Journal] = The influence of elements on alloys properties // MEST Journal / ed. Zoran Čekerevac. - Belgrade : MESTE, 07 15, 2013. - 2 : Vol. 1. - pp. 31-39. - ISSN 2334-7058 (Online); ISSN 2334-7171.

Style – **Harvard Anglia:**

Tontchev, N. & Kalev, Y., 2013. Determining influence of alloying elements on properties of alloys by robust experiment. *MEST Journal*, 15 07, 1(2), pp. 31-39.

Style – **ISO 690 Numerical Reference:**

Determining influence of alloying elements on properties of alloys by robust experiment. **Tontchev, Nikolay and Kalev, Yordan.** [ed.] Čekerevac Zoran. 2, Belgrade : MESTE, 07 15, 2013, MEST Journal, Vol. 1, pp. 31-39. ISSN 2334-7058 (Online); ISSN 2334-7171.



BOOK REVIEW OF STEVEN PINKER'S: "THE BETTER ANGELS OF OUR NATURE: WHY VIOLENCE HAS DECLINED"

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Category: **Book review**

Editor's note: *This article is too large to fit into any one of our issues. But, due to its importance, we have decided to run it as a three part series. The first of these, below, features the introduction, the beginnings of Block's critique of Pinker (2011) and the appendix. Part II, to appear in our third issue, contains most of the main body of this work. And the last appearance of this essay in three parts, in our fourth issue, will contain the author's conclusion and his voluminous bibliography.*

Part I

I. INTRODUCTION

This is a magnificent book. It was a joy to read. I learned something new and important on practically every page. But before I begin my very critical review,¹ in the interests of full disclosure I must reveal my initial prejudices, which were all wildly in favor of Steven Pinker.

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First, I am very grateful to Prof. Pinker for these publications of his: Pinker (1994, 1997, 1999, 2002, 2008, 2011). This author is a world renowned socio-biologist, and I am a strong devotee of this school of analysis.² Second, on a personal note, I am very appreciative of him because he was kind enough to adopt this book of mine (Block, 2008) for classroom use in a course at Harvard he team taught with Alan

² I am a mere student of this field. My only article in sociobiology is Eckhardt, Robert, John Levendis and Walter E. Block. Unpublished. "Sociobiology, economic freedom, trade and benevolence."

¹ Very, very, very critical review

Dershowitz.³ Third, when then Harvard president Larry Summers was subject to abuse for speculating that male-female differences in representation on the faculties of mathematics, physics, chemistry, etc., might be due to biological divergences (Saletan, 2005), Steven Pinker was one of the very few of his colleagues to rise to his defense. I regard this as an important contribution to the goal of academic freedom.

Pinker is a masterful writer. I read his book three times, in its entirety, and he had me at the edge of my seat on all occasions. His humanitarian sentiments come shining through. He hates with a palpable passion people hurting people and that does him great credit. I have never met the man, but I like him very much for this. I highly recommend this book of his. I have attempted a full frontal assault on it, however, because I regard the state as the greatest rights violator known to our species, and this book, from one end of it to the other constitutes an apologetics for this evil institution. Perhaps I have totally misconstrued what he says, for I conclude that he is really not on the side of the angels despite much evidence to the contrary. No one can be a total "good guy" who defends statism so well and so enthusiastically.

What is the thesis of Pinker (2011)?⁴ There are two:

1. Death due to violence is numerically *less* in modern times than in earlier days
2. This happy pattern is due to the rise of government, particularly democracy

As can be readily seen, the second of these two claims are in direct contradiction to anarcho capitalism or radical libertarianism. This is the philosophy that sees government not as a savior, but as an outright criminal gang. For example, states Rothbard (1988): "...the State is nothing neither more nor less than a bandit gang writ large." This book of Pinker's, then, can be interpreted as a shot across the bows of the good ship libertarian. Nor does his criticism of free enterprise come from the pen (well, word processor) of a lightweight. In my view Steven Pinker is at least the intellectual equal of other critics of Rothbardian libertarianism such as James Buchanan, Ronald Coase, Richard Epstein, Milton Friedman, Robert Nozick and Gordon Tullock.

Let us take each of Pinker's theses in turn:

1. Death due to violence is numerically *less* in modern times than in earlier days

When I first heard this claim, my mind went immediately to the 20th century in general, and, in particular to World War II. Surely, this was the bloodiest experience of mankind, I thought. And, in a sense, my immediate response was correct: 55 million poor souls perished in that conflagration, the most of any one episode. But Pinker has a strong defense against this criticism; he considers not the absolute number of deaths, but rather their number relative to the overall population of the world at the time they occurred. When this is done, an absolute death toll of 55 million ranks only 9th in his calculations (195). Thus, we see, that 20th century losses of life have an adjusted rank of only 9th (Second World War), 11th (Mao), 15th (Stalin), 16th (First World War), 20th (Russian civil war), and 21st (Chinese civil war). The really horrendous losses on a per capita basis occurred during these centuries: worst of all, 8th (An Lushan revolt), second worst, 13th (Mongol conquests); third worst, 7th-19th (mid East slave trade), fourth worst, 17th (Ming Dynasty), and fifth worst, 3rd-5th (fall of Rome).⁵

³ This course, "Morality and Taboo" was given during the spring 2007 semester: http://141.164.133.3/exchange/walterblock/Inbox/Re:%20Pinker,%20Defending.EML/1_multipart_xF8FF_2_Morality%20and%20Taboo%20syllabus.pdf/C58EA28C-18C0-4a97-9AF2-036E93DDAFB3/Morality%20and%20Taboo%20syllabus.pdf?attach=1.

⁴ All otherwise unidentified page numbers will be to this book alone.

⁵ See Appendix at the very end of this essay for a replication of Pinker's table (195). If there were only 100 people on earth, and Cain killed Abel, there

Pinker calculates the number of deaths proportionate to the total world's population. But the so-called World War I and World War II didn't really involve entire world. If we placed in the denominator only the total population in Europe for WWI and only those populations directly and even indirectly involved in WW II, we would reach a far different conclusion than Pinker's.

Consider next the U.S. drone attacks in Pakistan.⁶ States Rose (2012):

"*The Mail on Sunday* today reveals shocking new evidence of the full horrific impact of US drone attacks in Pakistan. A damning dossier assembled from exhaustive research into the strikes' targets sets out in heartbreaking detail the deaths of teachers, students and Pakistani policemen. It also describes how bereaved relatives are forced to gather their loved ones' dismembered body parts in the aftermath of strikes.

"The second case is being heard in the city of Peshawar. In it, Mr. Akbar and the families of drone victims who are civilians are seeking a ruling that further strikes in Pakistani airspace should be viewed as 'acts of war'.

"They argue that means the Pakistan Air Force should try to shoot down the drones and that the government should sever diplomatic relations with the US and launch murder inquiries against those responsible.

would be a stupendous, gigantic death rate per year per 100,000 persons. But there would only be one murder. This puts a further bit of perspective on Pinker's decision to consider deaths per capita.

⁶ These drone attacks have been much in the news since the horrendous attack on school children in Newton, Connecticut (<http://www.telegraph.co.uk/news/worldnews/barackobama/9749559/Connecticut-school-shooting-Barack-Obamas-Sandy-Hook-vigil-speech-in-full.html>);

Obama's tearful regret of these senseless killings at Sandy Hook have been called hypocritical in view of his own mass murder of Pakistani children. See on this Grigg, 2012; Shaffer, 2012. See also <http://www.lewrockwell.com/blog/lewrw/archives/128745.html>

"According to a report last month by academics at Stanford and New York universities, between 2,562 and 3,325 people have been killed since the strikes in Pakistan began in 2004."The report said of those, up to 881 were civilians, including 176 children. Only 41 people who had died had been confirmed as 'high-value' terrorist targets."

According to Friedersdorf (2012):

"Obama terrorizes innocent Pakistanis on an almost daily basis. The drone war he is waging in North Waziristan isn't 'precise' or 'surgical' as he would have Americans believe. It kills hundreds of innocents, including children. And for thousands of more innocents who live in the targeted communities, the drone war makes their lives into a nightmare worthy of dystopian novels. [People are always afraid](#). Women cower in their homes. Children are kept out of school. The stress they endure gives them psychiatric disorders. Men are driven crazy by an inability to sleep as drones buzz overhead 24 hours a day, a deadly strike possible at any moment. At worst, this policy creates more terrorists than it kills; *at best*, America is ruining the lives of thousands of innocent people and killing hundreds of innocents for a small increase in safety from terrorists. It is a cowardly, immoral, and illegal policy, deliberately cloaked in opportunistic secrecy. And Democrats who believe that it is the most moral of all responsible policy alternatives are as misinformed and blinded by partisanship as any conservative ideologue."

These two authors provide quite an indictment of the U.S. drone policy. In sharp contrast, here is how Pinker deals with this challenge to his thesis:⁷

"Where an army previously would have blasted its way in to the militants' hideouts, killing and displacing civilians by the tens of thousands as it went, and then ultimately reducing whole towns and villages to rubble with inaccurate artillery and aerial bombing in order to get at a few enemy fighters, now a drone flies in and lets fly a single missile against a single house where militants are

⁷ Pinker (266) cites Goldstein (2011)

gathered. Yes, sometimes such attacks hit the wrong house, but by any historical comparison the rate of civilian deaths has fallen dramatically.”

I have to admit it, this author has a point. Who would have thought that there could be *any* coherent defense of this murder of the innocents from the skies?

Having praised Pinker, well, provisionally, it is now time for criticism. First, some overall criticisms, which permeate his entire book.

1. He does not confront libertarian critics.⁸ He cites about 900 publications in his tightly written book of 802 pages. His bibliography lists 1955 entries. He does address numerous other actual and potential critics of his perspectives, but never anarcho-libertarian ones. Pinker mentions the virtues of democracy scores of times; no, maybe, hundreds of times. But he has no room for dealing with Hoppe's (2001A) *Democracy - The God That Failed*.⁹ Pinker complains of the evils of

⁸ I don't say for sure that these libertarian critics would have prevailed over Pinker, although I think that would indeed have been the case; for more on this see below. My complaint, here, is only that in almost completely ignoring them, Pinker (2011) is far less satisfactory than it would otherwise have been. Surely, a publication that makes such controversial claims almost owes it to its readers not to limit itself to straw men opponents. According to Mill (1859, emphasis added) "The greatest orator, save one, of antiquity has left it on record that he always studied his adversary's case with as great, if not with still greater, intensity than even his own. What Cicero practiced as the means of forensic success, requires to be imitated by all who study any subject in order to arrive at the truth. He who knows only his own side of the case, knows little of that. His reasons may be good, and no one may have been able to refute them. But if he is equally unable to refute the reasons on the opposite side; *if he does not so much as know what they are*, he has no ground for preferring either opinion. The rational position for him would be suspension of judgment, and unless he contents himself with that, he is either led by authority, or adopts, like the generality of the world, the side to which he feels most inclination."

⁹ Pinker never tires of reminding us of the evils of Hitler, and of the greatness of democracy. However came to power through an entirely democratic process, not via a coup de etat. Therefore, there is a tension

anarchy on more occasions that you can shake a stick at, but completely ignores anarchist libertarian publications such as Hoppe (2001B).¹⁰

The name "Murray N. Rothbard," the dean of anarcho capitalists, appears nowhere in this book. If I had a dollar for every time Pinker reminds us of the Wild West in the U.S. I would be a moderately rich man, but one searches in vain for Anderson, T.L., Hill, P.J. (1979). "An American experiment in anarcho-capitalism: The *not so wild, wild, west*."¹¹ Pinker announces himself as a Hobbesian all throughout his book.

Does he confront any critics of this philosopher, other than Rousseau? To ask this is to answer it: he does not.¹²

2. Pinker places not merely his thumb on the balance scale, but his entire *elbow*: he waxes eloquent about explicit murders, but ignores numerous deaths created by government that are not so direct. For example, consider highway fatalities. There are some 40,000 per year in the U.S. alone.¹³ Multiplied by 100 years this amounts to 4,000,000 from this one source; it is equivalent to the Napoleonic wars, which are in 19th place on his hit parade (see appendix). If we

between these two claims of his, not to say a blatant logical contradiction.

¹⁰ See, also, Benson, 1989, 1990; Block, 2007C, 2010B, 2011A; Casey, 2010; DiLorenzo, 2010; Gregory, 2011; Guillory & Tinsley, 2009; Hasnas, 1995; Higgs, 2009, 2012; Hoppe, 2008, 2011A, 2011B; King, 2010; Kinsella, 2009; Long, 2004; Molyneux, 2008; Murphy, 2005B; Rothbard, 1973, 1977A, 1998; Spooner, 1870; Stringham, 2007; Tannehill, 1984; Tinsley, 1998-1999 on anarcho-capitalism. None of these are mentioned by Pinker either, let alone refuted.

¹¹ See also Anderson and Hill (2004); Dykstra (2009, 2010). I owe the cites to Dykstra to my friend and Loyola colleague, Leo Krasnozhon

¹² For critiques of Hobbes from a libertarian point of view, see Hoppe, 1999; De Jasay, 1985; Molinari, 1977

¹³ These numbers have decreased a bit in the last decade. For the argument that the cause of these deaths is not the proverbial speed, drunken driving and vehicle malfunction, but rather are the responsibility of the road managers, e.g., the state, see Block (2009).

consider the entire world, road socialism is a world-wide affair, we arrive at a much larger number.

In advanced western democracies, the government takes half the GDP. Suppose they did not. Posit that all taxes were abandoned. Might we then have a cure for cancer? For hurricanes? If so, then deaths from these sources are also the responsibility of Pinker's favorite institution, government. Is this too speculative? Well, then, consider the Food and Drug Administration, and its counterparts throughout the world. They have killed tens of thousands¹⁴ of people by not allowing new drugs onto the market (Peltzman, 1973, 1974, 1987A, 1987B, 2005).¹⁵ The FDA's delay of beta-blocker, alone, caused at least 50,000 premature American deaths.¹⁶ Particularly horrific is the decision of this organization to not allow patients

on their last medical legs to throw the dice and try new untested and thus not approved drugs.

Then there is drug prohibition, which causes numerous additional deaths, all at the hands of government, also completely ignored by Pinker.¹⁷ Nor can we forget about, as Pinker does, the government's decision to disallow markets in used body parts. Many thousands more die due to this anti commodification fetish of the state.¹⁸

Here is Rothbard's (1963) take on the institution so enthusiastically supported by Pinker:

"It is time now to bring the State into our discussion. The State is a group of people who have managed to acquire a virtual monopoly of the use of violence throughout a given territorial area. In particular, it has acquired a monopoly of aggressive violence, for States generally recognize the right of individuals to use violence (though not against States, of course) in self-defense. The State then uses this monopoly to wield power over the inhabitants of the area and to enjoy the material fruits of that power. The State, then, is the only organization in society that regularly and openly obtains its monetary revenues by the use of *aggressive* violence; all other individuals and organizations (except if delegated that right by the State) can obtain wealth only by peaceful production and by voluntary exchange of their respective products."

"All State wars, therefore, involve increased aggression against the State's own taxpayers, and almost all State wars (*all*, in modern warfare)

¹⁴ <http://www.fhareview.org/harm.shtml>

¹⁵ See also Becker, 2002; Goodman, 2011; Gottlieb, 2010; Henninger, 1990; Higgs, 1994; Hoppe, 1993A; Kaitlin, et. al., 1987; Kazman, 1990; Klein and [Tabarrok](#), Undated; Peltzman, 1973, 1974; Sardi, 2007; Steinreich, 2005;

<http://www.thefreemanonline.org/features/economists-against-the-fda/>;

<http://www.econlib.org/library/Enc1/DrugLag.html>;

<http://www.scu.edu/civilsocietyinstitute/articles/upload/EconagainstFDA.pdf>;

<http://www.cato.org/pubs/handbook/hb111/hb111-15.pdf>;

<http://www.cato.org/pubs/regulation/regv27n2/v27n2-8.pdf>;

<http://www.independent.org/printer.asp?page=%2Fnewsroom%2Farticle.asp?id=403>;

<http://www.fhareview.org/references.shtml#peltzman73>;

http://online.wsj.com/article/SB10001424052748703866704575224033831995628.html?mod=WSJ_latestheadlines

¹⁶ <http://spectator.org/archives/2009/06/22/the-employer-mandate-and-the-a>;

<http://www.independent.org/newsroom/article.asp?id=403>;

http://online.wsj.com/article/SB10001424052748703866704575224033831995628.html?mod=WSJ_latestheadlines

¹⁷ <http://www.drugwarrant.com/2009/10/4411/>; for the general case against drug prohibition, see Block, 1993, 1996B; Block, Wingfield and Whitehead, 2003; Cussen and Block, 2000; Friedman, 1992; Szasz, 1985, 1992; Thornton, 1991

¹⁸ See on this Anderson & Barnett, 1999; Barnett, 1999; Barnett, Saliba, & Walker. 2001; Beard, Jackson & Kaserman, 2007-2008; Block, Whitehead, Johnson, Davidson, White and Chandler, 1999-2000; Block, 1987, 1988A, 1988B; Carey, 2002; Cherry, 1999; Clay and Block. 2002; Garner, and Block. 2008; Healy, 2006; Hippen, 2008; Kaserman, 2002; Kaserman & Barnett, 2002; Malek, 2001; Richards, 2001; Taylor, 2005, 2006, 2007; Wilkinson, 2003; Young, 2004

involve the maximum aggression (murder) against the innocent civilians ruled by the enemy State. On the other hand, revolutions are generally financed voluntarily and may pinpoint their violence to the State rulers, and private conflicts may confine their violence to the actual criminals. The libertarian must, therefore, conclude that, while some revolutions and some private conflicts *may* be legitimate, State wars are *always* to be condemned.”

In section II of this review I attempt to refute each and every error in this book. I conclude in section III.

II. DETAILED CRITICISMS

Having given an overview of the general problems with this book, I now turn to a more thorough examination of its specific errors. This might prove tedious and unrewarding, but I think not. One reason is that Pinker is a gifted writer.¹⁹ Any painstaking analysis of his work might therefore prove to be of interest. Another is that I regard this book as one of the best critiques of the only political philosophy with a hope for preserving our species²⁰ to come down the pike in many a year. An intensive refutation of it, in *detail*, is therefore all the more important. It is thus worthwhile to cover the numerous other fallacies committed by this author, not only the ones relevant to his main two theses. The more errors we can unearth in it, the better. Let us begin.

Our author describes Alex Hamilton as a person who (21) “devised the institutions that support modern market economies.” Not so, not so at all. Here is the “moderate,” “compromiser” Rothbard (1982A) on this historical figure:

“Deficits, therefore, should be eliminated by drastic slashes of government spending. But where and how? The answer: anywhere and everywhere. There is no mystery about it. Just

¹⁹ Is he more dangerous because of that? Maybe. But maybe not. Keynes (1936) was not well written, but caused great harm to our economy, and to the economics profession.

²⁰ Rothbardian anarcho-capitalism

slash with a hefty meat axe. Go down, for example, the Eisenhower budget and reduce every item back to it. Or better yet, the Roosevelt budget of the 1930s. Still better, the Grover Cleveland budget. *Still* better yet, return to the average annual budget of the Federalist period of the 1790s: \$5.8 million dollars. If that was good enough for the statist Alexander Hamilton, it should be good enough for our ‘libertarian’ Reagan Administration.

“Of course, my most preferred position is that the United States budget go back, or rather go forward, to a nice round Zero. But, to demonstrate my devotion to moderation, I could live with a transitional level of \$5.8 million for a year or two.”²¹

Pinker (27) opposes (presumably all) spanking of children. But a few light slaps, nothing anywhere close to the child abuse he rightfully condemns, can be defended on grounds of proper child protection. A non brutal spanking may be the difference between little Johnny playing in traffic and refraining from doing so. Our author favors the “time out” instead. But this too is invasive. If I were to give Pinker a “time out” for writing this book, that would amount to forced kidnapping. How can this, then, be justified by a radical child “rights” advocate such as this author?

Pinker (42) avers that “early states were more like protection rackets.” But in what way are modern governments any different? The state does indeed sometimes protect its citizens against criminals.²² But protection racketeers did precisely the same thing, both against other protection racketeers, and miscellaneous marauders. The mafia did not happily tolerate it

²¹ For further critiques of the claim that Hamilton favored free enterprise, see DiLorenzo, 2008A, 2008B; Gordon, 2008; Gregory, 2011; Nock, 2010; North, 2012; Smith, 2008

²² It also does the very opposite through its drug prohibitions, which enhance a criminal class, and its gun control laws, which disarm the law-abiding population.

when other criminals preyed upon its own clients.²³

Political correctness rears its ugly head when Pinker (44) states: "Though we bristle when we read of Europeans colonists calling native people savages, and justly fault them for their hypocrisy and racism, it is not as if they were making the atrocities up." But it is not at all problematic, at least from a scientific point of view, to condemn these Europeans for their accurate assessments. It is unclear why it is racist to "justly fault" native peoples as "savages" when they do indeed engage in savage atrocities.

Pinker (47) asks, "If I were one of the people who were alive in a particular era, what would the chances that I would be a victim of violence?" This biases the statistics, however. Consider the death toll on the nation's highways, or as a result of FDA ineptitude, or which stem from drug prohibition. Are these all to be put down to "violence?" Well, maybe, yes, sort of. The government does employ violence in support of these institutions. It taxes people to pay for highways and streets, and would incarcerate anyone foolish enough to provide such services on a competitive basis without its permission. It upholds FDA decisions and the drug war at the point of a gun. On the other hand, many of the resulting deaths do not constitute direct violence, as being killed by a bullet. In order to remove this bias, we will count *any* untimely death, whether by a bullet, directly, or indirectly as the consequence of government roads, the FDA, the drug war, etc.

Pinker's figure 2-2 (49) indicates "that living in a civilization reduces one's chances of being a victim of violence fivefold (51)." But this is mere correlation. Is this relationship due to the rise of states, or is it in spite of them? He says (51), "The number of deaths per 100,000 people per year is the standard measure of homicide rates, and I will use it as the yardstick of violence throughout the book." Assume that road deaths

²³ I was going to footnote this claim when I realized that everyone knows this from watching gangster movies.

are 40,000 per year,²⁴ based on a U.S. population of 300 million. The rate of death per 100,000 people is thus 13.3 annually. This is not chopped liver. For purposes of comparison, Detroit homicides were rated at 45 (52) and at 30 in the 10 most dangerous U.S. cities (55).

Our author writes (76): "A fundamental insight of modern economics is that the key to the creation of wealth is a division of labor, in which specialists learn to produce a commodity with increasing cost-effectiveness and have the means to exchange their specialized products efficiently." But specialization and the division of labor are hardly discoveries of *modern* economics. Smith (1776) full well knew this in the 18th century, as did the Salamancans (De Soto, 1996; Watner, 1987) in the 16th.

What are we to make of this statement of his (77): "Not only is a state well suited to provide the public goods that serve as infrastructure for economic cooperation, such as money and roads..."

There are three errors here, none of which Pinker confronts. Indeed, it would be difficult to come up with less apt examples than these. The history of government is one of monetary debasement, inflation, hyperinflation.²⁵ In contrast, the market's reliance on gold (and silver) is one of relative

²⁴ Traffic fatalities hit a low in 2011 of 32,367, down from 43,510 in 2005. http://usnews.nbcnews.com/_news/2012/12/21/16070501-us-road-deaths-climbing-again-after-years-of-decline-new-data-show?lite

²⁵ To give but one example, the U.S. dollar has lost about 96% of its value in the roughly 100 years since the inception of the Fed, in 1913 (<http://www.ronpaul.com/congress/legislation/111th-congress-200910/audit-the-federal-reserve-hr-1207/>).

For more on the monetary mismanagement of the government, see Bagus, 2011; Block, 1999A; Block and Barnett, 2008; de Soto, 2006; Ebeling, 2000; Greaves, 1995. Hazlitt, 1965, 1980; Herbener, 2002; Hulsmann, 1998; Kaza, 1996; Laffer and Kadlec, 1981; Leconte, 2003; Mises, 1952, 1981; Mundell, 1981; Murphy, 2010; North, 1986; Paul, 1985; Rader, 1980; Reisman, 1996; Rothbard, 1962, 1994; Sennholz, 1975, 1979, 1985; Siegel, 1984, Vieira, 2002.

success. And how this author can choose statist roads as an example of the “Civilizing Process” when they kill some 40,000 people per year is beyond reason (Block, 2009). As for “public goods” proponents of this fallacy would be well advised to consult its critics,²⁶ as Pinker does not.

It is difficult to see how Pinker can impart a positive spin on “craft guilds” (78). Rather than promoting economic progress, they are an exercise in restricted entry. Our author applauds “the free market” (77); he supports middlemen and lending at interest (76). He does not seem to realize that guilds are incompatible with the free enterprise and laissez faire capitalism he favors on numerous occasions throughout his book.

It would be an exaggeration to claim that Pinker is totally unaware of the critics of Leviathan. He says (79): “Libertarians, anarchists and other skeptics of the Leviathan point out that when communities are left to their own devices, they often develop norms of cooperation that allow them to settle their disputes nonviolently, without laws, police courts or the other trappings of government.” He goes so far as to cite Ellickson (1994) in this regard (80). But Pinker cannot be allowed to have it both ways. The overwhelming majority of his commentary on government and anarchy is in exactly the opposite direction. I conclude than an alien presence snuck in when Pinker was not paying attention and is responsible for these few paragraphs in support

of anarchistic freedom.²⁷ But Pinker (80) quickly recovers from this alien invasion:

“As important as tacit norms are, it would be a mistake to think that they obviate the role for government. The Shasta County ranchers may not have called in Leviathan when a cow knocked over a fence, but they were living in its shadow and knew it would step in if their informal sanctions escalated or if something bigger were at stake...”

Our Harvard professor next (89) maintains the following:

“The most crime-prone regions in the world today are Russia, sub-Saharan Africa, and parts of Latin America. Many of them have corrupt police force and judicial systems which extort bribes out of criminals and victims alike and dole out protection to the highest bidder. Some, like Jamaica (33.7), Mexico (11.1), and Colombia (52.7)²⁸ are racked by drug-funded militias that operate beyond the reach of the law. Over the past four decades, as drug trafficking has increased, their rates of homicide have soared.”

He thus acknowledges the role of drugs in fomenting death, but claims this is “beyond the reach of the law.” No, no, no, a thousand times no. Rather, it is precisely the *result* of the law of the government he defends (well, sees as a force for good than bad), namely the legislation that prohibits drugs. This is 180 degrees contrary to his “civilizing” thesis, but he does not recognize it as such. In other words, Pinker is again attempting to have it both ways.²⁹ On the one hand, he full well recognizes the evils of drug prohibition; they give rise to drug gangs, criminals, militias. On the other hand, it can scarcely be denied that these are the results of the operation of his favorite institution, statist

²⁶ Barnett and Block, 2007, 2009; Block, 1983, 2003B; Bibliography, undated; Cowen, 1988; De Jasay, 1989; Holcombe, 1997; Hoppe, 1989; Hummel, 1990; Osterfeld, 1989; Pasour, 1981; Rothbard, 1985, 1997; Schmitz, 1991; Sechrest, 2003, 2004A, 2004B, 2007; Tinsley, 1999. Rothbard's (1997, 178) *reductio absurdum* of public goods is as follows: “A and B often benefit, it is held, if they can force C into doing something. . . . [A]ny argument proclaiming the right and goodness of, say, three neighbors, who yearn to form a string quartet, forcing a fourth neighbor at bayonet point to learn and play the viola, is hardly deserving of sober comment.”

²⁷ On a more serious note, I do indeed appreciate Pinker's mention of Ellickson (1994). But the authors mentioned in fn. 10, *supra* as much superior to Ellickson.

²⁸ These numbers refer to murders per 100,000 people per year.

²⁹ Presumably, the law of non contradiction has been repealed at Harvard.

democracies, not so much, of course Jamaica, Mexico and Colombia, but rather the nations with the most consumers of these banned products, such as the good old U.S. of A. Does he see this anomaly? He shows no evidence of having done so.

But wait. Perhaps I am being too kind to Pinker in thinking he sees prohibition as an evil that promotes violence. For he then calls it a “civilizing offensive” that “Community governments were set up to restrict gambling, drinking and prostitution” (91). This veers in the direction of re-prohibiting alcohol and keeping prostitution illegal. Yet Pinker is libertarian enough to want to legalize victimless “crimes” (133). Again, here is an unnoticed logical inconsistency on his part.

Pinker also contradicts himself on time preference. He writes (97): “... in the second half of the 19th century, police forces in American cities expanded, became more professional, and began to serve to criminal justice system rather than administering their own justice on the streets with their nightsticks.” Yet, according to virtually all criminologists, young impatient men, with high time preferences, are disproportionately overrepresented in crime statistics. These would be precisely the people most likely to be dissuaded by “nightstick justice,” and least likely to cease and desist based upon the slow-moving “justice” system of the state.

According to our author, the wild west was indeed an accurate representation of this geographical epoch.³⁰ He states (102-103): The American West, even more than the American South, was a zone of anarchy until well into the 20th century... In the American Wild West, annual homicide rates were fifty to several hundred times higher than those of eastern cities and Midwestern farming regions...”

However, in the view of Anderson, and Hill (1997, p. 10):

³⁰ In the view of Pinker (687): “The West was wild because it was young men who went there while the young women stayed behind in the East.”

“The West during this time often is perceived as a place of great chaos, with little respect for property or life. Our research indicates that this was not the case; property rights were protected and civil order prevailed. Private agencies provided the necessary basis for an orderly society in which property was protected and conflicts were resolved. These agencies often did not qualify as governments because they did not have a legal monopoly on

“keeping order.” They soon discovered that “warfare” was a costly way of resolving disputes and lower cost methods of settlement (arbitration, courts, etc.) resulted. In summary, this paper argues that a characterization of the American West as chaotic would appear to be incorrect.”

It would have been satisfying to peruse Pinker’s rejection of this claim. Alas, he ignores it.

We are also treated to a biased view (105-106) of the anti alcohol, feminist temperance movement. Yes, one can readily agree with Pinker that less alcohol and more monogamous marriage reduces crime rates, *ceteris paribus*. But, again, this author fails to look at the other side of the equation. Historically the way to reduce alcohol consumption was through Prohibition. But this law, too, increases the death rate. Rival gangs fight over turf, and bathtub gin sickens and kills people. These deaths are ignored.

Our author states: “... far more people are killed in car accidents than in homicides...” (107). True, true, all too true. But this also goes against Pinker’s thesis and, again, he does not appear to recognize it. For automobile deaths can hardly be attributed to the “Hobbesian anarchy” against which Pinker inveighs, time and again. Rather, these fatalities take place on the very property, and thus are the *fault* of (Block, 2009) the institution our author is so anxious to defend: the all-loving government.³¹

³¹ And not the “crappy one” denigrated by Pinker (89, 279m 310-311, 313, 341, 681-862). The U.S., the “land of the free and the home of the brave” is now under consideration from this perspective.

Pinker (108-109) attributes rising death rates from 1960 to 1970 to radio and television, which raised the solidarity of the “new barbarians” (those aged 14 to 24). Maybe so. But this along with marriage is orthogonal, at best, to his thesis that government is a civilizing force. At worst, that is, more realistically, radio and television were then and still are now heavily under the regulation and control of the state.³² So, if these means of communication are to be indicted for “barbarism,” a charge to which I am greatly sympathetic, again this can be laid at the door of the statist, not the anarchists.

Back to defending his thesis, Pinker (110) avers that the elites, the “upper classes (read, statist), lost power due to “informalization.” The lower classes no longer respected their betters because the latter “abandoned hats, gloves, ties, and dresses for casual sportswear.” But ‘twas President John F. Kennedy, about as upper crust as you can get, who was among the first famous person instrumental in foreswearing headgear. So this hardly constitutes a rebellion of the proletariat. Pinker (110) also credits (well, debits) the rise of Marxism “from the 1960s to the 1990s” as part of this de-legitimization process of the government and its leaders. But Marxism arose quite a bit before the 1960s, and continues into the 21st century, if the election of Obama can be interpreted as the popularity of socialism. Pinker’s (110) view of this phenomenon: “The leveling of hierarchies and the harsh scrutiny of the power structure were unstoppable and in many ways desirable. But one of the side effects was to undermine the prestige of aristocratic and bourgeois lifestyles that had, over the course of several centuries, become less violent than those of the working class and underclass.”

Pinker’s views on sex, drugs and rock and roll are also problematic. Reading his account of Jimi Hendrix (112) one might suppose our author to hold one of my all time favorite heroes, Lenny Bruce, guilty of fomenting violence. Yes, Peter

Townshend perished due to addictive drugs, but this was at least in large part the responsibility of Pinker’s favorite institution, for promulgating the drug war. Here we again see our author not with his thumb on the balance, but with his elbow.

Our Harvard professor waxes eloquent about the decrease in respect for law and order eventuating in fewer criminals arrested and imprisoned (115). He fails to distinguish between crimes with victims, and those lacking this ingredient. But victimless “crimes” are not rights violations. Incarcerating people “guilty” of such acts are therefore an *embodiment*, not the antithesis of, the very violence that Pinker and all men of good will oppose. In other words, our author has this one backwards. Instead of complaining that these types of prisoners are being locked up at decreasing rates, he ought to exult in that fact.

He also complains (115) that “the wards of mental hospitals were emptied.” Here, again, Pinker makes the same sort of error. If there is anything that his fellow psychologist Szasz (1961, 1963, 1979, 1985, 1992) has taught us, it is that many of the denizens of these institutions are innocent of any (real) crime. “Emptying” statist mental hospitals, then, is an act in *favor* of “the better angels of our nature,” not opposed to them, as per our author.³³

Pinker (115) sees quite rightly that “the de-civilizing effects hit African American communities particularly hard.” But, strangely, our author is fully aware of Murray (1984) which demonstrates that *government*, with its vicious, depraved and immoral welfare programs, not anarcho-capitalism, was responsible for this plague on the black community. He goes so far as to reiterate the Murray (1984) hypothesis, attributing it to “perverse welfare incentives that encouraged young women to ‘marry the state’ instead of the fathers of their children.” Pinker (116) is “skeptical of theories of parental influence that say that fatherless boys grow up violent because they lack a role model or paternal discipline ... widespread fatherlessness

32

http://en.wikipedia.org/wiki/Federal_Communications_Commission; see also Goldsmith, 2004; Gregory, 2011; Marcus, 2004; Mayer, 1999

33 Of course, there are some real criminals in these institutions, too. They should be placed in prisons.

can lead to violence for a different reason.” I am not at all “skeptical” about this claim. What is the “different reason?” Pinker writes (116):

“All those young men who aren’t bringing up their children are hanging out with one another competing for dominance instead. The mixture was as combustible in the inner city as it had been in the cowboy saloons and mining camps of the Wild West, this time not because there were no women around but because the women lacked the bargaining power to force the men into a civilized lifestyle.”

So, heads Pinker’s thesis survives, and tails it does too. Pinker does not recognize that it does not matter which of these two reasons for violence in the black community is correct: fatherless boys are more likely to embrace crime, or “hanging out” breeds violence. *Both* of them stem from government welfare programs.³⁴ This should give him pause for thought. It does not. He plows along, oblivious to the fact that his cited evidence cuts *against* his own hypothesis.

It is not as if Pinker has an absolute allergy to confronting views with which he disagrees. He does take to task some worthwhile opponents. Murray (116), John Donohue and Steven Levitt (120), for example. My complaint is that he avoids like the plague his most serious adversaries, the libertarian anarchists.

Pinker (121) continues his analysis:

“By the early 1990s, Americans had gotten sick of the muggers, vandals and drive-by shootings, and the country beefed up the criminal justice system in several ways. The most effective was also the crudest: putting more men behind bars for longer stretches of time. The rate of imprisonment in the United States was pretty much flat from the 1020s to the early 1960s... But then it shot up almost fivefold, and today

more than two million Americans are in jail, the highest incarceration rate on the planet.”

Some of these inmates, no doubt, deserve to be exactly where they are.³⁵ But not *all* of them, not by a long shot. How does incarcerating vast number of non violent people, for the peaceful sale, manufacture and consumption of addictive drugs, for example, reduce violence? Rather, such laws are the very *embodiment* of violence, the reduction of which Pinker is often so intent.

Pinker (125) points to the doubt cast “on the wisdom of redistributing wealth at the point of a gun.” He goes as far as characterizing this as one “of the goofier ideas of the 1960s.” But what in bloody blue blazes does he think that *every* government, without exception,³⁶ does, other than precisely this? Certainly the election of Obama in 2008, and again in 2012, shows that this “wisdom” was back in full force. Of course, this is by no means a monopoly of the Democrats. There are no exceptions to this rule

³⁵ However, libertarian punishment theory emphasizes making the victim whole, not jailing perpetrators, unless that is the only way to ensure they do indeed indemnify those they preyed upon. Crime should be seen as against the victim, not the government, Pinker (147, 148) to the contrary notwithstanding. Under present institutional arrangements, the victim pays twice; once from the crime itself, and secondly, as a tax payer, forced to pay for the care and feeding of prisoners, with air conditioning, color television sets, computers, gymnasiums, etc. In the view of Rothbard (1998, p. 88, ft. 6): “It should be evident that our theory of proportional punishment—that people may be punished by losing their rights to the extent that they have invaded the rights of others—is frankly a *retributive* theory of punishment, a ‘tooth (or two teeth) for a tooth’ theory. Retribution is in bad repute among philosophers, who generally dismiss the concept quickly as ‘primitive’ or ‘barbaric’ and then race on to a discussion of the two other major theories of punishment: deterrence and rehabilitation. But simply to dismiss a concept as ‘barbaric’ can hardly suffice; after all, it is possible that in this case, the ‘barbarians’ hit on a concept that was superior to the more modern creeds.” For more on this see Kinsella, 1996, 1997; Olson, 1979; Rothbard, 1977B, 1998; Whitehead and Block, 2003.

³⁶ Democratic states certainly not excepted

³⁴ We should never lose sight of the fact that the drug war, too, has played havoc in the inner city (see footnote 17, *supra*). It is to the eternal shame of the leaders of the black community that they did not oppose this horrendous slayer of their young men.

in the mainstream; it certainly applies to Republicans as well.³⁷

In the considered opinion of Pinker (125) “‘Take Back the Night’ protests made these ... workplace, schools and street ... environments safer for everyone.” Well, yes, for about 5 minutes, while the rapists were too overcome with laughter to ply their usual practices. Well, maybe, for a half hour; as I am sure that the rapists find this *very* funny. The real reduction in rape comes about with the adoption of the great equalizer, the gun.³⁸ Perhaps the best evidence for this is supplied by Kennesaw, Georgia, which had been suffering from an outbreak of rapes. The city fathers passed a law compelling virtually all adults to possess a firearm, and, also, to learn how to use it safely. The countryside was subsequently filled with women shooting at berms, in order to obtain their carry permits. Pinker would never guess what happened to the rape rate thereafter! It decreased markedly! Amazing. Score: one point for freedom and gun use, zero for rapists and statist gun controls.³⁹

Pinker (127) mentions the “revitalizing process of the past two decades.” His book was published in 2011. The last two decades, then, presumably, refer to 1990-2010. It is difficult to see how all these “civilizing tendencies” held true for this entire period. One of them occurred in the 2012 election, but our author is not in a position to welcome this as “civilizing”: referenda in Washington State and Colorado legalizing drugs not for medicinal purposes but for recreational use. The problem, here, for Pinker, is that this will

reduce the incarceration rate, and run counter to that great civilizing force, Washington D.C.

Chapter 4 of this book regales us with horrid tales of man’s inhumanity to man. It is really not for the squeamish. But he declares (133): “... *all* of the first complex civilizations were absolutist theocracies which punished victimless crimes with torture and mutilation.” That is, *government* was responsible for these outrages. How Pinker squares this with his continual contentions that anarchism (absence of government) is the villain of the piece demonstrates once again his intellectual dexterity.⁴⁰

One ploy of Pinker’s is to blame religion for these atrocities, not the state. He says (140): “Though no one knows exactly how many people were killed in these holy slaughters, we can get a sense from numerical estimates by atrocitologists such as the political scientist R.J. Rummel in his books *Death by Government* and *Statistics of Democide*.” I note something important here, typical of Pinker. The title of Rummel’s book is *Death by Government* not *Death by Religion*. Here, once again, Pinker relies on evidence that undercuts his own thesis, and is impervious to this difficulty. How is it possible to cite a book that blames government, not religion, in support of a claim that finds guilty religion, and not government? Only at Harvard would this sort of thing be acceptable. Similarly (140): “In the 13th century the Cathars of southern France embraced the Albigensian heresy, according to which there are two gods, one of good, and one of evil. An infuriated papacy, in collusion with the king of France, sent waves of armies to the region, which killed around 200,000 of them.” One wonders how many divisions the “infuriated” pope could call upon to this end? One suspects, precious few. In contrast, we may suspect that the king of France had quite a few. So, is this a religious atrocity, or one of, you guessed it, *government*? This is yet another indication that the state was far more responsible for these heinous deaths than were religious leaders.

³⁷ No, I take that back. There is one Republican exception: Ron Paul. See on this: Alford, 2013; Block, 2012B; Doherty, 2012; Hammond, 2012; Richardson, 2008; Rink, 2011; Stevo, 2012.

³⁸ Aziz, 2012; Block and Barnett, 2001A, 2001B; Block and Block, 2000; Halbrook, 1970[2012]; Kates, 1979; Kleck 1986, 1988, 1991, 1997; Kleck and DeLone, 1993; Kleck and Gertz, 1995; Kleck and Sayles, 1990; Lott, 1998, 2007; Shughart, 1999; Sowell, 2012, Stormfront, 2012; Tucker, 2012, Wright, 1998.

³⁹ On the Kennesaw case, see Baldwin, 2007; DeMar 2012; Kleck, 1991; Malnik, 2012; Mirror. 2010; Reynolds, 2007; Vatican, 2012.

⁴⁰ I do not mean this as a compliment.

Pinker falls victim to left-wing do-goodism when he writes (147): “The goal of the judicial system should be to rehabilitate wrongdoers rather than harming them...” and (148): “The only legitimate use of punishment, then, is to deter people from inflicting great harm on others than the harm inflicted on them.” What about forcing the criminal to compensate the victim? One wonders where this author from whence he gets his views? What is their basis? What reasons does he call forth to defend them? Does he just make this stuff up as he goes along? Pinker places great importance on rationality, but here he seems to be operating in the absence of this characteristic.⁴¹

Consider his (148) view that “A clearheaded view of criminal justice also entails that the death penalty is unnecessary as a deterrent and is not among the powers that should be granted to a state.” Naturally, Pinker does not condescend to refute empirical studies demonstrating that actual executions, not merely an unused “death penalty” law do have deterrent effects (Ehrlich, 1972, 1973, 1974, 1975, 1975B, 1976A, 1976B, 1977A, 1977B, 1978, 1979, 1981, 1982, Ehrlich and Gibbons, 1977, Ehrlich and Posner, 1974). It is more than passing curious that a statolatrist such as Pinker would oppose allowing this magnificent institution to put a murderer to death. Surely, so august a group as the *government* would never err in this regard.

Further, I now offer a “proof” that the death penalty is at least philosophically justified. Suppose A murders B. And, we have a machine such that if we place the perpetrator and his victim in it, and throw the switch, the life will transfer out of B and into A. That is, the murderer will lose his life to the person he unjustifiably killed. Would we be justified in compelling the criminal to enter this machine and give up his life in favor of the victim? Of course we would. A stole a life from B, and there is nothing that fits our notion of justice better than that B would get this precious commodity back from A. Now, of course, we do not have any such capability. No

⁴¹ For the libertarian view on punishment, see fn. 35, supra.

doubt in 500 years we will, if we do not blow ourselves up before that time. But by use of this contrary to fact conditional, we have proved that the murderer’s life is forfeit. By committing this unspeakable act, his has lost his right not to have his life taken from him.

Pinker is not immune to basic economic error. He (154) offers up this bit of “analysis”: “The slave trade not only killed people in transit, but by providing a continuous stream of bodies, it encouraged slaveholders to work their slaves to death and replace them with new ones.” However, there was “trade” in horses, cattle and pigs, and other farm and barnyard animals. There was a “continuous stream” of these creatures available, too. Yet, it was not at all the usual practice to “work these (beasts) to death and replace them with new ones.” Farmers, and slave owners too, presumably, attempt to maximize the present discounted value of their property, and hence profits. It would be the very rare case indeed where this could be accomplished by killing off *either* before their time of usefulness, merely because more were available.⁴²

In the view of Pinker (156): “Closely related to slavery is the practice of debt bondage.” Au contraire, there is all the world of difference between them. The first is a clear and present rights violation, the latter need not be at all. In the truly free society, there might well be two kinds of loan contracts. The usual one, widely practiced today, would stipulate that if the debt is not repaid, the creditor may seize thus and such property (collateral) of the borrower (usually luxury goods) but not other things he may own (e.g., necessities, such as home, food, etc.). Two, an entirely different kind of contract, where not only is *all* the debtor’s property liable in case of default, but that includes his very person: that

⁴² Does Pinker confront the cliometricians (Fogel and Engerman, 1974; see also Hummel, 1996) who have studied this issue, and arrived at the opposite conclusion? To ask this is to answer it: of course not. Pinker (154) does mention Fogel and Engerman, but in a different context.

is, at the discretion of the creditor, the debtor may be placed in prison at hard labor, until he repays what he owes. Why would any borrower voluntarily sign such a contract? Presumably, because he is very sure he can repay the amount borrowed, and also, when he puts up such a significant amount of collateral (his person, his freedom), the interest rate charged will be lower than otherwise. It is a rights violation to place such a borrower in debtor's prison if he fails to fulfill his obligations? It is not clear why that should be the case. Certainly, Pinker offers no reason in behalf of his per se opposition to such arrangements. It should be noted that opposition to contracts of this sort amounts to a prohibition against "usury," since this amounts to a very high rate of interest (risking one's freedom), and would be outlawed. It should also be noted that we do now have debtor's prison, for those who fail to pay the taxes claimed by government. But this, presumably, at least for the Pinkers of the world, would be entirely acceptable, since the state is such an exalted institution.

But our author goes way further than merely opposing debtor's prison. He says (157, footnotes omitted):

"The history of our treatment of debtors ... illustrates the mysterious process in which violence has declined in every sphere of life. Western societies have gone from enslaving and executing debtors to imprisoning them and then to seizing their assets to repay the debt. Even the seizure of assets, he points out, is a kind of violence: 'When John buys groceries on credit and later refuses to pay for them, he has not used force. If the grocer goes to court and gets the police to seize John's car or bank account, the grocer and police are the ones who are initiating the use of force.' And because it is a form of violence, even if people don't usually think of it that way, this practice too has been in decline. The trend in bankruptcy law has been away from punishing debtors or squeezing assets out of them and toward giving them the opportunity of a fresh start. In many states a debtor's house, car, retirement accounts, and spouse's assets are protected, and when a person or company declares bankruptcy, they

can write off many debts with impunity. In the old days of debtors' prisons, people might have predicted that this lenience would spell the demise of capitalism, which depends on the repayment of loans. But the commercial ecosystem evolved workarounds for this loss of leverage. Credit checks, credit ratings, loan insurance, and credit cards are just some of the ways that economic life continued after borrowers could no longer be deterred by the threat of legal coercion. An entire category of violence evaporated, and mechanisms that carried out the same function materialized, without anyone realizing that that was what was happening."

True, free enterprise has been able to skirt around the danger of debtors stealing creditor's property. However, when it resorts to using credit ratings, etc., the state, once again, in its infinite wisdom, steps in with prohibitions against racial and other types of discrimination, thus undermining this safeguard.⁴³ But the main error of Pinker in this passage is that he fails, utterly, to distinguish between offensive (unjustified) and defensive (justified) violence. To be sure, "to seize John's car or bank account" is an act of violence, but it is entirely righteous, in that this is really the legitimate property of the grocer, not John.⁴⁴ John, if he resists this transfer of property back to its rightful owner, would be the one guilty of utilizing unjust violence.

Suppose a rapist R has his way with his victim, V. In medias res, V pulls out her revolver and shoots

⁴³ It turns out, surprise, surprise, that blacks have worse credit ratings than whites, even when wealth is held constant, and that therefore when banks discriminate in their mortgage lending against the former, this is deemed racist, and punished by law. (The fact that orientals have better credit ratings than whites, *ceteris paribus*, and that banks favor them even over whites, does not get these evil institutions off the hook.). See on this Block, Snow and Stringham, 2008; Liebowitz, 2008A, 2008B, 2008C, Liebowitz and Day, 1998. Pinker, unfortunately for his credentials as a supporter of liberty, free association, etc., supports anti discrimination legislation.

⁴⁴ Pinker is in error in characterizing the car or the bank account as John's. It is no such thing. This is in effect stolen property.

R. According to the “logic” employed by our author in this passage, V would clearly be guilty of employing “violence;” it would be unclear, at best, if R would also be in the wrong, given Pinker’s analysis. Well, yes, the rape victim who puts a bullet into her attacker is surely using “violence.” But it is entirely *justified* violence, as in self-defense. Perhaps this distinction escapes people who occupy the environs of Cambridge, MA.⁴⁵

Our east coast liberal (157) believes that people can “sometimes (be) coerced by circumstances.” I beg to differ. I go so far as to say that in the entire history of the universe *no one* has ever been “coerced by circumstances”. I offer an extreme example to illustrate this:

Suppose that aliens grab A into their space ship, do horrid things to her, and then drop her into the middle of the ocean (back on earth, for those of you not paying full attention to this scenario). B, a boater, comes by and offers to rescue her, if she will agree to be his slave forevermore. Otherwise, he will leave her be, sure to drown, since she is now 500 miles from shore, and cannot swim that far. She agrees. She values her life more than her freedom. B is A’s benefactor. A profits from this transaction to the tune of the difference in degree she values these two options, her life and her freedom. B did not coerce her. *Circumstances* did not coerce her. The bad guys of the piece are the Martians, and them alone.

Pinker sees some of this, but not all of it by any means when he writes (158): “Governments ... are institutions that by their very nature are designed to carry out violence.” No, no, no, this is only *half* of the picture. Yes, governments “carry our violence” alright. But these weasel words hide more than they reveal. The full truth of the matter is that the state initiates unjustified violence, not the *defensive* variety indulged in by our victim of rape, mentioned above. Indeed,

⁴⁵ See the response of Michael Dukakis to the hypothetical that his wife was raped and murdered: http://www.time.com/time/specials/packages/article/0,28804,1844704_1844706_1844712,00.html

government is the *only* institution in society⁴⁶ with the legal right not only to employ violence, but to *initiate* it against innocent people. There is a *gigantic* difference between initiatory and defensive violence. Indeed, this is perhaps the most important distinction in all of political philosophy.⁴⁷ Pinker entirely misses this crucially important libertarian point.

Our author is on firmer ground when he says (159), “Rummel estimates that governments killed 133 million people before the 20th century, and the total may be as high as 625 million. So once raiding and feuding have been brought under control in a society, the greatest opportunity for reducing violence is reducing *government* violence.” This is a bit difficult, however, to reconcile with the overriding thesis of this book: that the state is to be credited for human safety and well-being. This brings to mind the offer of the Mafioso protection racket: to “protect” their “clients” from *their own* predation.

Pinker (161) offers a paean to democracy. “The idea of democracy, once loosed on the world, would eventually infect larger and larger portions of it... and would turn out to be one of the greatest violence reduction technologies since the appearance of government itself.” He fails to confront to the views of Hoppe (2001A) to the contrary, needless to say. He fails to reckon with the fact that Hitler and the Nazis came to power through this very institution. One would have

⁴⁶ Labor unions are an exception to this rule. See Block, 2010A. In the view of Rothbard (1963): “The State, then, is the only organization in society that regularly and openly obtains its monetary revenues by the use of *aggressive* violence; all other individuals and organizations (except if delegated that right by the State) can obtain wealth only by peaceful production and by voluntary exchange of their respective products. This use of violence to obtain its revenue (called ‘taxation’) is the keystone of State power.”

⁴⁷ Did anyone hear this joke: “Do you know the difference between a living room and a bathroom?” If the respondent fails to answer, the response is: “Well, don’t come to my house, then.” In like manner I say to Pinker whose appreciation of the difference between “starting up” and “hitting back” is problematic, “Don’t get into political philosophy.”

thought that in a book of over 800 pages Pinker would have at least mentioned, and tried to refute, such criticisms. He does, however, teasingly, mention our man Hitler (162) but in an entirely different context: "If Hitler's luck had held out a bit longer, he probably would have gone down in history as Adolph the Great."

Our author, however, is to be congratulated for his appreciation (171) that the industrial revolution was a civilizing force for good that vastly improved human welfare. However, Pinker's support for the industrial revolution by be tempered by his positive reaction to (177) "Charles Dickens's *Oliver Twist* (1838) and *Nicholas Nickelby* (1839) ... (which) ... opened people's eyes to the mistreatment of children in British workhouses ..." Here comes a joke: "A person asks an economist, 'How is your wife?' Comes the answer: 'Compared to what'" Yes, the plight of children then was bad, horrid, compared to the present day, on average. But compared to pre Industrial Revolution times, it was an improvement, a vast improvement,⁴⁸ a point entirely missed by Dickens, and now by Pinker.

However, our author falls victim to the Malthusian fallacy (171):

"Before 1800 the mathematics of Malthus prevailed: any advance in producing food only bred more mouths to feed, leaving the population as poor as before. This was true not only in England but all over the world. Between 1200 and 1800 measures of economic well-being, such as income, calories per capita, protein per capita, and number of surviving children per woman, showed no upward trend in any European country. Indeed, they were barely above the levels of hunter-gatherer societies."

Malthus (1798) thought our species was destined to wallow at a subsistence level: if population rose above this point, we would need a weeding

⁴⁸ See Ashton and Hudson. 1998; Berg, 1992; Crafts, 1985; Floud and Johnson, 2004; Floud and McCloskey, 1994; Hartwell, 1967,1970, 1972; Hayek, 1954; Levin, 1998; McKendrick,1983; Mises, [1949] 1998; Nardinelli, 1990; Rosenberg and Birdzell. 1987; Shaffer, 2012; Taylor, 1975

out: disease, war, pestilence, starvation. If our numbers fell below this level, more of us would survive, until the process reared its ugly head once again.

But this story is incompatible with the existence of (coercive) slavery, a virulent pox which has been with us from time immemorial. Suppose we really were in a subsistence level of productivity. How much would anyone pay for a slave? This would now be a worker who could not produce more wealth than was necessary to sustain himself, and maintain his numbers. Precisely. No one would pay a plugged nickel for the ownership of such a person. No one would invest any resources at all to capture such a person, or to keep him from escaping. Hence the "curious institution" would not exist. But slavery did sully our species, all throughout recorded history and presumably long before.⁴⁹ Scratch Malthus' subsistence theory, and Pinker's support of it as well.⁵⁰

According to Pinker (174): "The growth of writing and literacy strikes me as the best candidate for an exogenous change that helped set off the Humanitarian Revolution." But this violates his

⁴⁹ "Slavery has existed ever since man has been fighting wars. Back to the earliest civilizations and before, there has always been slavery. It is still happening today, from sex slavery here in America and abroad to traditional slavery in Africa, mid east and even in Asia.... The oldest known written records (Egyptian) speak of slaves. All the cultures, every continent, every tribe and native village on our planet had slaves. Until the practice was ended by the 'colonialists' and 'imperialists'." (<http://answers.yahoo.com/question/index?qid=20100315143904AAMpNy3>).

"Slavery dates back to prehistoric man" (http://wiki.answers.com/Q/What_year_did_slavery_start). "Slavery began in prehistoric times and has been practiced ever since." (<http://franklaughter.tripod.com/cgi-bin/histprof/misc/slavery1.html>)

⁵⁰ Pinker (620) finds it difficult to divorce himself from Malthusianism: "... the Industrial Revolution ... for the first time in history increased material well-being faster than the increase could be eaten up by population growth."

statist-democratic thesis. Unless, of course, he thinks the all-loving government is responsible for writing and literacy, a point he does not even attempt to make, let alone buttress. 'Twas Gutenberg, not the state, methinks.

Yet another counter example to Pinker's democratic and statist hypotheses is provided by our author himself, who posits the civilizing effects of (178-179):

"... e-mail, digital documents, Web sites, blogs, teleconferencing, Skype, and smart phones. And two centuries *before* they were written, the technologies of the day—the sailing ship, the printed book, and the postal service—had already made information and people portable. The result was the same: a global campus, a public sphere, or as it was called in the 17th and 18th centuries, the Republic of Letters... A global campus increases not only the complexity of ideas but their quality. In hermetic isolation, all kinds of bizarre and toxic ideas can fester. Sunlight is the best disinfectant, and exposing a bad idea to the critical glare of other minds provides at least a chance that it will wither and die. Superstitions, dogmas, and legends ought to have a shorter half-life in a Republic of Letters, together with bad ideas about how to control crime or run a country. Setting fire to a person and seeing whether he burns is a dumb way to determine his guilt. Executing a woman for copulating with devils and turning them into cats is equally inane... Airplanes can bring people together, but people who live in a city are already together, so cities have long been crucibles of ideas. Cosmopolitan cities can bring together a critical mass of diverse minds, and their nooks and crannies can offer places for mavericks to seek refuge. The Age of Reason and the Enlightenment were also an age of urbanization."

Pinker does not see the need to claim, as did Al Gore about the internet,⁵¹ that the state created all these good things. But, unless this is true, his

view that the democratic government reduced barbarism is weakened; nay undermined.

States Pinker (181):

"We are also committed to reason. If we are asking a question, evaluating possible answers, and trying to persuade others of the value of those answers, then we are reasoning, and therefore have tacitly signed on to the validity of reason. We are also committed to whatever conclusions follow from the careful application of reason, such as the theorems of mathematics and logic."

I don't accuse Pinker of plagiarizing these brilliant ideas from Hoppe (1993B, 1995). I make no such accusation. I am fully convinced that Pinker has not done his homework: he is totally unaware of Hoppe's contribution. I mention this issue only to highlight the similarities between the two authors. It is too bad that the former shows no evidence of being acquainted with the publications of the latter.

Pinker on several occasions waxes eloquent about the Golden Rule (182, 695, 697). He pays homage to the idea that we should act in a way to others in the manner we would like them to act toward us. In his words (182): "I have to state my case in a way that would force me to treat you in kind." This fails because of the masochist. He wishes that you would aggress against him. Therefore, according to the Golden Rule, he is justified in engaging in this violent act against others. A far better, more civilized rule of behavior is the non aggression principle (NAP) of libertarianism (Rothbard, 1973, 1982).

Pinker attacks anarchism on numerous occasions (35, 36, 51, 54, 74, 79, 102, 103, 104, 114, 166, 183, 199, 223, 291, 307, 312, 328, 336, 337, 347, 348, 515, 528, 538, 612, 677, 681).⁵²

As a devout anarcho-capitalist, I take great exception to his numerous pot shots at this philosophy. What is anarchy? It is not a synonym for chaos, or barbarism, as Pinker and many

⁵¹ <http://www.snopes.com/quotes/internet.asp>;

⁵² I am trying to be thorough here, but I may have missed a few of them. Do you think Pinker has a thing with regard to anarchism?

others suppose. Etymologically, the prefix “an” in this word means “against.” So, against what, precisely, is anarchism? Why, archy, of course. And what in turn is archy? It is the unjustified rule of the tyrant against his victims. In other words, what anarchists oppose⁵³ is violations of the NAP. Anarchists support the NAP. Anarchism is the embodiment of the non aggression principle. Its opponents, then, such as Pinker, support violations of the NAP. And they call themselves civilized, and us barbarians.

A case in point is world government. He is Pinker's (288-289, footnotes omitted) view on that monstrosity:

“World government seems like a straightforward extension of the logic of the Leviathan. If a national government with a monopoly on the use of force is the solution to the problem of homicide among individuals and of private and civil wars among factions, isn't a *world* government with a monopoly on the legitimate use of *military* force the solution to the problem of wars among nations? Most intellectuals did not go as far as Bertrand Russell, who in 1948 proposed that the Soviet Union should be given an ultimatum that unless it immediately submitted to world government, the United States would attack it with nuclear weapons. But world government was endorsed by, among others, Einstein, Wendell Willkie, Hubert Humphrey, Norman Cousins, Robert Maynard Hutchins, and William O. Douglas. Many people thought world government would gradually emerge out of the United Nations.

“Today the campaign for world government lives on mainly among kooks and science fiction fans. One problem is that a functioning government relies on a degree of mutual trust and shared values among the people it governs which is unlikely to exist across the entire globe. Another is that a world government would have no alternatives from which it could learn better governance, or to which its disgruntled citizens could emigrate, and hence it would have no

natural checks against stagnation and arrogance. And the United Nations is unlikely to morph into a government that anyone would want to be governed by. The Security Council is hamstrung by the veto power that the great powers insisted on before ceding it any authority, and the General Assembly is more of a soapbox for despots than a parliament of the world's people.”

This is impeccable reasoning. Once allow a Hitler, a Stalin, or a Mao⁵⁴ to be in charge of the entire planet, through world government, it is pretty much curtains for most of the human race.

The only problem with Pinker's magnificent rejection of world government is that he does not seem to realize that as an opponent of anarchism, he is logically *compelled* to *accept* this type of institutional arrangement. The option before him, the *only* option before him, and for everyone else of course, is world government or anarchism. States Rothbard (1963) in this regard:

“In the modern world, each land area is ruled over by a State organization, but there are a number of States scattered over the earth, each with a monopoly of violence over its own territory. No super-State exists with a monopoly of violence over the entire world; and so a state of ‘anarchy’ exists between the several States. (It has always been a source of wonder, incidentally, to this writer how the same conservatives who denounce as lunatic any proposal for eliminating a monopoly of violence over a given territory and thus leaving private individuals without an overlord, should be equally insistent upon leaving *States* without an overlord to settle disputes between them. The former is always denounced as ‘crackpot anarchism’; the latter is hailed as preserving independence and ‘national sovereignty’ from ‘world government.’)”

At present, Canada and Cuba are in a state of anarchism with each other, since there is no world government that rules over both of them. The same applies to China and Chile, to France and Fiji, to Afghanistan and Algeria, to Spain and Sweden, to Grenada and Great Britain; indeed, to

⁵³ At least of the Rothbardian anarcho capitalist variety; I speak of no other type

⁵⁴ And don't say it can't happen here

all the nations on the planet. Elsewhere (183) Pinker has this to say: "... in a state of anarchy, people's self-interest, self-deception, and fear of these shortcomings in others would lead to constant strife." The anarchist idea is that without a national government, individual A and B will be at each other's throats. But the same identical relation exists in the international context. Without a *world* government, countries A and B will engage in fisticuffs, and worse, with each other. The logical implication, here, is *not* that we should eschew world government. Rather, it is that it (183) "must be checked by the power of other people, to force them to govern with the consent of the governed. They may not use violence against their citizens beyond the minimum necessary to prevent greater violence. And they should foster arrangements that allow people to flourish from cooperation and voluntary exchange. This line of reasoning may be called humanism."⁵⁵ The problem with Pinker is not that he contradicts himself.⁵⁶ Mere logic should not be allowed to constrain Harvard professors. The difficulty is that he does not even realize that he is doing so, and thus makes no effort, none whatsoever, to rescue himself from this predicament. Enquiring minds would dearly love to know how he would attempt to extricate himself from this dilemma, were he but to be made aware of it. Perhaps, maybe, there is hope for our author as a potential convert to libertarian anarchism. For he does deliver himself of this remark (186, footnote omitted): "In *The Blank Slate* I argued that two extreme visions of human

nature—a Tragic vision that is resigned to its flaws, and a Utopian vision that denies it exists – define the great divide between right-wing and left-wing political ideologies. And I suggested that a better understanding of human nature in the light of modern science can point the way to an approach to politics that is more sophisticated than either." Well, libertarianism, too, is neither left nor right; the freedom philosophy rejects both.⁵⁷ Perhaps there is hope for Pinker after all.

In my view, Pinker's most important thesis is that government is a force for good. If anything sticks in the craw of the anarchist, that would be it. I now arrive at what I see as his second most important thesis: the death toll is decreasing over time. Exhibit "A" is Pinker's chart (195; see appendix of present paper).

A key element in Pinker's analysis is to count not the absolute number of deaths in any one episode, but rather that relative to, or divided by, the entire earth's population at the time. With this technique he demonstrates that even though World War II killed the most people (55 million), its adjusted rank is only 9th in these death sweepstakes. I suggest this is misleading. A better relative measure would have placed in the denominator not the population of the entire planet, but only what I call for want of a better word the relevant number of people. For example, the Napoleonic Wars of the 19th century were pretty much confined to Europe and a bit of Asia. Why count the populace of the other continents? Similarly, the deaths due to the fall of the Ming Dynasty and the Taiping Rebellion were pretty much confined to China, and those of the French wars of religions and the Russian Civil War to those nations, respectively. If this practice were followed, I suspect that Pinker's

⁵⁵ In the view of Pinker (240): "The great powers took on the responsibility of preserving peace and order (which they pretty much equated), and their Concert of Europe was a forerunner of the League of Nations, The United Nations and the European Union. This international Leviathan deserves much of the credit for the long intervals of peace in 19th century Europe." Does this sound like support for centralization in the direction of World Government. It sure does to me.

⁵⁶ Later in the book (288-289) he offers as splendid a critique of world government as can be written. But here (183) he is calling for "other people," who else than world government?, to check the power of national governments.

⁵⁷ See on this Block, 2010; Hultberg, 2005; Read, 1998; also see http://www.google.ca/#hl=en&sugexp=les%3Bpchatce&gs_rn=1&gs_ri=hp&cp=9&gs_id=10&xhr=t&q=nolan+chart&pf=p&tbo=d&output=search&client=psy-ab&oq=nolan+cha&gs_l=&pbx=1&bav=on.2,or.r_gc.r_pw.r_qf.&bvm=bv.1355534169,d.cGE&fp=fbd581612f005b5a&bpcl=40096503&biw=1280&bih=878

contentions would fall by the wayside, or at least be radically reformed.

Here is a minor error (197). There was no “civil war” in the mid 19th century in the U.S. In a true civil war, e.g. Russia, 1917 or Spain, 1936, there are two sides each of which desires to rule over the entire country, consisting of the possessions of both. The U.S. case, while the North did indeed wish to prevail over the south, and thus attain sovereignty over the entire country, the opposite was not true. The latter merely wished to secede from the former. Thus a more accurate title for this conflagration would be *The War Between the States*, or *the War to Prevent Southern Secession*, or *the War of Northern Aggression*.

Another mistake is to equate anarchism with of all things, practically its polar opposite, feudalism (199). Free market anarchism is the embodiment

of the freedom philosophy: all people are free to do exactly as they wish, provided, only, they act in a way compatibly with their respecting the same rights for all others. Feudalism in contrast reserves such liberty to the king and his nobles; all others are serfs, not too far removed from actual outright slavery.⁵⁸

I have no objection to critics whose main work lies outside the realm of political economy impugning research from this discipline. But when they do so, it would be nice if they gave reasons for their rejection. Pinker (207) refers to the “so-called business cycle” but vouchsafes us no justification for his claim that such variations are “really a sequence of unpredictable lurches in economic activity rather than a genuine cycle with a constant period.” Business cycles need a “constant period?” Perhaps in music or mathematics, but not in economics.⁵⁹

⁵⁸ Henderson, 1980; Hoppe, 2004; Reisman, 2006; Rothbard, 1998, ch. 10, 2012

⁵⁹ There is a library full of citations to economic business cycles with which I will not clutter up the present review. All anyone needs to do is google “business cycle.”

Appendix (source: p. 195)

Rank	Cause	Century	Death toll	Death toll: mid-20th-century equivalent	Adjusted rank
1	Second World War	20 th	55,000,000	55,000,000	9
2	Mao Zedong (mostly government-caused famine)	20 th	40,000,000	40,000,000	11
3	Mongol Conquests	13 th	40,000,000	278,000,000	2
4	An Lushan Revolt	8 th	36,000,000	429,000,000	1
5	Fall of the Ming Dynasty	17 th	25,000,000	112,000,000	4
6	Taiping Rebellion	19 th	20,000,000	40,000,000	10
7	Annihilation of the American Indians	15 th -19 th	20,000,000	92,000,000	7
8	Josef Stalin	20 th	20,000,000	20,000,000	15
9	Mideast Slave Trade	7 th - 9 th	19,000,000	132,000,000	3
10	Atlantic Slave Trade	15 th -19 th	18,000,000	83,000,000	8
11	Timur Lenk (Tamerlane)	14 th -15 th	17,000,000	100,000,000	6
12	British India (mostly preventable famine)	19 th	17,000,000	35,000,000	12
13	First World War	20 th	15,000,000	15,000,000	16
14	Russian Civil War	20 th	9,000,000	9,000,000	20
15	Fall of Rome	3 rd -5 th	8,000,000	105,000,000	5
16	Congo Free State	19 th -20 th	8,000,000	12,000,000	18
17	Thirty Years' War	17 th	7,000,000	32,000,000	13
18	Russia's Time of Troubles	16 th -17 th	5,000,000	23,000,000	14
19	Napoleonic Wars	19 th	4,000,000	11,000,000	19
20	Chinese Civil War	20 th	3,000,000	3,000,000	21
21	French Wars of Religion	16 th	3,000,000	14,000,000	17

END of the Part 1

[Proceed with the Part II](#)

Received for publication: 23.02.2013

Accepted for publication: 29.03.2013

How to cite this article?

Style - **APA** Sixth Edition

Block, W. E. (2013, 07 15). Book review of: Steven Pinker's "The better angels of our nature: Why violence has declined" - Part I. (Z. Čekerevac, Ed.) *MEST Journal*, 1(2), 40-61.
doi:10.12709/mest.01.01.02.04.

Style - **Chicago** Fifteenth Edition

Block, Walter E. "Book review of: Steven Pinker's "The better angels of our nature: Why violence has declined" - Part I." *MEST Journal*. Edited by Zoran Čekerevac. MESTE NGO. 03 09, 2013.
http://www.mest.meste.org/MEST_Najava_clanaka.html.

Style - **GOST** Name Sort

Block Walter E. Book review of: Steven Pinker's "The better angels of our nature: Why violence has declined" - Part I [Journal] = Review of Pinker's: Why violence has declined? // MEST Journal / ed. Čekerevac Zoran. - Belgrade : MESTE, 07 15, 2013. - 2 : Vol. 1. - pp. 40-61. - ISSN 2334-7058 (Online); ISSN 2334-7171.

Style - **Harvard** – Anglia 2008

Block, W. E., 2013. Book review of: Steven Pinker's "The better angels of our nature: Why violence has declined" - Part I. *MEST Journal*, 15 07, 1(2), pp. 40-61

Style – **ISO 690** Numerical reference

Book review of: Steven Pinker's "The better angels of our nature: Why violence has declined" - Part I.
Block, Walter E. [ed.] Zoran Čekerevac. 2, Belgrade : MESTE, 07 15, 2013, MEST Journal, Vol. 1, pp. 40-61. ISSN 2334-7058 (Online); ISSN 2334-7171.

Reviewed book:

Pinker, S. (2011). *The better angels of our nature: Why violence has declined*. New York, NY: Viking.



THE DEVELOPMENT OF THE LOGISTICS SYSTEM OF THE REPUBLIC OF BELARUS

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JEL category: **O, O3, O52, R4, R41**

Abstract:

In the article some questions of the development of logistics sector in the Republic of Belarus are considered. The favorable geographical position of Belarus determined a rapid development of logistics services in the country. Belarus is interested in growth of transit potential, the increase of accessibility of the remote areas, as well as the major European exporters. The most relevant evidence of this interest is an international project “Amber Coast Logistics”, which is implemented in the framework of “Baltic Sea Region program” (funded by EU) and aims at increasing the volume of foreign trade in the region. Since the Index of Transit has been developed, the growth of cargo flows was forecasted as a result of the elimination of barriers for development of foreign economic activities in Belarus. The new transport corridors, linking the southern Baltic Sea region with the countries of the Customs Union and Ukraine have been proposed, as well as the new multi-modal transport chains through these corridors, oriented, first of all, to Belarus.

Keywords: logistics, traffic flows, index of transit, foreign trade, transport accessibility

1 INTRODUCTION

The modern stage of development of the world economy has been characterized by sharp competitive struggle for the spheres of influence on the basic commodity markets. Globalization of the economy causes a rapid growth of trade flows in the Euro-Asian continent. Growing economies of China, Japan, as well as the developed economics of European countries, are consuming more and more of the raw material

resources. At the same time, they produce modern high-tech engineering products, which have huge needs of the developing economy of the same China, Russia, Kazakhstan, Belarus, the Ukraine and other Post-Soviet republics.

In recent years, cargo flows in the direction of Europe – Russia – Ukraine – Kazakhstan – China are quite stable. Nevertheless these flows have been already formed. The practice shows the rapid growth of foreign trade between these countries, and hence the growth of trade flows.

The dynamic development of the integration processes in the frames of the Customs Union of Belarus, Russia and Kazakhstan, has expanded

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the possibilities of our country for the development of logistics and transit of goods in the Europe-Asia direction.

Location of the Republic of Belarus in the heart of the European continent allows to become a specific bridge between the countries of Europe and Asia and to ensure the smooth movement of traffic flows on the main transport corridors passing through Belarus. This is well understood by the Republic's Government and conditions for the transit of cargoes through its territory are constantly improving. Bodies of State Management are constantly and systematically working to increase the transit of freight traffic through Belarus, contributing to the growth of trade turnover of the countries of the European Union with Asian States.

The cooperation in the sphere of logistics of railway transport with the neighboring States is rapidly developing. The most bright examples are: the international combined train „Viking“, which follows the route “Klaipeda-Minsk-Kiev“; specialized container train „Mongolian vector“ - on the route „Brest - Naushki - Ulan-Bator“; container train “Zubr” - on the route “Tallinn - Riga - Minsk - Kiev“; container train "Mercury" - on the route “Klaipeda /Kaliningrad - Minsk - Moscow“. The train “Viking“ is sent to weekly, "Mongolian vector“ - three times a month, “Zubr“ and “Mercury“ are in process of formation of the composition. The advantages of container trains are obvious. For example, the distance from the Port of Hamburg up to ports of China is about 21 000 km and the term of cargoes delivery varies up to 30-40 days, while switching the flow of cargo in the direction of the railway transport reduces the time of delivery in 3 times.

2 THE LEVEL OF DEVELOPMENT OF LOGISTICS IN BELARUS

Activities that were conducted in the Republic of Belarus for the development of logistics, assessed as part of the Logistics Performance Index of the World Bank at the level of 91st position in 2011, while in the previous year it was 74th position. Considering the individual factors of Logistics Performance Index, it should be noted, that for the organization of international transport, Belarus is located at 107th position in the World, on the timeliness of the goods delivery - at 114th position, on the system of tracking the movement of goods - on the 98th position, and on the efficiency of customs and border control - at 121st position. In the LPI ranking for the year 2012, Republic of Belarus took the 91st place from 155.

(Arvis, Mustra, Ojala, Shepherd, & Saslavsky, 2012)

According to “The Efficiency of Customs and Border Control Indicator“, Belarus has lost 43 percentage points, what is the worst indicator not only among the countries of the Commonwealth of Independent States (CIS), but also in the World (the worst dynamics has been observed only in some African and Asian countries: Syria, Libya, Eritrea etc.). This trend is conceptually impact on the overall picture of the Logistics Performance Index for the Republic of Belarus in 2011.

As can be seen, Customs is the bottleneck in determining index mentioned above. In general, the level of logistics development in Belarus is lower than in Latvia, Lithuania and Kazakhstan, but slightly higher than in Russia, which occupies 95th position. In this connection, the Government of the country was given the task to implement a set of measures which would allow rising on 50-60th places in this ranking. For this purpose, first of all, it is necessary to improve the legislation of the Republic of Belarus, reduce the number of formalities in the internal and border terminals, to simplify the conditions for obtaining of various permits and certificates.

As noted above, the most difficult place in the transport and logistics system of Belarus is the State Border. At the present time the State Border has only 34 road check points, which are equipped with devices of technical control, computerized and connected to the information lines, which allows to use new forms and methods of customs control and customs clearance of goods, based on the modern electronic technologies. New technologies allow reducing time of customs clearance and control through the use of electronic exchange of information between customs and participants of foreign economic activity. From June 17, 2012 compulsory preliminary informing about the goods imported to the Customs territory of the Customs Union was introduced on the road transport. According to this decision, the authorized economic operators should provide information in respect of imported road transport of goods of not less than two hours prior to their importation into the customs territory of the Customs Union.

Customs bodies of the States-members of the Customs Union, on whose territory the place of arrival of goods and transport vehicles is located, are obliged to carry out its analysis with the use of a risk management system within 2 hours from

the moment of receipt of preliminary information. Further, the customs authorities carry out a comparison of the data contained in the transport and commercial documents, submitted by the carrier, with the information contained in the preliminary information. In the case of presentation of the preliminary information in the required volume, provided preliminary information is used as electronic copies of the transit declaration in the absence of differences preliminary information and data contained in the documents used as a transit declaration. The decision on further delivery of the goods is made no later than after 2 hours from the moment of registration of the transit declaration if there is no risk of noncompliance with the norms of legislation of the Customs Union.

The principle of preliminary information should also be applied for the rail cargo transport. However, this procedure is still not obligatory.

In the National transport regulatory and legal basis of the principle of freedom of transit – there is the list of documents, which should be provided at the border by the carrier. In addition, there are 4 criteria, on the basis of the unreliability of which customs authorities shall have the right to detain the goods: the name of the product, its quantity, gross weight and number of packages.

An important direction of development of transport-logistics activity in Belarus is the introduction of amendments and additions into the Code of the Republic of Belarus “On the ground” in the part of the transition of the property right to the ground when investing in the construction of a transport-logistics centers, in the Investment Code in the part of the extension of the rights of the concession and to the Tax Code in the part of exemption from fees for storage of goods under customs supervision and exemption from payment of the profit tax for a certain time.

Positive role to enhance the transit attractiveness played abolition of transport and other agreed types of controls at internal inter-state borders of the countries-participants of the Customs Union, which increased the speed of movement of transit vehicles. (EurAsEC, *Koncepcija formirovanija Edinogo transportnogo prostranstva Evrazijskogo ekonomičeskogo soobšestva*, 2008)

The concept of formation of single transport space, adopted in EurAsEC, provides the creation of transport-logistical chains and

logistics terminals in the territory from Alma-Aty to Brest (EurAsEC, *Concept of Establishment of the Common Transport Space of the Eurasian Economic Community*, 2008). The strategy of creation and development of logistics centers of the EurAsEC is based on the provisions of the Agreement between EurAsEC Member States on establishing the Transport Union and the Concept of the formation of a Common Transport Space of the EurAsEC. This strategy covers the period up to the year 2020 and is designed to combine the practical efforts of the members of mentioned community to the joint implementation of the tasks of the EurAsEC in the sphere of transportation activity (EurAsEC, *Strategija sozdaniya i razvitija sistemy meždunarodnyh logističeskih centrov Evrazijskogo ekonomičeskogo soobšestva (na period s 2009 po 2020 gody)*, 2008):

At the external borders of Belarus and Russia the uniform control of vehicles on the principle of “one-stop” is carried out from 2011. As a result of this measure, the number of transit trips of freight cars owned by foreign carriers in 2011, has increased compared to 2010 more than in 21 percent.

Further enhancing the attractiveness of the automobile transit through the territory of the Republic of Belarus has contributed to the transfer of the 2011 monitoring of implementation of international road transport with the Kazakh-Russian border to the external border of the Customs Union.

Particular attention in the implementation of the policy aimed at increasing the transit potential is paid to development of the international transport corridors infrastructure. The length of motor roads with a carrying capacity of 11.5 tons per axle which are included in the international transport corridors has increased by 327 kilometers over the past three years. The maximum speed of movement on the 2nd transport corridor through the territory of Belarus for freight transport is 100 km/h, while in Russia - only 70 km/h.

3 THE INTERNATIONAL COOPERATION ON THE DEVELOPMENT OF LOGISTICS IN BELARUS

Belarus is interested in the growth of transit potential and increasing the accessibility of remote areas, as well as the major European exporters. This fact was confirmed by the approval of an international project „Amber Coast Logistics“, which is realized in the framework of

the „Baltic Sea Region program” (European Commission). Implementation period of this project is 2010 – 2014 years (ACL, 2012).

There are 6 countries involved in the project: Germany, Denmark, Poland, Lithuania, Latvia and Belarus. Project partnership is represented by 20 partner organizations, including 4 partners from Belarus.

School of Business and Management Technologies of the Belarusian State University is one of the performers and at the same time acts as a National coordinator of the project in Belarus.

The project aims to expand the volume of trade between the countries of the Baltic Sea region and Belarus, Russia, Kazakhstan and the Ukraine. This should be achieved through the following activities:

- increasing the accessibility of the remote areas of these countries,
- the application of multimodal cargo transportation systems,
- formation of new transport corridors,
- informing the carriers about the peculiarities of transport policies in partner countries,
- simplification of customs procedures of border crossing.

3.1 Study of legal acts in the sphere of international cargo transportation

A study of normative-legal acts in the sphere of international cargo transportation was conducted in the framework of the project "Amber Coast Logistics". The customs laws and regulations which are in force in the European Union and Belarus were also included in this analysis.

In particular, there were considered the following documents: the international legal instruments concluded between the Commonwealth of Independent States (CIS) Member States, the legislative acts of the Republic of Belarus in the sphere of international cargo transportation, customs rules, agreements on trade in goods between the EU and Belarus. This research has shown that in general the legislative acts of the Republic of Belarus have been harmonized with the corresponding acts of the European Union.

Nevertheless, there are certain problems, such as:

- the absence of a single customs control with use of inspection complexes at the customs office of departure;

- the lack of joint customs control by the customs authorities of Lithuania at all crossing points on the principle of "One stop";
- the absence of a joint inspection of the goods ADR before the beginning of transportation of the Customs Service and Ministry of Emergency Situations;
- highly regulated customs procedure on withdrawal of marriage and import new equipment under the terms of the old transaction;
- low throughput speed of data transmission in electronic preliminary information of the customs bodies for the import/export of goods in/from/through the Republic of Belarus (the speed is less than 15 Kbit/sec);
- complicated procedure of declaring the customs value of the goods;
- instead of being a declaration of delivery of the goods necessary to use the shipping documents, for example, a road consignment note together with the international standard of the convention on the contract for the international carriage of goods by road (CMR) (UNECE, 1956);
- the need to reduce the time of customs control and clearance of goods in a logistics center up to 4 hours from the moment of the adoption of a full package of document, by applying the European technology of customs clearance „Trust relationship“;
- the lack of priority or accelerated procedure of customs clearance of the goods within the country and across the border;
- for the processing of goods at the border is not taken into account the positive image of the national and international carrier, as well as the image of the shipper/consignee;
- multiple overstatement of prices for the accommodation of the goods in the transport-logistics centers to 9-11 Euro per one pallet place instead of \$2-2.5 as in other countries;
- not legally establish the availability of information about prepared by the normative documents of foreign trade activities, procedures, customs,

- phytosanitary, quarantine and other types of processing and control;
- the lack of services provided by organizations on certification sanitary control and certification in the internal customs posts, for which it is necessary to apply to the Central authority of these structures;
 - the need for representation in various governmental authorities of the country of the documents, which do not have access to them direct relationship: for example, to the authorities for the issuance of hygienic certificate, a copy of a foreign economic contract with a CMR consignment note and the mark of the customs on the placing of the goods in the customs control zone;
 - excessive demands to the design of the originals of documents on protected from fakes paper on a model form, etc.;
 - many of assuring the manufacturer, provider, carrier, forwarder, a notary, an issuing authority, etc. copies of documents;
 - the need to provide documents, which are a by-cognitive nature of the information (documents of the receipt of the payment on the letter of credit, for the distribution of the costs of transport, documents on currency operations, confirmation of residence, simplification of customs clearance, etc.);
 - restriction of the conditions of admissibility or conditional recognition of the documents sent by e-mail and Fax;
 - extremely inflated administrative responsibility for the consequences of the submission of improper (wrong) documents in the field of foreign economic activity. A measure of responsibility - from large fines to the full confiscation of the goods or even a vehicle;
 - a number of other less important issues.

Therefore, these discrepancies should be eliminated at nearest future.

3.2 The development of the transit index

In the framework of the project it is tasked for the first time to develop the index of transit on the basis of the basic criteria of the legislative acts. These criteria are grouped into five areas: customs clearance, technical specifications, network access and tariff policy, requirements for drivers of vehicles, special requirements.

The first group includes four criteria (customs clearance):

1. Pre-shipment inspection: in what period is it acts? On which countries has it been spread? How much does it cost? How widely has it been implemented? For what groups of the goods it has been applied and whether it is an obligatory procedure?
2. Customs fees: how has the amount of dues for customs clearance of goods varied?
3. The customs value: how has the procedure for determining the value when moving goods across the border varied?
4. Customs control: in what year has it been finally abolished on the border with the Russian Federation? To check, if this control is absent in any of the years of the studied period?

The second group includes four criteria (technical specifications):

1. Restrictions on the movement of vehicles: in what years restrictions on movement in the daytime were applied (in the spring and summer periods)?
2. The maximum permissible axle load: The General requirements for the maximum permissible load on the axle has changed; the maximum permissible axle load in the period of limitations? If there are any restrictions applied on all the roads?
3. Vehicle dimensions: Whether the General requirements for the size of the vehicles were changed?
4. Tachographs: If the rules of using tachographs have changed, and if they differ from European?

The third group includes four criteria (network access and tariff policy):

1. The fee for travel on public roads: how

varied the value of this collection with foreign carriers?

2. Fares: how changing the value of a payment for travel on highway M1/E30?
3. Other charges: if any of the other charges against carriers for transportation on the territory of Belarus were applied?
4. Payment for transportation of heavy and oversized vehicles: how has the fee for automobile roads of General use changed?

The fourth group includes two criteria (requirements for drivers of vehicles):

1. Charges with the drivers of vehicles shall apply: is there payment of any fees (ecology, medical insurance, etc.) for the drivers of vehicles (except for the visa)?
2. The mode of work and rest of drivers: were the requirements of the regime of work and rest of the drivers changed?

The fifth group includes three criteria (special requirements):

1. The customs escort: what goods should obligatory be accompanied and how their value is changing?
2. Types of control: what significant changes have taken place in carrying out veterinary and phytosanitary control (requirements to the submitted documents, the complexity and cost of procedures)?
3. Prohibitions: if there any restrictive measures to the transit of certain types of goods, such as waste and dangerous goods?

The entire study was conducted by the 17 criteria for the period from 1995 to 2010. According to the results of processing the initial data, a correlation model of dependence of the freight traffic volume in/from/through of the Republic of Belarus and these criteria will be built. On the basis of the developed model, the forecast of growth of cargo volumes up to the year 2020 was done. It is based on the realization of a complex of measures designed to eliminate the existing problems in the field of international cargo transportation, as well as deeper harmonization of legal acts of Belarus and the European Union.

4 NEW MULTIMODAL TRANSPORT CHAINS

On the basis of prepared forecast of volumes of

cargo transportations, five of the most promising transport corridors between the Baltic Sea Region and the countries of the Customs Union and Ukraine were identified:

- This corridor A – Ventspils – Riga – Moscow,
- corridor B with its two directions:
 - 1 - Riga-Vilnius-Minsk-Kiev,
 - 2 - Riga-Smolensk,
- corridor C - route under the Baltic sea between its southern ports,
- corridor D - Klaipeda-Vilnius-Minsk-Moscow,
- corridor E - Hamburg-Berlin-Warsaw-Minsk-Moscow.

Using data transport corridors developed multimodal transport chains, which allow reducing the environmental load due to the shift of freight from road to sea and railway.

Studies of existing transport chains have shown that the potential of the Republic of Belarus is used to a small extent. In general, all goods are carried in Moscow or in the Moscow region, where they undergo customs clearance, processed and then sent to the consignee back to Belarus, as well as Kazakhstan and the Ukraine. Such routes have been developed as a result of the enormous volumes of cargo flows following in Moscow, thanks to which the importers receive a big discount, eliminating additional transportation expenses due to increase of the length of the route. In this region a fairly well-developed logistics infrastructure with a wide variety of rendering logistics services has formed. However, the existing capacity of the logistics centers now is heavily overloaded, and their further development will lead to the growth of total logistics costs due to increasing the load on the whole infrastructure: roads, railways, passenger transport, energy, systems of life, etc. The consequences of such development are: a complicated ecological situation, the shortage of human and financial resources for the further development of logistics infrastructure.

Therefore it is necessary to change the existing transport chains, making full use of the geographical position of the Republic of Belarus. This should be a network of large logistics centers, which will provide the whole complex of logistics services of 3PL and 4PL operators.

Meanwhile, the logistics sector in Belarus is in the initial stage of development. The Program of development of the logistics system of Belarus till

2015 was adopted only in 2008 as well as the Program of development of the transit potential of the Republic of Belarus for 2010-2015. Both programs determine the directions of logistics development in the Republic. In accordance with these Programs, 11 logistic centers with quite a wide range of logistics services are already functioning on the territory of Belarus. Not far from Minsk there is in the process of building the Europe's largest transport-and-logistics center called "Prilesye". This center will be located on an area of 83 hectares. The unique location provides direct access to the Minsk Ring Way, the European transport corridor №2 (Berlin-Warsaw-Minsk-Moscow), motorway M-4 (Minsk-Mogilev) and the National airport "Minsk-2". The main purpose of TLC can be divided into two areas: service of the Belarusian export and import on the borders of Minsk and Minsk region and service of transit cargo flows. (Sovet Ministrov .. , 2010)

Delivery of all goods in the complex will be carried out as by motor roads and by rail to the complex from the territory of one of the largest industrial centers of Minsk. Warehouse premises with a total area of storage in 200 thousand square meters, are designed on the principle of universal modules and can satisfy the most demanding clients. There also an intermodal terminal with an area of 80,000 m² will be made.

In 40 km from Minsk on the territory of 79 hectares, close to the National airport „Minsk-2“, has been started the construction of multimodal logistic center under the name Air Logistic Park. The center is located in 2 kilometers from the motorway M1, which is part of the Trans European corridor № 2. The distance to the capitals of neighboring States is: Vilnius - 172 km, Riga - 403 km, Warsaw - 477 km, Kiev - 437 km, Moscow - 678 km.

In the Air Logistics Park the following infrastructure and logistics services will be available:

- cargo air terminal with direct access to the parking of aircraft;
- railway terminal, storage and handling of containers;
- services of forwarding;
- warehouses of class A;
- business center;
- customs registration and clearance;
- filling station and the maintenance of automobiles;
- restaurant and hotel;

- guarded parking for trailers;
- car parking, playground for maneuvering;
- industrial zone.

In addition, about 40 logistics centers are in the stage of construction and by the end of 2015 it is expected that their number will reach 50 (Sovet Ministrov, 2008).

The development of the logistics activity in Belarus is particularly relevant especially in connection with the creation of the Customs Union and the Single Economic Space. In the new conditions it is economic expedient to make the delivery of goods from Western Europe to the logistics centers of our country, make their customs clearance, cargo handling and send them to the Customs Union countries on lower tariffs. Also effective the delivery of goods from the countries of the Customs Union to the logistics centers of Belarus, which will do their customs clearance of cargoes and sending them in the countries of Western Europe under the customs control. The new multimodal schemes of cargo transportation will be used here, ensuring lower overall costs and higher ecological compatibility of delivery.

The reorientation of the major traffic flows in direction West - East and North - South through Belarus will provide the development of the transport industry of the country and allow to create a modern infrastructure of roadside service along major transport corridors and maintain them at a modern European level.

It is expected that as a result of the implementation of these activities the total amount of incomes from transit in 2015 (without accounting of incomes from the transit of oil and the cost of services on transit of natural gas through trunk pipelines) will amount to \$2.4 billion, or 160.2% to the level of the year 2010, and also - of 2.6-2.7% in the GDP. The volume of revenues from the implementation of transit flights by foreign aircraft to \$73.8 million or 142.8% to the level of the year 2010, the transit of goods and passengers by rail - \$691 million (135%), the implementation of the residents of the international road transport through the territory of the country - \$392.2 million (160%), services of the objects of roadside service is \$1.2 billion (180.3%).

Deductions in the budget of the executed residents of international road transport in transit through the Republic of Belarus in 2015 will amount to \$25.4 million, or 155% to the level of the year 2010. Deductions in the budget for travel

by automobile roads of general use in 2015 will reach \$11.2 million (160%), and payment for travel by highway M-1/E30 - \$79 million (164.6%).

5 CONCLUSION

The globalization of the economy caused a rapid growth of trade flows in the Euro-Asian direction, because of the increasing volumes of consumption of raw material resources, as well as the increasing needs of developing countries in the modern high-tech products.

The dynamic development of the world integration processes, as well as the creation of the Customs Union of Belarus, Russia and Kazakhstan, expanded the possibilities of the Republic of Belarus for the development of logistics and increase on this basis the transit of goods through its territory.

At the present time the logistics sector in Belarus is in the initial stage of development. The Program of development of the logistics system of Belarus till 2015 and the Program of development of the transit potential of the Republic of Belarus for 2010 - 2015 were adopted only in 2008. In accordance with these programs 11 logistics centers with a wide range of logistics services provided is already functioning on the territory of Belarus and it is planned to build about 40.

The work which is conducted in the Republic on the development of the logistics, estimated by the World Bank at the level of 91 seats for the year 2011, while in 2010 it was 74th place. Analyzing the individual components of the index, it should be noted that the most vulnerable area is the customs and border control, to which Belarus is located at 121st place. This is the worst indicator of not only among Commonwealth of Independent States (CIS) countries, but also all over the world. This trend has affected the overall picture of the Logistics Performance Index for the Republic of Belarus for the year 2011.

In this regard legislative acts in the sphere of international cargo transportation and foreign trade activities, as well as customs legislation have been investigated. In the result there were revealed the key bottlenecks that hinder the development of foreign trade and transit through the territory of the Republic and the actions on

their elimination have been proposed. The great importance in the development of logistics in Belarus is given to the international project "Amber Coast Logistics"(implementation period 2011 – 2014). The project aims to expand the volume of trade between the countries of the Baltic Sea region and Belarus, Russia, Kazakhstan and Ukraine due to increase of accessibility in remote areas of these countries, the application of multimodal cargo transportation systems, formation of new transport corridors, information carriers about the peculiarities of transport policies in partner countries, as well as the simplification of customs procedures of border crossing.

In the framework of the project it is tasked for the first time to develop the index of transit on the basis of the basic criteria of the legislative acts. These criteria are grouped into five areas: customs clearance, technical specifications, network access and tariff policy, requirements for drivers of vehicles, special requirements. All study covers 17 criteria for the period from 1995 to 2010. According to the results of processing the initial data is built correlation model of dependence of the volume of freight traffic in/from/through the Republic of Belarus and data criteria. On the basis of the developed model, the forecast of growth of cargo volumes up to the year 2020 was done. It is based on the realization of a complex of measures designed to eliminate the existing problems in the field of international cargo transportation, as well as deeper harmonization of legal acts of Belarus and the European Union. According to the forecast of volumes of cargo transportations, five of the most promising transport corridors between the Baltic Sea region and the countries of the Customs Union and Ukraine were identified. This corridor A – Ventspils–Riga–Moscow, entrance B has two directions: 1 – Riga–Vilnius–Minsk–Kyiv, 2 – Riga–the city of Smolensk, a corridor C - route under the Baltic Sea between its southern ports, entrance D – Klaipeda–Vilnius–Minsk–Moscow, corridor E – Hamburg–Berlin–Warsaw–Minsk–Moscow. Using above mentioned transport corridors, multimodal transport chains have been developed. They allow reducing the load on the environment due to the shift of freight from road to sea and rail, making full use of the geographical position of the Republic of Belarus.

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Received for publication: 07.01.2013
Revision received: 28.02.2013
Accepted for publication: 14.03.2013

How to cite this article?

Style – APA Sixth Edition:

Molokovitch, A. (2013, 07 15). The development of the logistics system of the Republic of Belarus. (Z. Čekerevac, Ed.) *MEST Journal*, 1(2), 62-70. doi:10.12709/mest.01.01.02.05

Style – Chicago Fifteenth Edition:

Molokovitch, Anatoli. "The development of the logistics system of the Republic of Belarus." Edited by Zoran Čekerevac. *MEST Journal* (MESTE) 1, no. 2 (07 2013): 62-70.

Style – GOST Name Sort:

Molokovitch Anatoli The development of the logistics system of the Republic of Belarus [Journal] = The logistic system of the Belarus // *MEST Journal* / ed. Čekerevac Zoran. - Belgrade : MESTE, 07 15, 2013. - 2 : Vol. 1. - pp. 62-70. - ISSN 2334-7058 (Online); ISSN 2334-7171.

Style – Harvard Anglia:

Molokovitch, A., 2013. The development of the logistics system of the Republic of Belarus. *MEST Journal*, 15 07, 1(2), pp. 62-70.

Style – ISO 690 Numerical Reference:

The development of the logistics system of the Republic of Belarus. **Molokovitch, Anatoli**. [ed.] Zoran Čekerevac. 2, Belgrade : MESTE, 07 15, 2013, *MEST Journal*, Vol. 1, pp. 62-70. ISSN 2334-7058 (Online); ISSN 2334-7171.



THE CONTEMPORARY TRENDS IN INTEGRATION OF MANAGEMENT SYSTEMS

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JEL category: **L16, L22, O33**

Abstract

The paper explores actual trends in integration of management systems which can help in solving the problems that some organizations face in the separated systems. A growing body of information indicates that organizations are increasingly implementing integrated management systems that bring them significant benefits. Contemporary trends aim at complex integration of management systems when some of the models compromises the quality of the management system. Environmental management system and occupational health and safety system can be completed by other organization management subsystems, e.g. risk management system, corporate social responsibility, energy management, etc. The degree of the management systems integration depends on the specific needs of an organization. Since the integration process is not standardized, each organization may apply its own methodology or the existing guidelines and standards. It is recommended to use the existing experiences of other organizations that successfully improve their integration process, or to contract a consultant for assistance. Except for many benefits, this integration approach can also bring some limitations that are related especially to a tendency to develop over-documented bureaucratic process and unwillingness of quality professionals to accept requirements that do not relate to product quality.

Keywords:

management, management systems, integration, quality, environment, health, safety

1 INTRODUCTION

In the last years many organisations implemented or are implementing multiple management systems in light of increasing competitive pressure and effort to meet requirements of their internal and external stakeholders. Products supplied by the firms

have to meet demanding requirements of the customers and also must conform to the social requirements for protection of natural environment, health and safety and so to meet demanding requirements resulting from laws, regulations and also moral codex. Whereas in the past injuries of persons, damages and pollutions caused by defected products or services were not accepted as decisive matter, today the producer is legally responsible for these matters (Kmet', 1998).

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Organisations with implemented multiple management systems, that frequently are operated as independent systems, are considering, more and more, integrating their different management systems into a single system, because of its efficiency and exploitation of synergies (Bernardo, 2011). The problem is that the integration process is not standardized and each organisation must find a way how the processes within the management systems can be best integrated to achieve significant integration benefits and meet business needs. Integration of management systems requires to take into account a lot of aspects and therefore in case of a lack of knowledge it is recommended to study the methodologies proposed in the literature and use existing experiences of other organisations that successfully improve their integration process or contract a consultant for assistance. The aim of this paper is to provide a brief overview of the integration methodologies as well as benefits and limitations of integration that can serve as a starting point for designing integrated management systems.

2 METHODOLOGIES PROPOSED BY STANDARDIZATION BODIES AND PROFESSIONAL BODY FOR QUALITY MANAGEMENT

The effort to integrate requirements laid down in various international and industry standards in a single uniform management system has resulted in developing several standards or guidelines in different countries. They include:

A. AS/NZS 4581:1999

This Australian International Standard AS/NZS 4581:1999 Management System Integration - Guidance to Business, defines integrated management system (IMS) as a consolidation of processes, procedures and practices used by an organisation to implement the policy of the organisation where the organisation will be more efficient in achieving the goals and policies from the management system which is different (Kadir, 2011). The common elements of the management systems as the quality, safety and health, and environment can be integrated into a single system, although other systems such as human resource management or financial control can also be integrated (Bernardo, 2011).

The main components of the IMS according to the AS/NZS 4581 are as follows (Kadir, 2011):

- Leadership & Management Responsibilities.
- Identification & Analysis Requirements.
- Objectives & Policy.
- System Design & Implementation.
- Distribution Source.
- Communication & Information.
- Resources.
- Process & Management Activities.
- Measurement & Monitoring.
- Re-evaluation Management & Improvement Plan.

B. PAS 99:2006

The British standard PAS 99:2006 defines the common requirements of management systems. It is intended for use as a framework to implement the common requirements or specifications for an integrated management systems. The adoption of this standard allows simplifying deployment of multiple management systems. The particular requirements of each management system must be managed and satisfied to achieve certification and help for organisations to achieve the benefits of the consolidation of the common requirements. The standard specifies that integration must be planned and improved in a structured manner and adopted for internal benefits (Bernardo, 2011). The benefits include e.g. improved business focus, a more holistic approach to managing business risks, reduced duplication and bureaucracy. Although the PAS 99 was primarily intended to be used for ISO 9001, ISO 14001, ISO/IEC 27001, ISO 22000, ISO/IEC 20000, OHSAS 18001 it can also be used for other national and international management systems and specifications (PAS 99, 2006).

C. UNE 66177:2005

The Spanish standard UNE 66177:2005 (AENOR 2005) provides guidelines for developing, implementing and evaluating the integration of quality management systems, environment and health and safety at work. This standard helps the management team to design and implement an integrated management system and identify methods and tools applicable for the implementation of an integrated management

system. It is based on the PDCA cycle of continuous improvement (Bernardo, 2011).

The **Chartered Quality Institute** (CQI) defines integrated management as the understanding and effective direction of every aspect of an organisation so that the needs and expectations of all stakeholders are equitably satisfied by the best use of all resources. According to CQI the integrated management is characterized as follows (Dalling, 2007):

- can be applied to any type or size of organisation (commercial, government, regulatory, etc.),
- should be holistic,
- should make no distinction in its general approach to managing potential loss and potential gain,
- leads to optimal efficiency (economic use of resources) and optimal effectiveness (meets objectives by satisfying the totality of stakeholders needs in an equitable way),
- should be inclusive – address the totality of the organisation and its stakeholders,
- should address the totality of stakeholder's needs and aspirations in an equitable way,
- must include every facet of management that may impact stakeholders such as health, safety, environment, ethics etc.,
- should require that all components of an organisation add optimal value both individually and collectively,
- should take an approach embracing simplicity, least action, least use of energy, efficient and effective use of total resources
- should address all aspects that contribute to an organisation's performance such as the process, management system, culture, knowledge base, top management leadership, stakeholders and human consciousness,
- should require managers to recognise and take into account all significant influences on their organisation such as the strategic direction of the business, relevant legislation and standards, internal policies and culture,

resource requirements and the needs of those who may be affected by any aspect of the organisation's operation or existence.

3 DIMENSIONS OF THE INTEGRATION OF MANAGEMENT SYSTEMS

Each organisation, in accordance with its own objectives, concentrates on satisfaction of the requirements of the five groups of its stakeholders that include staff, customers, suppliers and partners, owners and investors, neighbours and the public. Requirements of these stakeholders refer to work conditions, motivation, quality, service, reliability, value enhancement, risk management, environmental protection, etc.

When designing an IMS it is useful to break down it into several dimensions (Figure 1).

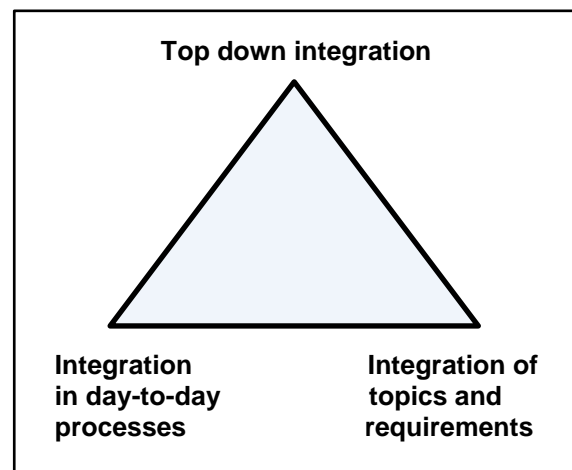


Fig.1 Dimension of the integration of management systems (Quality Austria, 2012).

The top down integration is a basic requirement that means the organisation mission and strategy will be reflected in its processes since the value is added just through the best possible integration in the value -oriented processes. Integrated management system requires a consistent leadership framework that allows understanding the different requirements of the individual management systems and so to satisfy them in accordance with the organisation values.

The integration of topics and requirements is usually given the maximum priority when designing an IMS. The requirements of the

individual stakeholders often correspond with the requirements resulting from standards. While in the past these requirements were perceived in an isolated manner, at present understanding the connections and interrelations of processes is required. This enables to integrate the different requirements and keep the documentation of the IMS simple, understandable, easy to amend and enhance.

The integration in day-to-day processes considers the fact that a lack of consistency is more probable in implementation than consistent practice. So the importance of the leadership tasks of implementation and enforcement becomes apparent. Rooting the management system in day-to-day processes brings alive and effective economic benefit (Quality Austria, 2012).

4 APPROACHES TO INTEGRATING MANAGEMENT SYSTEMS

At present the principle not to look at various but closely coherent systems as isolated and mutually independent systems is generally applied and the effort to put them on common base – modern management of processes is pursued. Based on the experience of people working with IMS, the following ten approaches to IMS have been defined (Quality Austria, 2012):

- **Approach through stakeholders** - ensures balance and reconciliation of interests. It is important to take into account the requirements and expectations of all stakeholders and to find an adequate balance. ISO 9004 approach to integration is based on the five stakeholders of employees, customers, owners, suppliers and society.
- **Approach through strategy** - consolidates the operating business. Top down integration should be consistent, target-oriented action in all important fields of organisation. Harmonisation and consistency of the targets down to the process and process indicator levels should be supported by the management system.
- **Approach through organisation** - creates effective structures. Documents as organisational chart, jobs description, position descriptions, etc. and process model

(structure) should be reviewed and supplemented by requirements from the models to be integrated.

- **Approach through employees** - fills a management system with life. The involvement of the staff, increasing their awareness of the IMS advantages, further development and the avoidance of discouragement are major factors of success.
- **Approach through process management**- provides a basic framework for designing processes. The organisation process model forms the important basis for the integration of additional topics relating to the environment, safety, health, risk and further specific requirements.
- **Approach through key performance indicators** - makes effects measurable. It is important to put the key performance indicators into an appropriate context, process them together and to use them jointly for decision-making in the future.
- **Approach through legal certainty**- creates a court-proof organisation.
- **Approach through rules and standards** - creates an overview and synergies. Overlapping requirements are worked on and documented only once in an integrated management system. So the regulations resulting from this process cover overlapping requirements and the overall system documentation is lean.
- **Approach through documentation** - reduces effort and boosts acceptance. The aim is to create a single integrated, self-contained set of rules for mapping several requirement models. Duplications and possible contradictions are identified and avoided.
- **Approach through established methods** - makes successful implementation easier. Methods (PDCA, Q7, M7, 5S, FMEA ...) reduce complexity and support the visualisation of challenging situations and the decision - making process, taking into account all relevant aspects. It is important to have professional competence when working on a specific task.

The degree of organisation management systems integration depends upon its specific needs. Each organisation should evaluate its applied management systems and then decide how the processes within those systems can be integrated to achieve the best results. Although the organisation is able to integrate the systems, the consultations with specialist to ensure that regulatory requirements are identified, met and continually improved are necessary.

5 INTEGRATION OF QMS, EMS and OHSAS

The Quality Management System, Environmental Management System and Occupational Health and Safety Management Systems are the most often combined and managed as an integrated management system. The above mentioned Australian International Standard AS/NZS 4581:1999 provides IMS model based on identification of common needs and unique requirements of each major management system (Fig. 2) (Kadir, 2011).

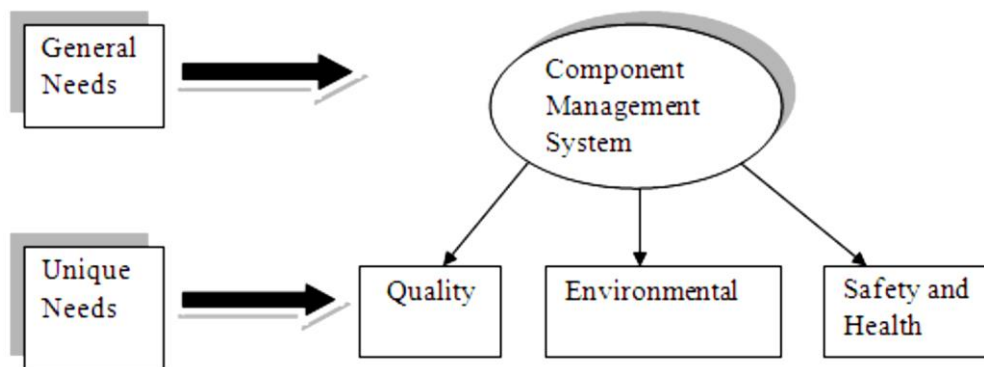


Fig. 2 Integrated management system model AS/NZS (Kadir, 2011).

The first compact field, where the management of the Slovak industrial enterprises has gained any experience, was the quality management system according to the ISO 9000. This system has become necessary marketing-commercial condition and basic assumption of products and services saleability for the majority of the Slovak enterprises.

The ISO 9000 family of standards (1.version 1987) have their origin in the USA military standards. Within several years practically all industrial countries adopted these standards to their national systems. In 1994 so called "small revision" of the ISO 9000 was realized. The ISO 9000:1994 family of standards had universal character and in consequence of this the formulations were too general, uncertain and some especially beginning organisations were not able to master the application of the standards requirements into practice. They presented file of minimum requirements that should be implemented in organisations; the principle of continuous improving was missing. In 2000, the great principal revision of the ISO 9000 family of standards, that are based on the system

access to quality and use of managerial methods and tools, was realized.

From the above mentioned follows that the system of ISO standards is constantly developing and enhancing and not only from the view of the range of including fields but also from the view of approaching to the other aspects of human activity, human needs and interests, e.g. safety and health protection, protection of natural and working environment, data protection and security, social responsibility of organisations, etc., that cannot be omitted at any level (Nenadál, 2008).

The greatest damages to natural ecosystems are caused by business sphere. In the past, many industrial enterprises did not feel directly the impacts of their negative acting on the natural environment and therefore they did not deal with these problems. Therefore it was necessary to force them to be active in the natural environment protection through legislative and environmental politics. At present, the organisations have to respect more and stricter requirements for natural environment protection including integrated prevention and control of pollution and a lot of

legal regulations related to natural environment. The Environmental Management System (EMS) enables to master these tasks and also to obtain the competitive advantage.

At present two systems of environmental management are applied in Europe (Mateides, 2006):

- EMS (Environmental Management System) presented by the ISO 14000 family of standards that proceeds from ISO 9000, it is concentrated not on the quality but on the impact of production and services on natural environment.
- EMAS (Eco-Management and Audit Scheme) based on the Council Regulation (EEC) No.1836/93.

OHSAS 18001 (Occupational Health and Safety Management System) is international standard that presents requirements for safety management system and occupational health protection, enables to manage relating risks and improve the organisation performance. OHSAS is applicable for each organisation that is going to certify the system of the safety and health protection at work (Veber, 2010).

Although the requirements of the above mentioned standards ISO 9000, ISO 14000 and normative recommendation OHSAS are different concerning their scope, their structure of requirements, processes for their implementation and maintenance are very near (Figure 3).

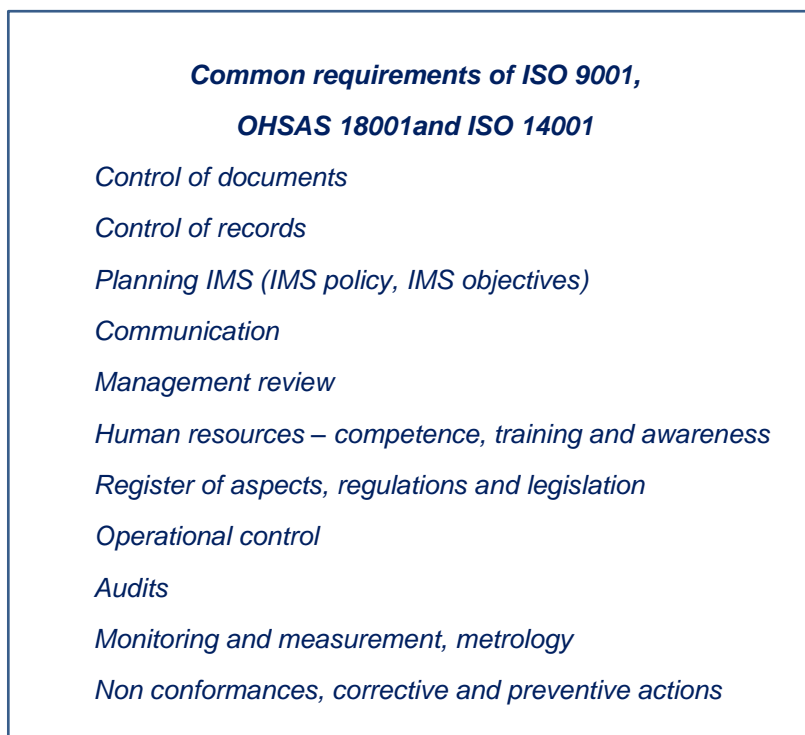


Fig. 3 Common requirements of ISO 9001, OHSAS18001 and ISO 14001

From this follows that assurance of these requirements within integrated management system is less demanding especially from the view of costs in comparison with autonomous isolated systems. Integrated system involving requirements of standards ISO 9001, ISO 14001 and normative recommendation OHSAS 18001 is one of the most often introduced integrated management system. Deming model of continuous improvement PDCA, that presents the

basic platform of all three above mentioned systems, brings the compatibility among their requirements and enables to synchronize the requirements of individual systems into one integrated management system (Veber, 2010).

From the view of actual trends the QMS, EMS a OHSAS systems are joined by other subsystems of organisation management, e.g. risk management system, data security system, energy management, corporate social

responsibility and other systems necessary for assurance organisation competitiveness. Especially the importance of the risk management is going to increase considerably in the near future.

6 BENEFITS AND LIMITATIONS TO INTEGRATING MANAGEMENT SYSTEMS

Development towards the integration of management systems is required also by actual worldwide trends of organisation management. But there is no just one rule how to integrate the management systems. Each organisation has to consider the nature of its business when deciding how far the integration will be applied to bring the best results.

There are many benefits to integrating the organisation management systems that include (McDonald, 2003):

- Simplification of systems – employees use only one set of working instructions and so the confusion, resulting from the use of documents from different management systems that can be sometimes conflicted, is minimized.
- Optimized resources – if one system meets the requirements of all systems, then the resources for development, implementation and maintenance of one integrated system are minimized in comparison with resources required by separate systems.
- Improved organisational performance – a formal system, that helps to identify potential problems and risks, can reduce also costs associated with these risks.
- Integration of management systems objectives into the overall business strategy – this fact indicates the importance of the effective complex organisation integration as a base for the organisation competitiveness.
- Established framework for continual improvement of the integrated management system- the goals and objectives of the IMS are reviewed at the regular intervals, necessary corrective and preventive measures are accepted and also the opportunities are defined. This results in improved organisation performance.

There are also limitations to integrating the organisation management systems that include (McDonald, 2003):

- A tendency to develop over-documented bureaucratic processes – it is necessary to avoid writing uselessly lengthy procedures and working instructions that “do not let the people do their business”.
- Turf battles – if the QMS already exists in the organisation, professionals from other fields often resist tackling their requirements onto the existing QMS. And likewise, the quality professionals do not like requirements in their system that do not relate to quality.
- Limits on degree of integration – some management systems are highly compatible, but requirements of some of them is not possible to integrate with existing quality system easily.

7 CONCLUSIONS

The integration of management systems is a very important tool to reduce the complexity of an organisation management system and provides an opportunity to manage organisations more effectively and efficiently. Integrated management systems implementation has become an important issue of organisation competitiveness and sustainability. Therefore many integrated management activities are either being planning, underway or have been completed within the companies.

From the literature review as well as experiences of organisations that have successfully undertaken the integration of their management systems results that development and implementation of integrated management systems require careful preparation as there are number of challenges and barriers accompanied by integration. They include, e.g. people's attitudes to changes, communication gaps between the top-middle management and employees, lack of qualified personnel, very high fees charged by consultants and their participation in maintaining the integrated systems, updating the systems due to continually changing regulations and guidelines, ensuring a fast reporting system across the organisation to avoid delays in the finalisation of the future

improvement plans, possible time-delays of some departments in integration that should be considered when finalising the target dates (Zutshi, 2005).

Smoother and faster course of integration of management systems can be achieved through these recommendations (Zutshi, 2005, Dalling 2012):

- Top management commitment and management review – top management support and commitment is essential for the integration process to be initiated, completed and maintained within the organisation. Regularly held management review dealing also with results of the internal audits and the overall direction of the company is important for the maintenance and progress of the system.
- Appointing a representative from the management responsible for successful implementation and maintenance of the integrated system. Such person must be a good communicator, negotiator, coach and trainer.
- Adequate training for all employees – the training program should be aimed to provide employee's awareness of the need and benefits of an integrated system and understanding the way of its implementation, utilisation and maintenance.

- Maintenance and control of documentation system to avoid duplication of procedures and confusion among the employees.
- Regular reliable internal and external audits of all management systems carried out by multi-disciplinary team. Integrated audits save resources and help to obtain holistic view of the necessary improvements.
- Building the organisation culture that is willing to embrace change and people are avoiding clashes.
- Educating and closely working with the suppliers.
- Communication is the most effective way to overcome the problems and demanding tasks.

Integrated view of management systems is supported also by the International Organisation for Standardisation (ISO). The ISO members have made considerable progress in the harmonisation of texts and standards structures what leads to the holistic concepts in organisation management e.g. context of organisation, leadership. It is expected that in the future the organisations will be able to meet all requirements only through a single comprehensive integrated management system that will contribute to the organisation success.

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***This paper was elaborated within the project
KEGA 077ŽU-4/2011 Integration of Quality and Risk Management.***

How to cite this article?

Style – APA Sixth Edition:

Luskova, M. (2013, 07 15). The contemporary trends in integration of management systems. (Z. Čekerevac, Ed.) *MEST Journal*, 1(2), 71-79. doi:10.12709/mest.01.01.02.06

Style – Chicago Fifteenth Edition:

Luskova, Maria. "The contemporary trends in integration of management systems." Edited by Zoran Čekerevac. *MEST Journal* (MESTE) 1, no. 2 (07 2013): 71-79.

Style – GOST Name Sort:

Luskova Maria The contemporary trends in integration of management systems [Journal] = Trends in integration of management systems // *MEST Journal* / ed. Čekerevac Zoran. - Belgrade : MESTE, 07 15, 2013. - 2 : Vol. 1. - pp. 71-79. - ISSN 2334-7058 (Online); ISSN 2334-7171.

Style – Harvard Anglia:

Luskova, M., 2013. The contemporary trends in integration of management systems. *MEST Journal*, 15 07, 1(2), pp. 71-79.

Style – ISO 690 Numerical Reference:

The contemporary trends in integration of management systems. **Luskova, Maria.** [ed.] Zoran Čekerevac. 2, Belgrade : MESTE, 07 15, 2013, *MEST Journal*, Vol. 1, pp. 71-79. ISSN 2334-7058 (Online); ISSN 2334-7171.



DEVELOPMENT OF BEEF RAISING PRODUCT MANUFACTURING ON THE INNOVATIVE BASIS

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JEL category: **D2, O14, O3, Q19**

Abstract

In terms of agricultural sector, reformation of beef production is necessary, in order to reduce livestock output and the concentration of production. In accordance with this, in the period between 1990 and 2010, cattle production in all parts of the Chernivtsi region decreased by 331.7 thousand units, or 74.0%. The main reason for this negative trend is the unprofitable beef production, which is primarily due to the low animals' productiveness, net realizable value of live weight and its high cost. In order to solve the strategic tasks of beef breeding it is necessary to support the innovative activities of scientific and technological progress and innovative organizational economic reforms in agriculture. The priorities concerning innovative processes in this field are connected with the improvement of cattle's quality and species composition, production of food and feeding systems for the cattle, the usage of power-saving technologies that take into account beef raising reproduction peculiarities and make it possible to improve efficiency and competitiveness of agricultural field.

Keywords: innovation processes, efficiency in production, beef raising products, animals productiveness, manufacturing costs, realizable value.

1 INTRODUCTION

Livestock rising is an important sector of agriculture, which occupies a significant portion in the structure of its gross output. Development of innovation processes in livestock raising is

connected with the resource potential on a qualitatively new basis. Accordingly, the competitiveness of the industry is largely determined by the use of science and technology at all stages: from research to the development of their results in practice. (Putsenteilo, 2012)

From 1009 agricultural enterprises in Chernivtsi region 235 enterprises (23.3%) are involved into the development of livestock rising. In 2010 costs of beef raising products of the regional farms

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amounted to 340.1 million, or 40.3% of all manufacturers' production costs. The production of meat in slaughter weight of all categories of agricultural enterprises in Chernivtsi region in the structure of the regions in Ukraine took: 1990 – 1.8%, 1995 – 2.1%, 2000 – 1.8%, in 2005 – 1.9%, 2010 – 1.9%.

Due to the deteriorating situation in this meat industry the Ministry of Agriculture together with scientists drafted an innovative investment model of livestock development. It has to provide financial investment support for the implementation of new productive technologies into the growing of young cattle, pigs and poultry, tested by European and international practice, and the development of selection and breeding work. (Petryshyn, 2008)

One of the major livestock raising industries in Ukraine's agriculture is cattle breeding, which figures prominently in addressing state food security because it provides citizens with such valuable foods as milk and beef. It should be noted that cattle breeding is a kind of "engine" of the livestock raising industry, which consumes significant amounts of crop production.

Separate specialized industry is beef cattle breeding, the main task of which is to produce high quality beef and tough leather on the basis of breeding meat cattle breeds. (Cherkaschenko, 1975) In particular, a beef cattle breeding is a supplier of raw materials for the development of light industry, organic fertilizer. Beef is the most valuable kind of meat nutritionally and for taste, in comparison with pork and lamb it has less fat. Fat and protein in beef are in the most favorable ratio, and the even distribution of fat provides meat with "marbling". The main advantage of this industry is that cattle can most effectively use coarse and succulent food with much less consumption of expensive concentrated foodstuff.

Natural and climatic conditions of Chernivtsi region, which is divided into steppe, foothills and mountain areas, promote the development of livestock, particularly beef. Primarily this is due to large areas of natural grasslands. Therefore, region requires new approaches to the strategy of livestock industry, the search for effective ways

of producing cheap, high-quality and cost-effective beef and milk. (Kalynka, 2010)

For the beef raising development an advanced science-based resource-saving technology of beef raising cattle was introduced on the basis of Bukovinian Institute APV biochemistry. In the region plant breeding and five reproducers of Ukrainian Simmental beef breeding are functioning. Bukovinian type of this breed features adaptability to farming in the foothills of the and pastures reaches 39.3-54.8% and pasture period is 220-270 days. This is a guarantee of efficient resource-saving pasture beef raising development. (Vyhrystiuk, 2006)

2. ANALYSIS

In the terms of the agricultural sector reforming beef rising is inherent in tendency to reduce livestock output and reduce the concentration of production. Thus, during 1990-2010 cattle in all categories of the region decreased by 331.7 thousand units, or 74.0%, including agricultural enterprises to 309.8 thousand units, or to 95.4% (fig. 1).

There is also a reduction of livestock in the people's households, so during the 1990-2010 cattle decreased by 21.9 thousand units, or 17.7%. Such tendency affects the total output of beef cattle as biological features and low rates of updating do not allow restoring livestock herds quickly.

In recent years, despite attempts to reform agriculture, a decline in the production of beef and veal is observed (fig. 2).

At the same time the level of livestock productiveness remains low and does not fully compensate the reduction in the number of cattle. Despite the increase in average daily gain of cattle over the past few years, beef production in the Chernivtsi region remains very low, and more than 2 times less than in the U.S., Canada and Western Europe, where this figure is an average of 1000-1200 units. Meat and meat products are important building blocks of product consumption basket. As one of the essential food meat is available for consumption in raw form or in the form of processed products.

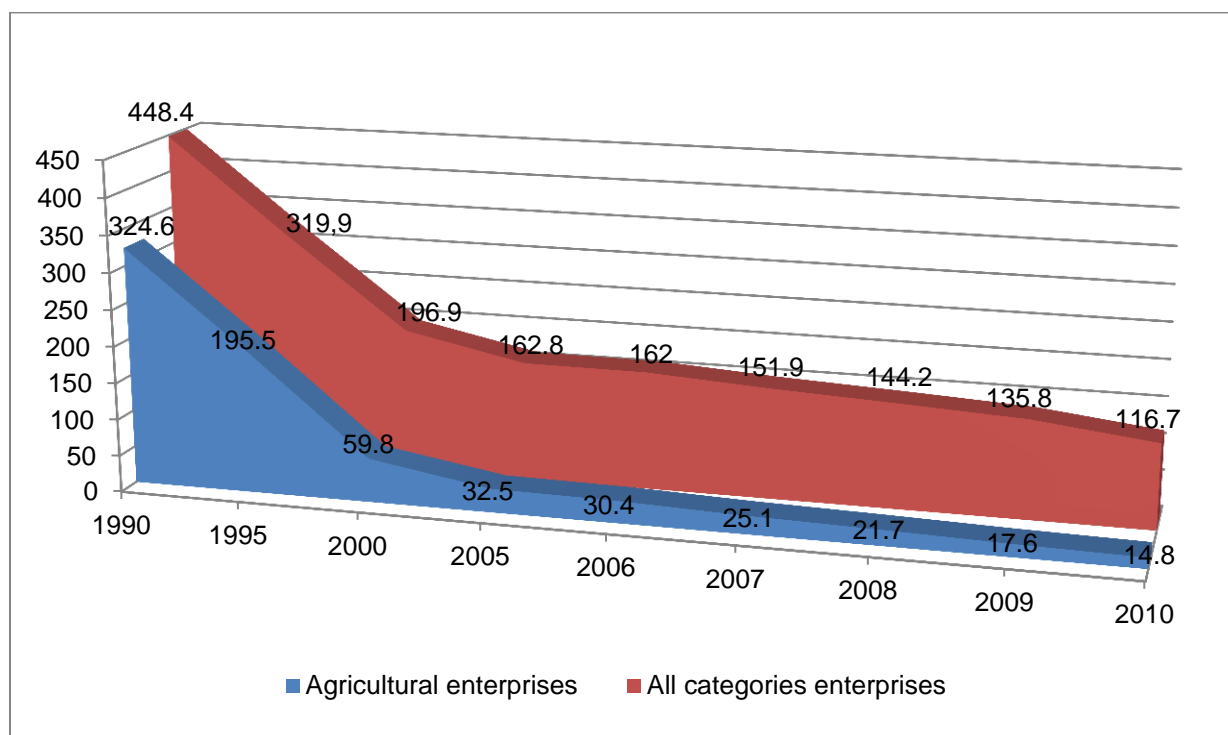


Figure 1 Dynamics of cattle livestock in the Chernivtsi region

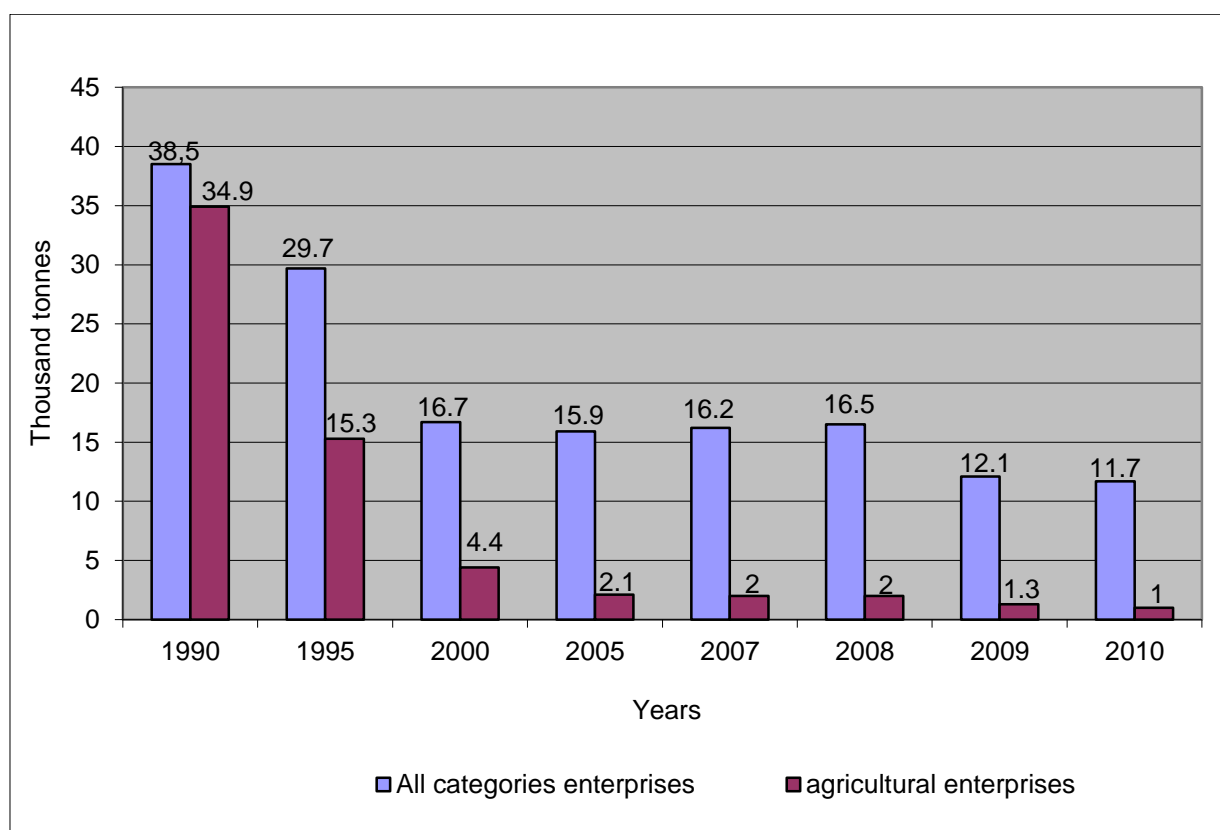


Figure 2 Dynamics of production of cattle meat (slaughter weight) in the Chernivtsi region

Significant reduction of the consumption of some important types of food by the country's population and changing of dietary pattern is an important indicator of reduction of the quality of life. During the studied period of time dangerous for its social and demographic consequences reduction of average food consumption, especially of animal products can be observed.

Consumption of meat and meat products per capita in the region during 1990 - 2010 decreased from 52.4 kg to 42.8 kg and is 51.6% of the science-based standards of consumption – 83 kg per 1 person. In particular, the consumption of beef and veal was 9.8 kg, which is in 50.3% less than the physiological minimum and in 3.7 times less according to the science-based standards.

These figures show the urgent need for increased consumption of meat. Meat of farm animals is rich in complete protein containing essential amino acids, minerals, vitamins and almost completely absorbed by the human body. (Prysiashniuk, 2011)

Consider the efficiency of production of beef cattle farms in the Chernivtsi region (table 1). In the dynamics of years there was a significant decrease in the gross production of beef cattle - to 23.5 times, increase in body weight of cattle on 100 hectares of agricultural land decreased in 7.0 times. Also, a decrease in average daily live weight gain per head of cattle for 24 d, or 4.9%. Feed costs per 1 kg gain increased by 1.86 kg feed units, or 15.1%.

Table 1 Dynamics of production efficiency of the meat of cattle in the agricultural enterprises of Chernivtsi region

Indices	Years							2010 to 1990 %
	1990	2000	2005	2007	2008	2009	2010	
Gross production, thousands of UAH	305767	34565	25924	20274	19143	16086	13028	4.3
Increase in body weight of 100 hectares of agricultural land, Cwt	131.7	17.9	24.2	28.3	25.6	39.2	18.8	14.3
Average daily live weight increase per head, h	492	264	451	424	464	453	468	95.1
Feed expenses per 1 Cwt increase, Cwt feed units	12.33	14.98	14.57	14.39	13.77	16.37	14.19	115.1
Manufacturing costs of 1 Cwt of live weight sold, UAH	-	542.87	692.06	913.53	1111.41	937.8	1308.27	in 2.4 times
Realizable value of 1 Cwt of live weight, UAH	-	201.71	591.88	514.79	800.99	754.3	870.31	in 4.3 times
Profitability (loss), %	27.1	-38.3	-9.3	-33.3	-18.5	-29.7	-33.5	-60.6 pp

In 2000 - 2010 the manufacturing costs of 1 kg of live weight sold of cattle increased by 2.4 times, and the selling price increased to 4.3 times. However, despite the accelerated growth rates, significant dominance of manufacturing costs over the price contributed to unprofitable activity of agricultural enterprises in the region. The high cost of meat production is offset by proceeds from its sale. As a result of this situation, the more meat is produced by the farm, the more

losses it gets. The same was true for most farms of Chernivtsi region.

One of the major causes of reduced economic efficiency of production of beef cattle is unreasonably high prices for energy and combined foodstuff. In particular, at certain times this industry has not received budgetary subsidies. In 2010 most state funds to support farmers in Chernivtsi region aimed at pork production – 4,411.7 thousands, or 61.6%, to

produce beef – 2,019.7 thousands, or 2.2% and 727.9 thousands, or 10.2% devoted to support all kinds of poultry. Presently it's appropriate to direct most funds to support cattle-breeding, as this would encourage companies to increase meat breeds of cattle.

Today beef rising in Ukraine is not a prosperous industry. There are a few agricultural enterprises in Ukraine that are engaged in cattle breeding of meat and dual-purpose breeds. The greater part of enterprises is mostly specializing in the development of dairy farming.

However, the beef raising industry has a number of advantages comparing with other fields:

- 1) beef raising is a low-cost industry, since it requires less power consumption, heat, labor, equipment, comparing with the dairy industry;
- 2) in each area there are empty houses, which can be used for fattening cattle breeds after a relatively inexpensive repair;
- 3) the development of the beef raising industry gives an opportunity to make full use of natural pastures;
- 4) enterprises can get a big beef yield from cattle;
- 5) beef is always in demand, since it is a source of protein of animal origin.

It should be noted that the level of state support is a key factor in ensuring the competitiveness of beef cattle. The experience of countries with developed and efficient agriculture shows that intensive industry development is impossible without government regulation, based on systematic and long-term approach. In fact, in many countries of the world just the financial support from the state ensures the necessary level of profitability for agricultural producers. (Dunin, 2011)

In beef rising, as well as in other agricultural fields, there is a number of objective factors, the impact of which cannot be eliminated through organizational transformation. In particular, low capital turnover, technological continuity, unpredictable climatic conditions are included. Therefore, the objective existence and manifestation of the influence of these factors

lead to the need of government support – grants, concessional lending.

The development of innovational activities in beef rising will largely depend from the degree of budgetary support. Taking into consideration the specifics of the given industry, the main commercial products will begin to flow only in 3 - 4 years after the initial formation of beef herd. Consequently, beef rising will require the government assistance the most during this period.

For further improvement of the economic efficiency of beef production it is necessary to provide an innovative part of the production process. Innovative technology is a strategic factor for the economic stability of the meat industry, while effective production allows the implementation of advanced technology, ensuring high profitability of production.

Today, essential to increase production potential, is the use of biological unit of innovation, achievements in the selection, which reflects the main directions to improve breeding and genetic potential, on which the level of animal productivity, efficient use of food resources, development of resource-saving technologies aimed at improving level of intensity and efficiency depends. (Mazurenko, 2012) A prerequisite for the innovation processes development in the industry is also increasing of livestock productivity while reducing manufacturing costs, especially on foodstuff. Among the factors intensifying meat sector feeding occupies a special place because foodstuff is the main source to maximize productivity.

The presence of disparity between the development of food resources and livestock leads to the realization of animals' genetic productivity potential not in full. This is due to the low quality of food resources, the lack of science-based food allowance, balanced according to the basic feeding elements.

During the analyzed period of time the feed costs per 1 kg of cattle's live weight increase grew from 12.3 to 14.2 kg feed units, and average daily increase in growing and fattening fell from 492 to 468 g. That is, due to the increase of feed resources in 15.4% meat productivity decreased

in 4.9%. This is possible only in case of low quality food allowance, that do not meet the physiological needs of animals and the most part of the food recourses is used as maintenance.

In particular, the structure of diet feeding increased the proportion of concentrated feed at 2.1 kg feed units, or 11.7%. The increase of the proportion of concentrated foodstuff is connected primarily with feeding animals with grain in non-processed form. Manufacturers doing business using out dated technologies include in the diet of animals not feed but grain, that greatly impacts on reducing their productivity and increases the proportion of forage in the structure of manufacturing costs.

Therefore, to increase the productivity of food allowance it is necessary to balance the food recourses according to all necessary micro- and macro feeding elements taking into account all the latest scientific developments in this field. In particular, it is important not only to increase the overall feeding costs in livestock, but to consider their qualitative characteristics. Only in this case it is possible fully realize the existing livestock productivity potential.

So innovation processes related to the improvement of feed manufacturing have a significant impact on the increase the of cattle production efficiency.

Analysis of industry's current trends in developed European countries and the United States demonstrates impossibility in achieving high productivity of livestock without purposeful selection and breeding work and picking out the best breeds in the world for reproduction. That is why Ukraine needs large-scale replacement of existing extensive animal species with the intensive animal species. In particular, for the beef raising development it is necessary to increase the share of Hereford, Charolais, Aberdeen Angus and other specialized breeds of cattle.

It is proved scientifically and in practice that only the use of the best breeds of the world gene pool adapted to the industrial production technology can provide herd's qualitative renewal and, subsequently, increase the competitiveness of domestic products in a short time. It should be noted that the application of innovative

technologies determines the competitiveness of individual enterprises in the industry, is the material basis of its development and the optimal intensity and the highest economic efficiency is put down at the stage of agricultural technology design and development.

Ukrainian market conjuncture of beef raising products to some extent is determined by the imported products. A significant volume of imports restrains the innovative development of national producers. The monopoly of meat processing plants, which significantly reduced the proportion of raw material costs in retail, also contributes to such a situation. The profitability in the meat sector is significantly lower than in the whole economy. In this regard, farmers are not only unable to keep their production facilities on the basis of the latest achievements of science and technology, but also to maintain existing facilities in working order.

The development of innovative activities in livestock is correlated as well as with regional and with internal peculiarities of this sector. In various natural-economic zones and livestock sub-sectors biological processes go on unequally, which requires accounting and an individual approach in the distribution mechanisms of investment resources and products pricing formation. Unfortunately, the absence of such mechanisms, a systematic approach to the primary tendencies selection of innovative processes in beef raising leads to lower operational efficiency and investment attractiveness.

In the agricultural sector, innovation capital turnover and its growth cannot compete with the industry. In the first place it concerns new animal and plant varieties breeding, to create and master which needs decades. Disparities reducing between livestock development level in Ukraine and in developed countries are impossible without an innovative breakout strategy that requires maximum optimization of limited financial, investment, logistical resources.

Scientists distinguish the following fundamental innovative processes approaches in the livestock: biological, technical and technological, organizational and economic. (Nechaev, 2009) In livestock, beef raising in particular, the important

role is played by biological methods, connected with animals feeding peculiarities, their genetic potential, genetic engineering. Technical and technological methods allow increasing efficient usage of industry's resources due to the power- and resource-saving technology, science-driven beef production. Organizational-economic methods include production rational organization, skilled labor training, and innovative management improvement, and enable different ways of innovative activities coordination.

In the market conditions for first of all it is important to reduce production costs to the world's average level, it is possible in case of qualitative improvement of chain reproductive process through innovations that can substantially change the nature of the industry, accelerate its economic growth for providing the necessary profitability and competitiveness of beef cattle. Only complex development of innovative processes directions can provide technological breakout in beef rising.

The strengthening of economic growth innovative component is impossible without a significant increase of investments' level and quality. In the developed price disparity conditions and technological backwardness of most agricultural units, it is the necessary state regulation of inter-relationships, creation of contributory economic and legal conditions that motivate businesses to finance innovative projects for the growth of investment activities.

Current global trends of feed increase in price inevitably lead to production costs increase in the industry. This requires constant monitoring of ratio adequacy of product prices and production costs. That's why enterprises, providing normative conditions of technological process, require state guaranteed support of profitable production in order to prevent any further reduction in livestock.

2 3. CONCLUSION

Thus, the assessment of the beef cattle industry in Bukovina suggests reducing the number of cattle in all categories. The main reason for this negative trend is unprofitable beef production, which is primarily due to the low animal's productiveness, realizable price of live weight and its high cost. It's established that to solve the strategic tasks of beef rising breeding it's necessary to support the innovative activities of scientific and technological progress and innovative organizational economic reforms in agriculture.

Priority lines of innovative processes in this field are connected with the improvement of cattle's quality and species composition, feed production and feeding system, the usage of power-saving technologies, which take into account beef raising reproduction peculiarities and make it possible to improve efficiency and competitiveness of agricultural field.

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Received for publication: 11.02.2013

Revision received: 06.03.2013

Accepted for publication: 29.03.2013

How to cite this article?

Style – APA Sixth Edition:

Nakai, O. (2013, 07 15). Development of beef raising product manufacturing on the innovative basis. (Z. Čekerevac, Ed.) *MEST Journal*, 1(2), 80-87. doi:10.12709/mest.01.01.02.07

Style – Chicago Fifteenth Edition:

Nakai, Oleksandr. "Development of beef raising product manufacturing on the innovative basis." Edited by Zoran Čekerevac. *MEST Journal* (MESTE) 1, no. 2 (07 2013): 80-87.

Style – GOST Name Sort:

Nakai Oleksandr Development of beef raising product manufacturing on the innovative basis [Journal] = Development of beef raising product manufacturing // MEST Journal / ed. Čekerevac Zoran. - Belgrade : MESTE, 07 15, 2013. - 2 : Vol. 1. - pp. 80-87. - ISSN 2334-7058 (Online); ISSN 2334-7171.

Style – Harvard Anglia:

Nakai, O., 2013. Development of beef raising product manufacturing on the innovative basis. *MEST Journal*, 15 07, 1(2), pp. 80-87.

Style – ISO 690 Numerical Reference:

Development of beef raising product manufacturing on the innovative basis. **Nakai, Oleksandr.** [ed.] Zoran Čekerevac. 2, Belgrade : MESTE, 07 15, 2013, MEST Journal, Vol. 1, pp. 80-87. ISSN 2334-7058 (Online); ISSN 2334-7171.



MANAGING AGRICULTURAL ENTERPRISES WITH REGARD TO STRUCTURING THE MARKETING PROCESS

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JEL category: **D2, O14, O3, Q19**

Abstract

The article analyzes the process of structuring the marketing of agricultural enterprises in market conditions and its impact on the safety of the agricultural sector. After a brief analysis of recent researches, author considers some general concepts of marketing management. Detailed attention is paid to the stages of the process of marketing management and eight stages of the process of marketing management of agricultural enterprises. In the stage 1 a comparison of different types of market analysis is given. In the following stages are analyzed: selecting the market segments, choosing the concept of the agricultural enterprise, formation of marketing strategies, singling out the marketing mix, planning and development of marketing programs, the organization of marketing activities, coordination and monitoring and analysis of marketing of the enterprise. At the end of the article four key rules of marketing management for proper marketing management in advanced enterprise are specified. For proper organization of the marketing management in the developed enterprise, author suggests that four basic rules of marketing management should be used: "primary communicator", "establishing of interconnected system between market players", "integration of PR and advertising", and "marketing control and audit".

Keywords: agricultural enterprises, market analysis, market economy, marketing management, marketing structuring, stakeholders

1 INTRODUCTION

A lot of scientists devoted their scientific works to the problems of formation and functioning of

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marketing management of agricultural enterprises. In particular, in economic theory this aspect has been studied by: Ambler, T., Assel G., Bahiyev G. L., Voychak A. V., Golubkov E. P., Danko T. P., Dyhtl E., Kardash V. Y., Kotler F., Kretoy I. I., Lamben J. J., Romanov A. N., Starostina A. O., Hershgen H., Hrutsky V. E., and



others. Also, solving problems related to the implementation of marketing concepts in agricultural business and management of marketing processes is reflected in the works of scholars: Boyko V. I., Danilenko A. S., Zayinchkovsky A. A., Zinovchuk V. V., Imas E. V., Kamilova S. R., Kovalenko Y. S., Nelep V. M., Houdoliy L. M., Shpychak A. M., and others.

The process of marketing management of agricultural enterprises is a systematic series of actions and measures of marketing management for achieving business objectives and customer satisfaction. The constituent elements of the process of marketing management are: analysis of the market and consumer's needs, the choice of target market segments, the choice of the conceptual foundations of activity, formation of marketing strategies, allocation of the marketing mix, planning, developing of marketing program, organization of marketing activities, coordination, monitoring and analysis of marketing activity of agricultural enterprise.

2 PROCESS OF MARKETING MANAGEMENT

The process of marketing management of agricultural enterprises consists of several stages. This process takes place in a certain environment - marketing environment. The components of this environment are the enterprise (company), suppliers, intermediaries, clientele, competitors and contact audience.

2.1 Stage 1

At the stage of market and consumer needs it is necessary to perform the market analysis: its potential, capacity, market conditions, demands, consumer's behavior, the possibilities of the firm, the level of competition, etc. are being studied.

Table 1 Comparison of types of market analysis

No	PEST analysis	SLEPT analysis	PESTLE analysis	STEEPLE analysis
1.	Politics	Politics	Politics	Socio-demographic
2.	Economics	Economics	Economics	Technological
3.	Community	Community	Community	Economic
4.	Technology	Technology	Technology	Natural
5.	-	Law	Law	Political
6.	-	-	Ecology	Legal
7.	-	-	-	Cultural

Besides, the rate of management quality in general, marketing organization structure, the quality of all functions of marketing management, the results of marketing activities are being analyzed. This analysis involves the transformation and understanding of the information, establishing its reliability, completeness, accuracy etc. Structural map of the agricultural enterprise market shows:

- 1) description of the agricultural market (description of the branch, including its current size and historical growth rates, and other trends and characteristics);
- 2) competitive analysis (identification of their competitors at the level of product or service and market segment);
- 3) assessment of consumers needs (necessity of category, demand for the products at the agricultural market, the essence of buying process);
- 4) analysis of consumer expectations, the study of client perception (the study of the most important criteria of quality of service in terms of customer - what he expects and hopes to gain by acquiring service).

There are a variety of methodologies of market analysis: SWOT, PEST, and PESTLE - analysis. Differences in the use of these types of analysis are the following: PEST-analysis provides market research and SWOT-analysis - examines the enterprise's position in this market.

Very often such varieties of PEST-analysis are used: SLEPT analysis (involves legal factor), PESTLE analysis (political, economic, social, technological, legal, and environmental), STEEPLE analysis (social, demographic, technological, economic, environmental, political, legal, ethical factors) (see Table 1 Comparison of types of market analysis).

Let us consider SWOT and PESTLE analysis to be long-term in their application for market and organization analysis. In order to study the external microenvironment the model "Five Forces" (or "Five threats") is mostly used, and is called "5 Forces of Porter" in honor of its author Michael Porter. This model allows us to estimate five key forces that may affect the enterprise. Analysis is performed by identifying five basic competitive forces:

- 1) the threat of the emergence of competitors (how easy or difficult for new members is to start competing, what barriers exist),
- 2) the threat of the emergence of substitute products (how easy is to replace the product or service, e.g. making it cheaper),
- 3) market possibilities of buyers (determining the influence of buyers position, their ability to order large volumes),

- 4) market possibilities of suppliers (influence of the sellers position, identifying potential of suppliers, their quantity, the existence of monopoly),
- 5) the level of competition among existing enterprises (the presence of strong competition between the existing businesses, the presence of the dominant party or equality in strength and size. Sometimes the sixth competitive force is added: Government (Porter, 1998, p. 242).

The method of selecting the strategic directions of innovative development (innovation strategies) of the enterprise, which allows to identify and assess the competitive advantages of a certain company or activity (goods), depending on the market share that they hold, and their level of profitability, see. Fig. 1 "Selecting the strategic directions of development"



Fig.1 Selecting the strategic directions of development (innovation strategies) of agricultural enterprises * Authoring

Table 2 Expectations of parties interested – "Stakeholders" of agricultural enterprises (Kaplan & Norton, 1996, str. 830)

No	Parties interested	Needs, interests	Stakeholders	Needs, interests
1	Authority	Taxes	Owners	Dividends
2		Employment		Capital growth
3	Society	Employment		Security of investments
4		Environment protection	Authority	
5	Lenders	Ecology	Leaders	Remuneration
6		Interest income		Prestige
7	Suppliers	Safety of investments	Staff	Remuneration
8		Long-term cooperation		Satisfaction with work
9	Consumers	Timely payment	Vulnerable workers	Safe working conditions
10		Affordable products price		Non-discrimination
11		Quality of products		Fair conditions of employment

For a detailed study of the environment of the enterprise, desires and interests of stakeholders should be considered. Accountability Scorecard (ASC), proposed by F. Nichols, aims to find the point of balancing the interests of the enterprise and other interested in its activity persons (groups of people) - stakeholders, namely, key managers and shareholders, staff, suppliers, consumers of enterprise products.

In the model ASC the enterprise and stakeholders are connected with each other by two types of relationships: contributions and incentives, while the value of incentives must exceed or at least compensate the contributions. The main objective of the model is to identify the stakeholders (the optimal number of them - from 4 to 8). Contributions and incentives should be grouped according to priorities, to determine the most important ones in the construction of strategic maps of the enterprise. Later, chosen indicators are used in the process of making strategic management decisions by managers of the enterprise. Many concepts of evaluating the efficiency of the enterprise involve the use of revenue indicators: revenue before interest payments, taxes and dividends (EBITDA), market value added (MVA), total shareholder return (TCR), economic value added (EVA) and others.

2.2 Stage 2 - selecting the target market segments.

Selecting target markets:

- Measurement and prediction of the market demands, identifying the market segments and substantiation of target markets.
- Information on agricultural target market – limitation of the target market to an acceptable size. Many companies make the mistake of trying to appeal to a large number of target markets.

2.3 Stage 3 - choosing the concept of the agricultural enterprise.

The priority is given to the application of innovative concepts in synergistic use.

2.4 Stage 4 - formation of marketing strategies

The forming of marketing strategies means defining goals and objectives of the enterprise in the market segments according to the market situation and the possibilities of the subject which includes goals and measures. Selecting and forming strategies of differentiation and forecasting of marketing proposals; definition of significance and choice of suppliers, identifying of potential competitive advantages, choice of communicative measures for positioning the enterprise, selection of competitive differentiation tools; creating marketing strategies for market leaders, innovators, followers and owners, developing the strategies for the global market, assessment of global marketing environment, developing pricing strategies and programs: establishment and adaptation of price, selection of decisions about reactions to price changes.

2.5 Stage 5 - singling out the marketing mix

Model 4P - marketing mix consisting of such elements as product, price, distribution (place) and promotion (suggested by Jerry McCarthy in 1964.). In the Concept of McCarthy all four elements of the marketing mix start with the letter "P". The "4P" concept of McCarthy was first published in 1965 in the article "The Concept of the Marketing Mix" by Neil Boden. Later, as opposed to this model, the models 7 P, 12 P appeared (Otlacan, 2005, str. 34).

There is another known attempt to change the canonical "4P" formula, shifting the focus from the seller to the consumer, however, by complete abandonment of "P" – this is the concept of "4C" suggested by Bob Loteborn in 1990. The elements of the model are: Customer needs and wants; Cost to the customer; Communication - exchange of information; Convenience (Otlacan, 2005, str. 42)

An alternative model of marketing mix is "SIVA", which was proposed by Chekitan S.Dev and Don E. Schultz in the Journal of Marketing Management in 2005. This model allows looking at the traditional 4P from the point of view of consumer, and includes such elements as:

- Product - Solution (Is the solution of the found problem of meeting the customer needs appropriate?)
- Promotion - Information (Do buyers know about the decision and if so from whom they get enough information to make a decision of buying?)
- Price - Value (Value) (Does the buyer know about the value of transaction, expenses that he will bear, what will be the benefits and rewards?)
- Distribution - Access (Where can the buyer find a solution? Can they easily buy it and take delivery, near or far?)

Quite promising in application is Model 3C, which includes such components: Company, Competition and Clients.

Obviously, the model 4C allocates preferences of consumers as a priorities and the model 3C focuses on the environment of the enterprise. Formation of the marketing mix only on the basis of these models is almost impossible, as the studies of these spheres in a market analysis are

already carried out, but logical integration with the marketing mix could bring positive changes in the formation of the marketing mix.

2.6 Stage 6 - planning and development of marketing programs.

Marketing program of the agricultural enterprise is its formation, based on strategic goals of production and sales objectives of the enterprise and ways to achieve them. The first step is to identify priority areas of marketing of the enterprise which are defined in the plan. The second step is to develop different versions of marketing programs, which should facilitate the implementation of the relevant areas of marketing. Marketing program solves three main tasks:

- 1) determining the volume of new production and improving old products in bulk and value terms for current and prospective period,
- 2) selection of the target market and final consumer considering their requirements and needs in production, and

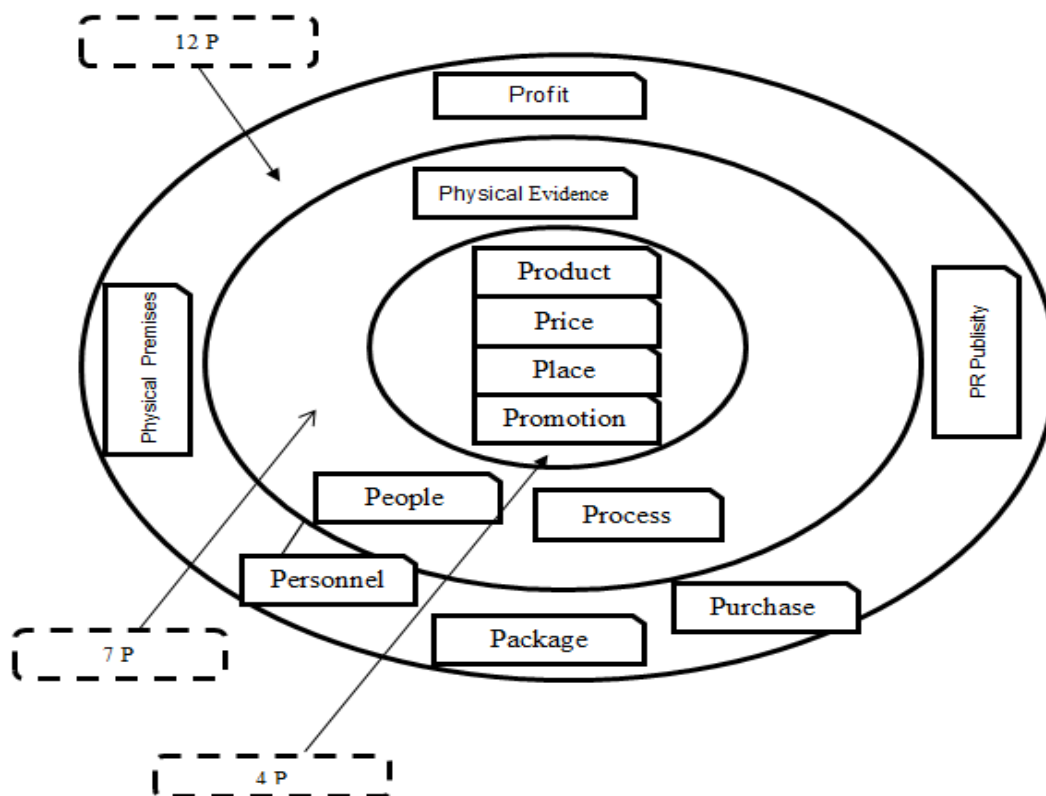


Fig. 2 Model of 4P, 7P, 12P dependence

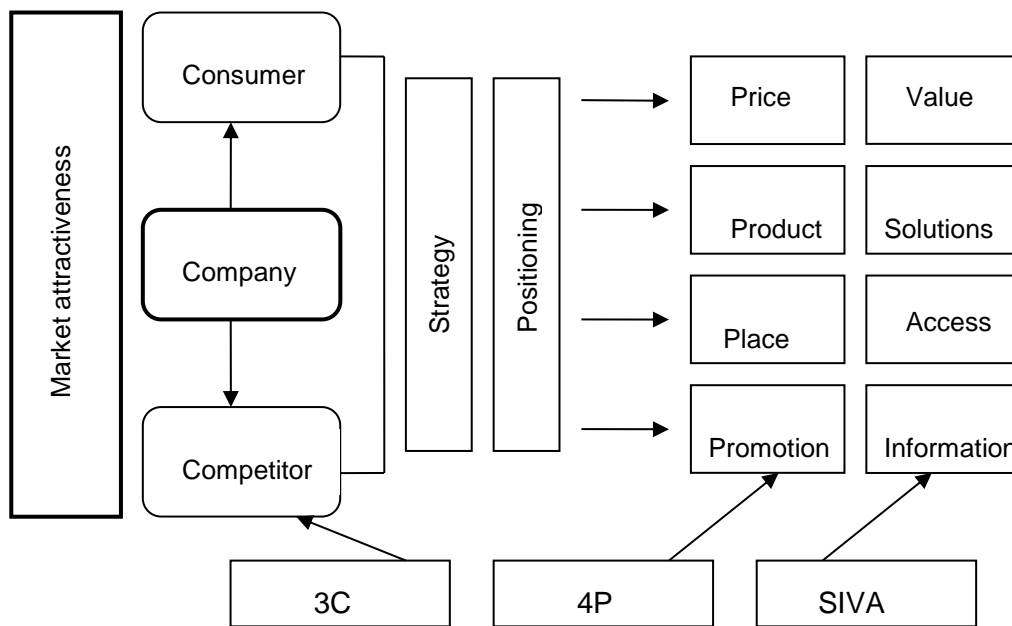


Fig. 3 Relationship of the marketing mix models

3) comparison of production costs, prices and profits for each specific product. For data processing modern information software is used including: Marketing Expert, Marketing GEO, Marketing Analytic. "Pro-Invest Consulting" has developed a set of programs - Marketing Expert, which consists of three independent programs (Marketing Expert, Marketing GEO and Marketing Analytic). (Vynogradov, 2005, str. 46)

Application of the three methods in the integrated model is presented in Figure 3.

2.7 Stage 7 - the organization of marketing activities, coordination.

The system of marketing services organization is very important. Such services are the prerequisite for an individual approach to the development of organizational and functional systems of marketing management. The organizational structure of the enterprise marketing activities can be defined as a set of services, departments and divisions, which include workers involved in various marketing activities.

Organizational and management structure of the marketing is aimed at: performed functions, goods and customers; regions of service. There is no universal scheme for marketing

organization. Marketing departments can be created on different bases. Choice of organizational structure of marketing is conditioned by: the peculiarities of target market segments and product range of the enterprise; functional specialization of departments; distribution channel type, the presence of sales personnel; territorial factor, - since the structure of organizational flexibility of management structures, i.e. the ability to react quickly and in time to various changes is essential for the adaptation of the enterprise to the new realities of life.

2.8 Stage 8 - monitoring and analysis of marketing of the enterprise.

This process is carried out to verify the effectiveness of the application of marketing at the enterprise, detection of threats and their localization. Control and analysis of marketing of the enterprise is the final phase of the process of marketing management. This stage is aimed at the consideration of the nature of feedback in the activities of marketing services and includes features of analysis and diagnostics. Control of marketing activity is a means to assess the executed marketing concepts of the enterprise in set and achieved goals. The implementation of annual plans control, profitability control,

efficiency control, strategic control, organization of audits of marketing activities is performed.

3 THE RULES OF MARKETING MANAGEMENT

For proper marketing management in advanced enterprise four key rules of marketing management should be used:

- the rule of "primary communicator" – the basic employee, whose purpose is to develop strategies of products promotion, marketing organization, monitoring the implementation of planned activities, etc.
- the rule of "establishing of interconnected system between market players", according

to which while developing measures of marketing management it is necessary to consider partnership with suppliers, customers, internal partnership and conditional partnership with competitors.

- the rule of "integration of PR and advertising" - a combination of PR and advertising functions.
- the rule of "marketing control and audit" - in order to achieve the results of marketing management it is necessary to exercise systematic control at all stages in order to correct the marketing management process see "Fig. 4 Basic rules of marketing management".

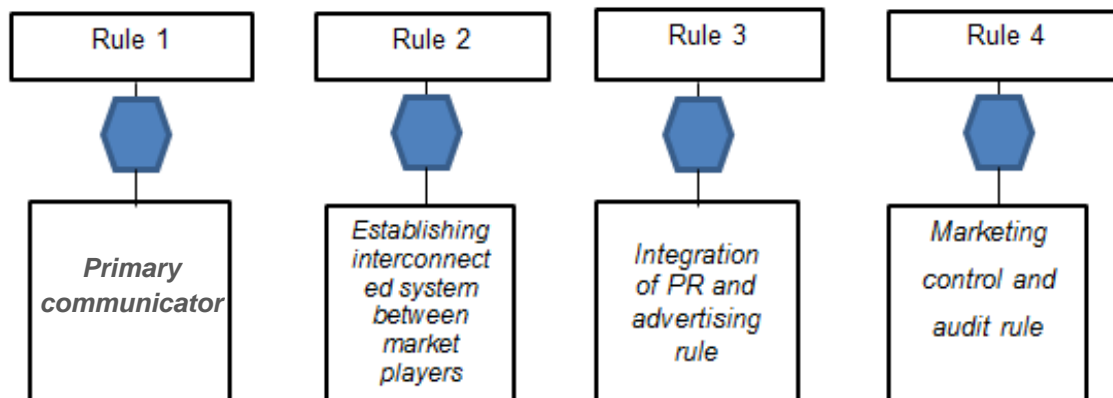


Fig. 4 Basic rules of marketing management

4 CONCLUSIONS

Thus, the process of marketing management of agricultural enterprises in conditions of market economy includes a set of interrelated activities on market analysis, identification of consumer needs and major market segments, the choice of conceptual frameworks of developing the marketing strategies, marketing planning, organization, coordination and control of marketing activities in the process of securing the agricultural sector.

For a detailed study of the environment of agricultural enterprises it is suggested to consider desires and interests of stakeholders, as the system performance responsibility (Accountability Scorecard - ASC) aimed to find the point of balance of the interests of the companies and

their stakeholders. For marketing programs processing, modern information software, as for example: MarketingExpert, Marketing GEO, or MarketingAnalytic can be used.

On that way, the selection and differentiation strategies forming and marketing offers forecasting, the determination of significance and selection of suppliers, the identification of potential competitive advantages, the choice of communicative actions for the enterprise positioning, the choice of tools of competitive differentiation, creating marketing strategies for market leaders, development of strategies for the global market, the evaluation of the global marketing environment, development of pricing strategies and programs, they all are the main directions of marketing management.

For proper organization of the marketing management in the developed enterprise, author suggests that four basic rules of marketing management should be used: "primary communicator", "establishing of interconnected system between market players", "integration of PR and advertising", and "marketing control and audit".

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Received for publication: 06.01.2013

Revision received: 01.03.2013

Accepted for publication: 29.03.2013

How to cite this article?

Style – **APA Sixth Edition:**

Levkiv, Y. G. (2013, 07 15). Managing agricultural enterprises with regard to structuring the marketing process. (Z. Čekerevac, Ed.) *MEST Journal*, 1(2), 88-95. doi:10.12709/mest.01.01.02.08

Style – **Chicago Fifteenth Edition:**

Levkiv, Yaroslavivna Galina. "Managing agricultural enterprises with regard to structuring the marketing process." Edited by Zoran Čekerevac. *MEST Journal* (MESTE) 1, no. 2 (07 2013): 88-95.

Style – **GOST Name Sort:**

Levkiv Yaroslavivna Galina Managing agricultural enterprises with regard to structuring the marketing process [Journal] = Marketing management on agricultural enterprises // MEST Journal / ed. Čekerevac Zoran. - Belgrade : MESTE, 07 15, 2013. - 2 : Vol. 1. - pp. 88-95. - ISSN 2334-7058 (Online); ISSN 2334-7171.

Style – **Harvard Anglia:**

Nakai, O., 2013. Development of beef raising product manufacturing on the innovative basis. *MEST Journal*, 15 07, 1(2), pp. 80-87.

Style – **ISO 690 Numerical Reference:**

Managing agricultural enterprises with regard to structuring the marketing process. **Levkiv, Galina Yaroslavivna.** [ed.] Zoran Čekerevac. 2, Belgrade : MESTE, 07 15, 2013, MEST Journal, Vol. 1, pp. 88-95. ISSN 2334-7058 (Online); ISSN 2334-7171.



ECONOMIC SECURITY MANAGEMENT OF ENTERPRISES IN THE SPHERE OF CRIMINAL CHALLENGES

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JEL category: **M00, M1, M11, M15, M21**

Abstract:

The article analyzes and studies the basic aspects of economic security management of the enterprise, the place of information in the security of business activity of enterprises and investigates the possibility of criminal attacks on the country's economy through loss of information resources. After an analysis of some recent researches, and some aspects of economic security management, and enterprises as objects that provide strategic position to strengthen the economic security, author analyses information as the security object. At the end of the paper author concluded that the information management process of the enterprise includes: all the information necessary to manage all types of enterprise resources maintained in informational databases, development of informational environment for enhancing positive organizational activities of employees, providing them with the necessary information, and joining national or industrial search systems, receiving, storage, transmission and processing of information, i.e. the organization of appropriate databases.

Keywords: *economic security, management, criminal challenges, European cohesion policy, presupposition, restrictions, information, management process.*

1 ANALYSIS OF RECENT RESEARCH

Economic security management of enterprises in market conditions requires the development of methodological principles of management process using modern doctrines of knowledge

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about security and their skillful application in the process of management. In addition to the general principles of business activity, it is necessary to have and effectively apply the basic methods of management of organization, personnel and security system at the enterprise. If managers have not got certain powers, responsibilities and knowledge, they (according to the domestic experience) convert to



commercial agents, officials, administrators or functionaries.

Formation of the enterprises competitive position and insuring its strategic development in the context of enterprise security, various aspects of entrepreneurship are the subject of scientific interest of Ukrainian scientists.

However, speaking about the economic security management of enterprises in conditions of intense competition and development of criminal activity in economy there are still many

unexplored aspects which will influence the financial and economic activity not only of a single enterprise but entrepreneurship in Ukraine as a whole.

2 THE PURPOSE OF THE ARTICLE

The purpose of the article is to learn about the basic aspects of economic security management of enterprises, to locate information in the business activity of enterprises and to explore the extent of criminal encroachments in the domestic economy.

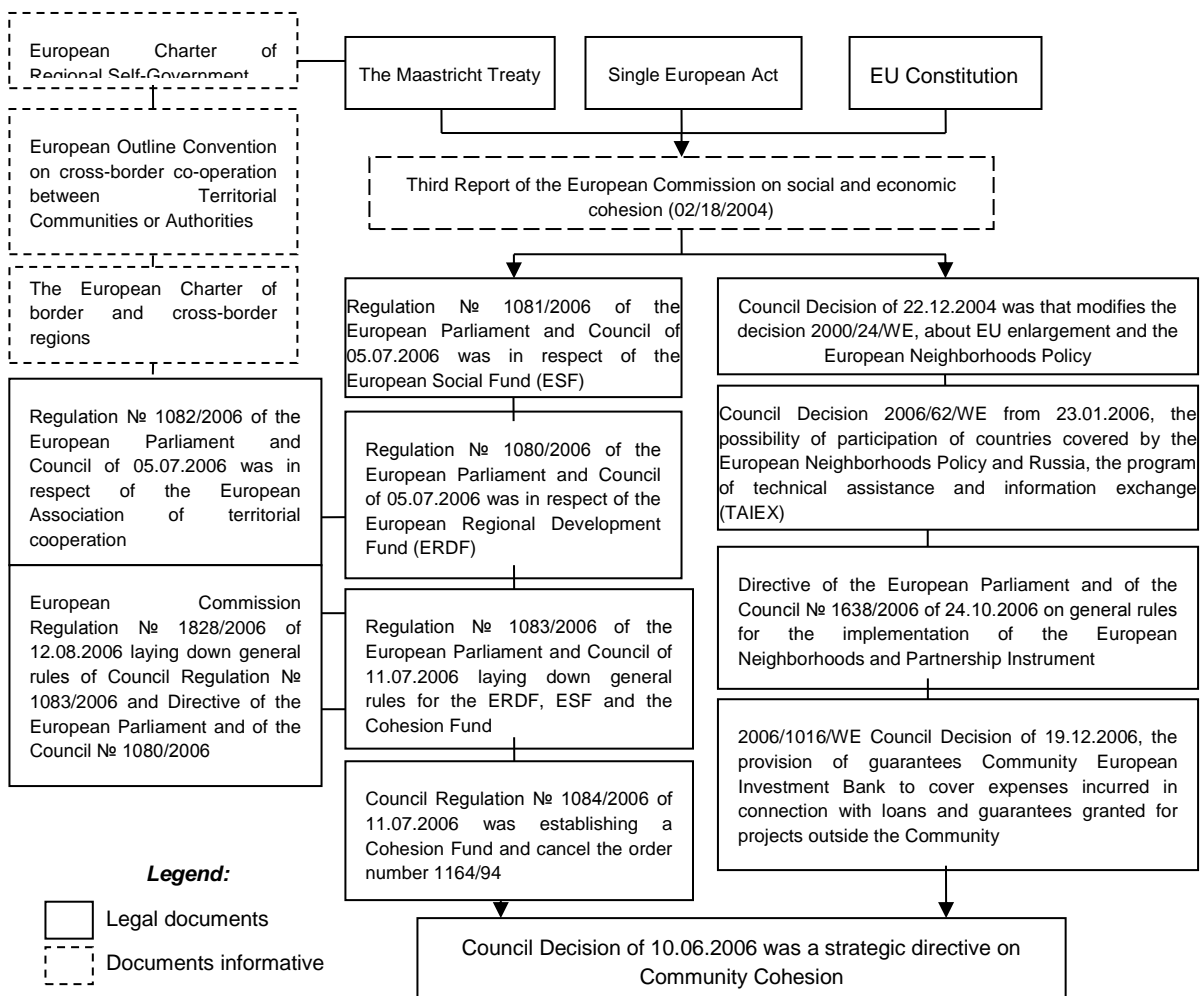


Fig.1. Structure of the legal-regulatory provision of regional international cooperation within the European cohesion policy *Compiled according to (Sheil, 2008) (Czuzhikov, 2008)

3 PRESENTATION OF THE MAIN MATERIAL

It is urgent for Ukraine to study the experience of European regional policy taking into consideration the proximity to the EU and the fact that the term of obtaining candidate status for accession to the Community remains uncertain, and implementation of European standards is very slow. Undoubtedly, improvement of the national institutional framework of regional development, i.e. regional entrepreneurship, introduction of systematic changes of institutional and structural character based on proven by EU tools and techniques of multilevel regional policy will improve the socio-economic development of local areas, will deepen the integration at the regional level and will develop the entrepreneurship and enterprise as its component.

3.1 Strategic support of economic

Strategic support of economic and institutional mechanism of enterprises economic security is executed for adaptation of the enterprise to the conditions of resource markets, for bringing into compliance the technical and technological basis of technological progress and for increasing the

3.2 The structure of the legal-regulatory provision of regional international cooperation

The structure of the legal-regulatory provision of regional international cooperation within the European cohesion policy in the sphere of legal and informational documents (Fig. 1).

Profitability of the enterprise. The main result of the strategic economic development is the formation of development strategy of economic and organizational mechanism for economic security.

Since the analysis of the enterprise activity is mainly based on the two-dimensional evaluation, which does not always reflect the real situation, let us consider a different approach, which we believe is more effective and adequate. In most cases, the great number of methods of strategic analysis is reduced to matrix methods (e.g. matrix of I. Ansof, M. Porter, Boston Consulting Group, McKinsey, Arthur D. Little, etc.).

The basis of the strategic matrix is a combination of two criteria, in particular, the rate growth of industrial market and relative market share (Matrix Boston Consulting Group). In practice, most critics of matrix methods of economic analysis claim that they are not objective because of their two-dimensions and the positioning of the enterprise is performed only according to two indicators, the remaining indicators are not taken into account. That is why we support an alternative, according to some scientists (Biloshkurska, 2012) that it is possible to implement a three-dimensional model with the inclusion of the third evaluation criterion and the positioning of enterprises is performed not according to the matrix quadrant, but to the volumes of three-dimensional space. The axes of this three-dimensional model of strategic support of economic and institutional mechanism of economic security reflect the characteristics and indicators of the internal state of the enterprise, its relationship with the environment and the level of economic security.

3.3 Enterprise as an object that provides strategic position to strengthen the economic security

Considering the enterprise as an object of market relations we should focus on its position in the environment, not only as a supplier of production factors or products, but also as an object in the stock market, which will insure its strategic position of economic security strengthening.

Theory and practice of financial management (Brygchem, 1997); (Cheng, Johnson, & Finnerty, 1990); (Modigliani & Miller, 1963) has formed the principle of efficiency of business for the owner, which is to maximize the market value of the enterprise: the growth of the market value of the enterprise is the aim of the owner and the key element for economic security. Here you can see a direct link – increasing the rate of economic security triggers an increase in the market value of the enterprise and vice versa.

Comprehensive understanding of efficient management and development of the enterprise is formed by its market value, which is why the orientation of the enterprise to increase the market value creates the preconditions to

strengthen its competitive position, enhances the viability and sustainability of the domestic and foreign markets. The market value of the enterprise is also a major criterion for investment decisions either for owner or external investor. Considering that the management process is impossible without reverse effect made by

management object to its subject, while the principle of feedback indicates the fact of transmission of information from object to subject, thus the perception and processing of information is the basis for functioning of the management subject.

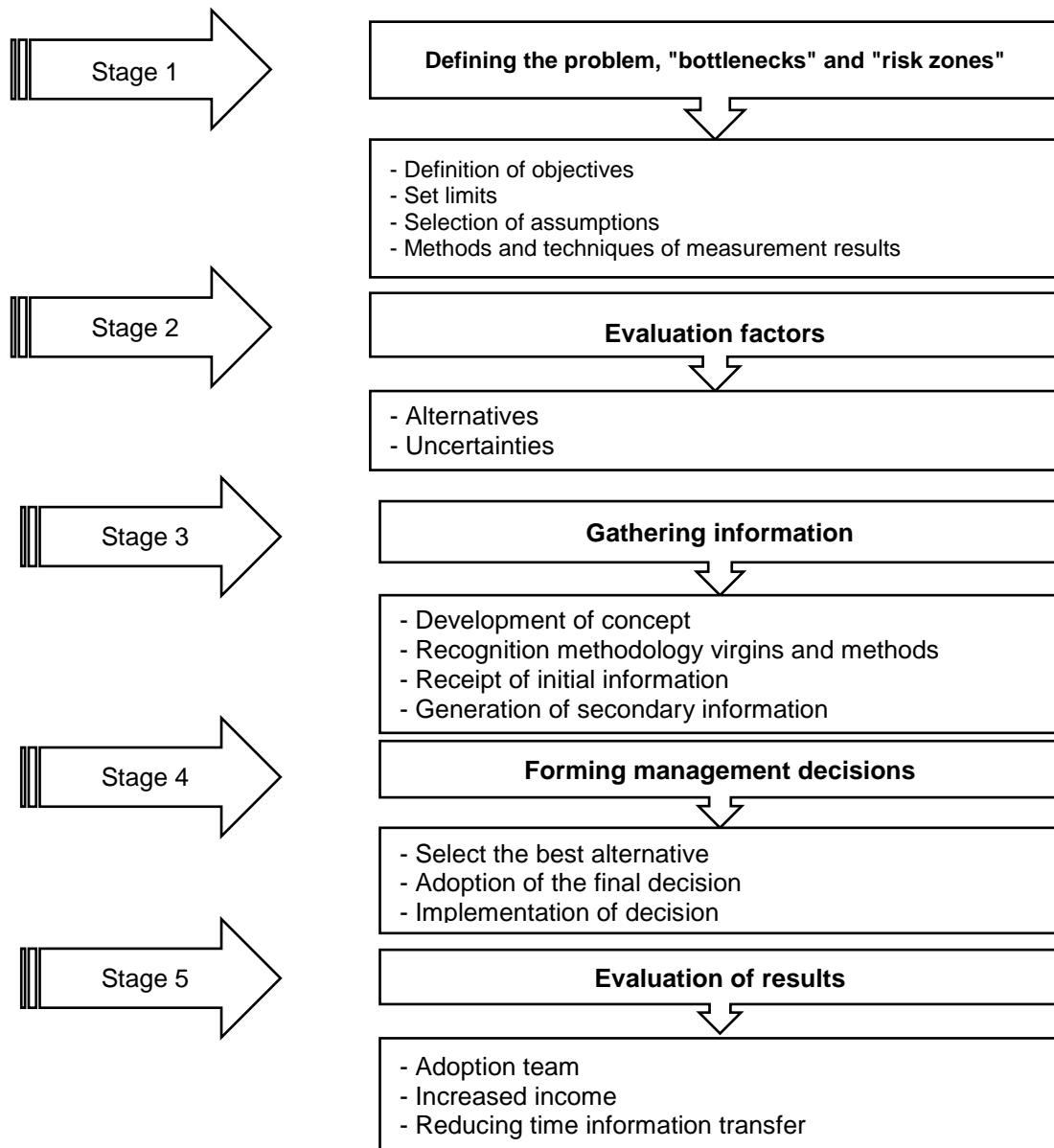


Fig. 2 Scheme of the formation of information management process of the enterprise (Lichonosova, 2012)

For decision-making and management of the enterprise security particular attention is paid to the information provision of the enterprise. In our view, schematic phases of self-organization of

the enterprise are quite aptly given by the author (Lichonosova, 2012) (Fig. 2.), which will be the basis of the information management process of the enterprise.

3.3.1 Stage 1

At the first stage the formation of information provision is defined by "bottlenecks", "risk zones" of the enterprise; main groups of factors are: 1) the purpose - future revenues, market share, received by the enterprise due to its self-organization, 2) restrictions - factors that complicate achieving the purpose (money, time limits, "tunnel vision" of development directions), 3) presupposition - assumptions regarding factors and situations that make it easy to solve problems within the existing restrictions (expansion of enterprise's leaders values, extension of existing credit obligations), 4) ways of measuring the results - development of criteria and standards that would allow to conduct evaluation of the proposed actions aimed at enhancing self-organization. It is also necessary to define – why this or that information is important for the enterprise, is the qualification of the leaders and employees sufficient for its perception, processing, analyzing and use.

3.3.2 Stage 2

The second stage should conduct evaluation of factors, namely: alternatives - predictable and

controllable factors and uncertainties - not controlled by the enterprise factors. The course of the process, the need of preparatory work and the expected volume should also be determined.

3.3.3 Stage 3

The third stage of information provision formation suggests finding a possible decision for self-organization. That is choosing the best available alternative, making the final decision and implementing it in the production and / or into management process. This step should also determine who controls the organizational work at the enterprise what are the levers for leveling the situation at the enterprise.

3.3.4 Stage 4

The fourth stage is the evaluation of the results of organizational activity which allows verifying the correctness of the decision of the organization, or vice versa - indicates its falsity. The resulting information at this stage must answer the question, what are the results of self-organization process. Is the further self-organization necessary and what its guidelines are.

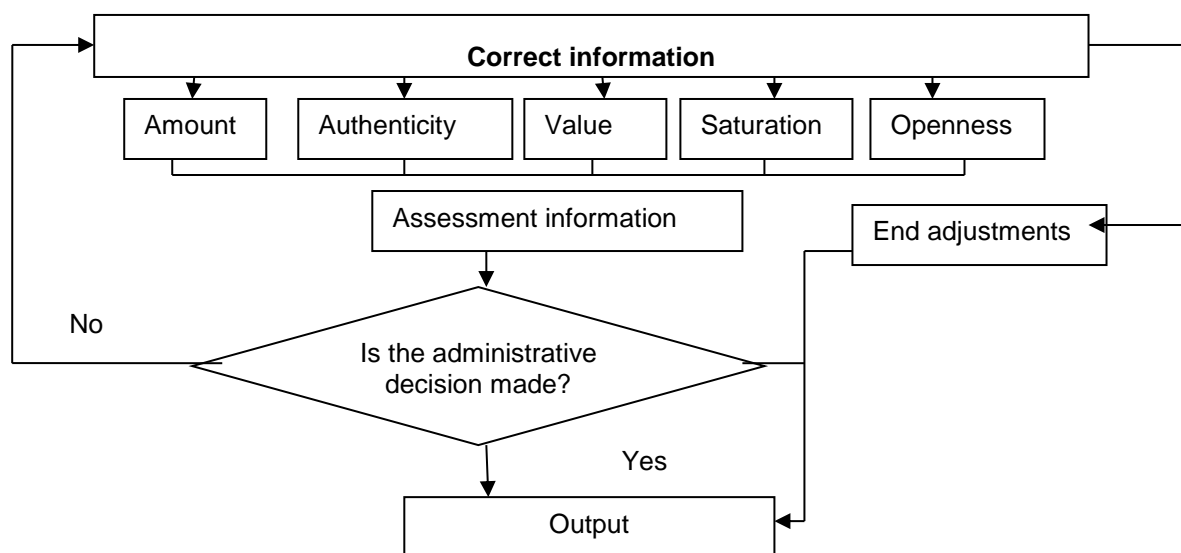


Fig.3. Algorithm of information correction according to the organization of management process

3.4 Levels of information and its correction algorithm

Based on the need to harmonize the organizational principles of management, formed

information provision of the enterprise requires constant adjustment. Correction of information provision is necessary for certain filtering or to give it some emotional coloring. Determining the points of impact on information provision is

necessary for effective correction. It is more effective to influence the information itself and the inherent characteristics in particular (Vasilenko, 2002) such as: volume, reliability, value, saturation and openness.

The amount of received information may have at least three levels: information redundancy, minimum required level, lack of information (information hunger).

Information redundancy concerning self-organization improves the quality of the decisions, however, increases the time for its processing and increases the value of information.

Lack of information makes it difficult to make the right decision, increases the risk and uncertainty of the situation requires advanced mathematical and economic methods to increase its probability for which experts and analysts are responsible, which also makes the cost of the decisions more expensive. The minimum required level of information - a minimum full information for managing subject in which he is able to make reasonable management decisions. It is clear that this level - is a subjective value and depends on the individual thesaurus of a certain person.

Correction of information provision according to this indicator should be aimed at manipulating the levels of received and transmitted amount of information (Fig. 3). For example, the head of the enterprise intentionally creates redundancy of information (if possible) or duplicates the information when making important decisions.

3.5 Specifications of information

3.5.1 Reliability of information

Reliability of information lies in the share of real information in total received data. Reliability also has three levels: absolute (100%), confidential (80%), negative (less than 80%). The fewer people are involved in collecting, processing and transmission of information, the higher is its probability. It largely depends on the time of information transmission. Even absolutely reliable information which was received by the recipient too late can be misleading (e.g., exchange rates or shares rates).

3.5.2 Value of information

The value of information is characterized by the reduction of the cost of resources (material resources, time and money) for making management decisions. It has four levels: zero, medium (reducing costs or increasing profits by more than 10%), high (reducing costs by more than 2 times), and ultra-high (reducing costs by more than 10 times).

3.5.3 Saturation of information

Saturation of information - is the ratio of useful information and the background information. Background information is used for better perception of useful (professional) information by improving the mood, raising the emotional level of the recipient, by preceding focus on the topic. Such information may include: witty jokes, examples of situations of professional achievements, i.e. some deviation from the main topic - supporting and introductory information.

3.5.4 Openness of information

Openness of information - is an opportunity to present the information to different levels of employees and society in general. Examined characteristics of information are closely related to each other and affect each other, so the impact (correction) of one of the characteristics entails a change in others.

For example, increasing of the probability of information makes it necessary to increase its volume and openness.

3.5.5 Place information provision and information security in business

Thus, the final, corrected information used by the head of the enterprise for support or ending of the organizational process, should have the characteristics of information at this level:

- Volume: minimum required level;
- Value: the average and high level;
- Probability: absolute level;
- Saturation: average;
- Openness: confidential and public level.

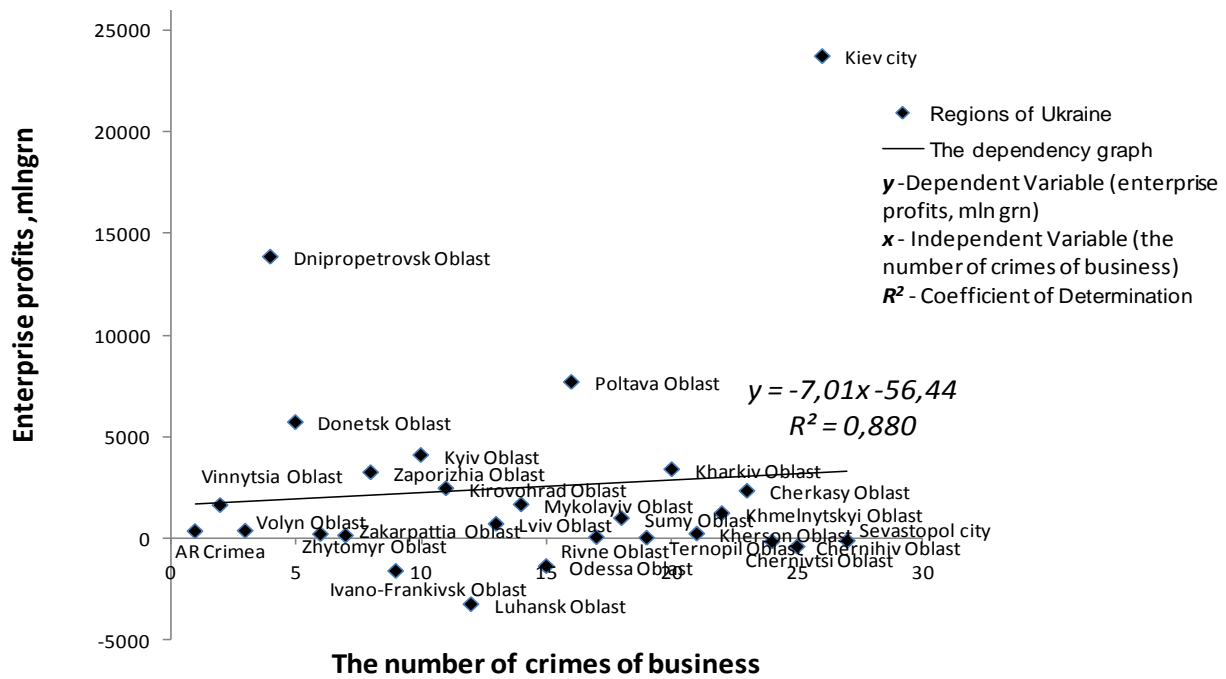


Fig.4. Dependence of profits of enterprises in Ukraine on the number of crimes in economic activity.
Calculated according to: (Ukrstat, 2013) (MIAU, p. 2012).

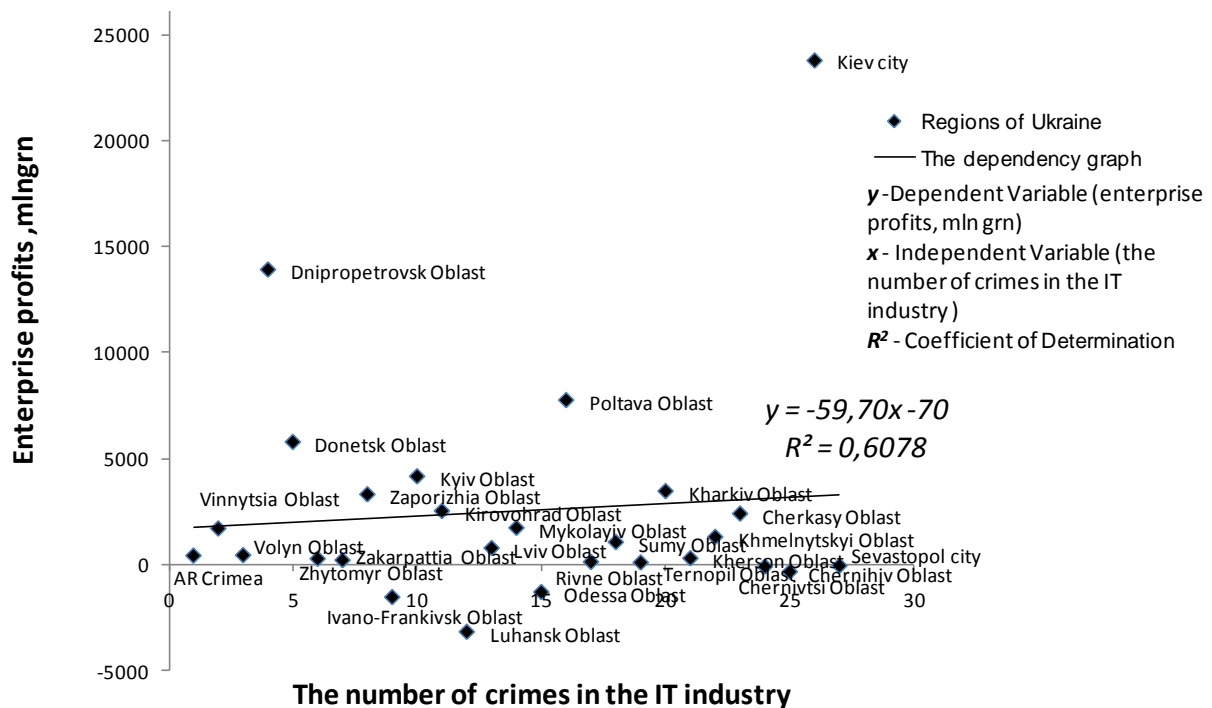


Fig.5. Dependence of profits of enterprises in Ukraine on the number of crimes in the sphere of information technologies

*Calculated according to: to (Ukrstat, 2013) (MIAU, 2012).

Leaders of the enterprise come to understanding that information management and information security is more strategically important for business than IT.

Manifestations of economic crime have a direct impact on the financial results of the enterprises. Thus, according to our estimation, this dependence in Ukraine is described by the following parameters (Figure 4.): $Y = -7.01x - 56.44$.

There is no doubt, that economic crimes are the key factor of economic security of enterprises.

Negative impact is also characteristic for spreading of criminal encroachments in the information technology at the enterprises.

Thus, crimes in the use of computers, (computer) systems, computer networks and telecommunications cause a decrease in profits in business for at least by 59.7% (Fig. 5).

Domestic enterprises equally suffer from abuses committed by both its employees and external fraud, while in 2009 the number of serious economic crimes committed by employees, increased by 22%.

Most white collar swindlers in Ukraine are representatives of higher (40%) and secondary (40%) managerial levels (MIAU, p. 2012).

In regional aspect the largest number of crimes in economic activity is observed in Donetsk region. - 1005 (in 2011). The second place according to this parameter occupies Dnipropetrovs'k region. - 666 crimes. The same two regions are also leading in terms of the crimes committed in the use of computers (computer) systems, computer networks and telecommunications.

This fact confirms the crucial importance of information security for businesses, the necessity to develop effective measures to strengthen and counter threats and risks.

4 CONCLUSIONS

Thus, the information management process of the enterprise consists of: all the information necessary to manage all types of enterprise resources maintained in informational databases, development of informational environment for

enhancing positive organizational activities of employees, providing them with the necessary information, and joining national or industrial search systems, receiving, storage, transmission and processing of information, i.e. the organization of appropriate databases. Based on the above, information provision of management process of the enterprise should include (Vasilenko, 2002; Zhyvko, *Economico-pravovi aspekty upravlinnja ta zachystu intelektualnoi vlasnosti v umowach integracii ta bezpeky biznesu*, 2011; Zhyvko, *Systematic approach to the functioning of information management systems and quality control*, 2010):

1. Providing management or other interested group of the enterprise with reliable, public information about the enterprise, aimed at organizational process and effective management. Effective method to provide such information may be available and constantly updated official business website on the Internet, conducting analytical work, participating in conferences and workshops.
2. Checking and public disclosure of the appropriate diligence of the enterprise as to its creditors and other liabilities. Such an examination includes: checking the financial and other information presented; accuracy of all records, including their compliance with applicable laws; qualification of leaders and employees of the enterprise or other initiators of the organizational process as individuals capable of meeting existing needs by ensuring the achievement of purposes on the basis of questionnaires. Such information should be within reach.
3. Using a wide range of information tools and practices for forecasting the enterprise activity. It is necessary to create a structure of competitive (business) intelligence, to develop a network of collection and analysis of data on future functioning of the enterprise - its macro environment of existence, internal psychological state of employees, financial parameters, and other. Developing on the basis of this information a model of the enterprise and this will widely characterize the enterprise at different stages of activity for making managing decisions.

4. Using the information and psychological tools and methods for enhancing positive self-esteem of employees. Such means and methods of psychology evaluate thinking, management skills, factor of strong-will of the organization initiators to identify their motivation, levers of impact on their behavior or vice versa - to identify obsessive, manipulative behavior. They will enable a comprehensive understanding of the internal climate of the staff.
5. Creating the appropriate conditions for the development of organizational culture. Conducting series of organizational measures which would unite the staff, create friendly relations, would give a feeling of care from the side of management of the enterprise.
6. Providing the material and moral leverage to motivate staff to guarantee security of the enterprise.
7. Bringing up a sense of loyalty and commitment to the enterprise among the staff.
8. Considering the commercial information as a commodity, this can be costly for the enterprise and which requires constant security and is the basis for management decisions.

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Received for publication: 09.01.2013

Revision received: 19.02.2013

Accepted for publication: 29.03.2013

How to cite this article?

Style – **APA Sixth Edition:**

Zhyvko, Z. (2013, 07 15). Economic security management of enterprises in the sphere of criminal challenges. (Z. Čekerevac, Ed.) *MEST Journal*, 1(2), 96-105. doi:10.12709/mest.01.01.02.09

Style – **Chicago Fifteenth Edition:**

Zhyvko, Zinaida. "Economic security management of enterprises in the sphere of criminal challenges." Edited by Zoran Čekerevac. *MEST Journal* (MESTE) 1, no. 2 (07 2013): 96-105.

Style – **GOST Name Sort:**

Zhyvko Zinaida Economic security management of enterprises in the sphere of criminal challenges [Journal] = Economic security management and criminal challenges // MEST Journal / ed. Čekerevac Zoran. - Belgrade : MESTE, 07 15, 2013. - 2 : Vol. 1. - pp. 96-105. - ISSN 2334-7058 (Online); ISSN 2334-7171.

Style – **Harvard Anglia:**

Zhyvko, Z., 2013. Economic security management of enterprises in the sphere of criminal challenges. *MEST Journal*, 15 07, 1(2), pp. 96-105.

Style – **ISO 690 Numerical Reference:**

Economic security management of enterprises in the sphere of criminal challenges. **Zhyvko, Zinaida.** [ed.] Zoran Čekerevac. 2, Belgrade : MESTE, 07 15, 2013, *MEST Journal*, Vol. 1, pp. 96-105. ISSN 2334-7058 (Online); ISSN 2334-7171.



THE DECLINE OF HUMAN CAPITAL IN UKRAINIAN EDUCATION AND SCIENCE: EXPERIENCE OF REVERSAL

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JEL category: **I2, I21, I19, J2, J24**

Abstract

Preservation and enhancement of the quality of education should be a priority in the development of any society. But, the Ukrainian higher education system has ceased to be competitive, and to date has continued to reduce in prestige. Ukrainian higher education diplomas are not recognized worldwide, in contrast to European and American diplomas. The vast majority of graduates are not competitive in the European labor market. 84% of Ukrainian students do not associate their professional future with Ukraine. Wages in the Ukrainian education system over the years are unprecedentedly low compared with other countries. Corruption and bribery have penetrated into all areas of higher education of the country.

Today, the Ukrainian sciences are three times behind Germany, twice from Slovakia, Hungary, Estonia, Spain, and the Czech Republic, and are on level with Romania and Bulgaria.

So, these are the reasons why Ukraine continues losing their young people, "the golden gene pool" of the nation, and faces a "Brain Drain" of the country. What are the steps that must be taken in the Ukrainian system of education, to regain prestige and respect? Completely and permanently eradicate corruption and bribery from the higher educational institutions of Ukraine raise the wages of the teaching staff of the Ukrainian universities to the international level, etc.

Keywords:

human capital, higher education institutions, scientists, teachers, academics, development, wages, science and education, international scientific journals, universities

1 ANALYSIS OF THE COMPETITIVENESS OF THE UKRAINIAN EDUCATION SYSTEM

Ukrainian higher education degrees are not recognized in the world, in contrast to the European model of diplomas. If, for example, in

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Brazil, the sixth world economy, part 180-million population with tertiary education is 7.9% (Terra, 2012), in Ukraine with 45 million people, 90% of citizens have secondary or higher education (Ukrainskaya sistema obrazovaniya, 2012). This fact indicates the quantity, not the quality of education in Ukraine.

What is the problem lack of competitiveness of the Ukrainian system of education, particularly higher education, compared to other education systems of the leading countries of the world? Perhaps the problem is that in the Ukraine in the system of higher education is not the accumulation of human capital? Categorically impossible, as in Ukraine today there are hundreds of institutions of higher education, where human capital is accumulated in the process of higher education. Why, then, is there not enough system of higher education? We believe that it lacks the quality of under-investment in human capital.

The concept of "human capital" is not only the realization of the crucial role of human beings in the economic system of society, but also recognition of the need to invest in people, because capital is acquired and increased by investment (due to limitations of current consumption) and bring long-term economic impact.

Investments in human capital are any actions that improve their professional skills and productive capacities of man, and thus the performance of his work. Expenditures that enhance human performance can be seen as an investment, since operating costs are made with the expectation that they will be compensated for income in the future (Vasylchenko, Grinenko, Gryshnova, & Kerb, 2005).

To date, the Ukrainian system of education is not competitive because the human capital of Ukrainian scientists, teachers and academics is not invested either by the state or by foreign educational foundations because of the low mobility of the faculty of education, or from the personal investment - because of meager wages. In view of this, the human capital of the Ukrainian science and education undergoes regression: the country going backwards.

2 THE CURRENT STATE OF UKRAINIAN SCIENCE AND ITS FUTURE DEVELOPMENT

Human capital development is inextricably linked to the development of science. However, according to D. Polozenko (2006, pp. 15-23), Ukrainian science is constantly experiencing "financial arrhythmia" - budget spending on science in 1992 was 2.2%, in 1996 - 1.9% 1999 - 0.8% in 2002 - 0.9%, 2004 - 2.2%.

In future periods, the situation has not improved in science. Analyze the dynamics of the financial sector "Science" from the State Budget of Ukraine for 2007-2011, Million UAH.

It is worth emphasizing that in fact the trend of decline in the share of the state budget on the science of GDP in 2007 and 2008, - 0.47% of GDP in 2009, - 0.45% of GDP in 2010, - 0.43% of GDP in 2011 - 0.38% of GDP. This is the lowest in the country over the last decade and the lowest rate among all European countries.

During the period of 1991-2011 years, Human resources science declined by more than three times. In 1991, the number of performers of scientific and technical work on the 1000 population of Ukraine was the first European country. Today the Ukrainian Science 3 times behind Germany, twice from Spain, Slovakia, Hungary, the Czech Republic, Estonia, while at Bulgaria and Romania.

Compared with 1991, the number of doctors and candidates engaged in scientific and technological activities, decreased by 8848 people (by 28%) due to the fact that their total number is constantly increasing. Also, the number of students, graduate and doctoral students is increased by 2.5 times, but the quality of their training has deteriorated. Intellectual continuity of generations is at risk. (Oleskin, 2012)

Ukrainian legislation provides for government funding of scientific activity at the level of 1.7% of GDP, which should be done by the base and competitive program financing. (Polokhalo, 2011) As already noted, the actual funding is at 0.38% of GDP in 2011.

B. Danilishin and V. Kucenko, based on data from the International Labor Organization, say:

"If, the country, in science spends less than 2% of GDP, begins the destruction not only of science but also the economy, and society in general." (Danilishin & Kucenko, 2006)

In situations of chronic underfunding, Ukrainian science is on the brink of survival. With no objective opportunities for a full research, scientists have to settle for a so-called "scientific secondary".

In addition, in 2011, researchers NASU not receive additional pay for academic degrees and doctoral degrees. Senior Researcher PhD receives a monthly salary of salary 2417 - 2500 UAH (300-350 USD) - these are the smallest salaries of scientists in the world.

Wages in Ukraine, including researchers, over the years cannot be a source of human capital investment, as unprecedented is low compared with other countries. (Koshul'ko & Koshul'ko, 2012, pp. 146-153) That is where we can see the source of increasing levels of migration, which, according to the results of the independent World Bank, in 2010, Ukraine took 5th place in the world after Mexico, India, Russia and China. (Ratha, Mohapatra, & Silwal, 2011)

According to another independent study of German experts, Ukraine is among the ten countries with the poorest citizens. In 2011, the average Ukrainian property was 928 euros (not including money spent on the credits.) These data are published German insurance company «Allianz» in its latest "Report on the global wealth in 2012." Ukraine occupies 49th place among 52 countries in the ranking by income citizens. (Ukrayina uvijshla do desyatky krayin z najbidnishymy hromadyanamy, 2012)

Wage level scientists significantly, and in the negative direction is different from the other groups. The key is that the level of income, in principle, does not allow them to solve their particular problems (housing, sanitation, etc.). According to statistics, in 2010, the salaries of scientists (R & D performers) increased by 1.4% to Rs 2535 (2218 UAH in 2009), almost at the level of wages of industrial workers (2580 Rs.), and well below the level of pay in the financial sphere (4601 Rs), as well as in a public administration (2747 UAH). The issue of income inequality is the reason scientists their negative

morale, and society with a sharp differentiation of incomes differs social instability, lack of strong incentives for professional growth, a significant degree of criminality of social relations, etc. No less urgent is the problem of logistics research, which requires significant financial resources to upgrade machinery and equipment. At the same time, the problem of underfunding for years cemented a number of other socio-economic and psychological problems. The most acute is a problem of housing for young scientists, health care facilities and the like. Low prestige of scientific labor and social protection of scientists had a negative impact on the completion of scientific institutions young, talented professionals. Such a lack of understanding that social, physical health scientists have a decisive influence on the level of their morale, creative thinking, creative scientific inspiration, is fatal to the country in the new global times for the economy, which should be based on knowledge. Therefore, crucial for scientists in Ukraine remains the problem of the transition from an existential level the own needs (security of existence, providing comfortable living conditions, etc.) to higher - social, spiritual. However, taking care of the problems of self-expression and success in science, as well as provide for themselves and their families with the necessary material means of subsistence, some scholars go abroad Ukraine. Although official statistics are not striking is considerable, but it clearly shows the trends, the realization of which is much more important. So, given the current state statistics, the most difficult period for the national scientific potential was the period 1991-1999., When went from Ukraine for permanent residence 268 doctors (including 40% in the technical area), who worked in perspective areas of mathematical analysis, solid state physics, semiconductor physics, structural mechanics, solid mechanics, surgery. (Mekh, 2012)

According to Ombudsman Ukraine, in the period from 1993 to 2003, 574 doctors and 907 candidates of science emigrated abroad. (Karpachova, 2003, pp. 14-15) (Karpachova, 2005, pp. 6-8) According to studies of O. Mekh (2012), most mass departure of scientists with a doctorate was in the 1990s. In the year 1996, one PhD left Ukraine every day. By the turn of the

century the process slowed down, the total number of candidates who left in 2006 was 5 times less than in 1996 and in 2008 that number reached a minimum value. However, in 2009 - 2010 their number increased again. (Mekh, 2012)

Focused on the oligarchs, socio-economic and socio-political model of modern Ukraine pushes science to degradation. When a country is in the state of geopolitical uncertainty, this can cause severe consequences for its existence among super-rigidity global competition. (Polokhalo, 2011)

On the basis of the experience of developed countries (Lebedev & Milenin, 1996), the basic principles of an effective system of direct government support in science (especially basic research) must be:

- In a careful and informed choice of priorities: there must be a clear system to choose the direction of support;
- In a variety of sources and methods of state support. There should be not one, but several sources of public resources for scientific and technological research;
- The selectivity and competition in the allocation of resources;
- In a democratic and transparent decision-making. Identification of priorities and the allocation of public resources should be controlled by scientific community.

Summarizing all the above, it can be said that the Ukrainian science degrades without proper funding, without any innovative development (e.g. techno-parks; Now in the USA, there are about 200 techno-parks, In Germany and the Netherlands – around 150, in the Ukraine - no one!) The Ukraine continues to be a raw materials appendage of other technologically powerful countries of the world. (Koshul'ko & Koshul'ko, 2012) Today, in Ukraine is existing one case of creating a technology park under the auspices of one of the universities, but if the approach to funding research and education projects in the near future doesn't radically change - it will remain another try only.

3 "COMPETITIVENESS" OF UKRAINIAN DIPLOMAS: WHO IS TO BLAME AND WHAT TO DO?

As a result, regression¹ science entails the destruction of education. Lack of funds for education from the state budget is offset by private investment, particularly by parents because education today came out of the scope of the traditional allocation of resources and become a big business. (Poplavskaya & Poplawsky, 2002)

As already noted, the Ukrainian higher education diplomas are not recognized almost everywhere, in contrast to the diplomas of European and American style.

In recent years, the quality of higher education in Ukraine has decreased to its lowest level. The vast majority of graduates are not competitive on the European labor market. Therefore, every year only increases the number of people wishing to study abroad. Naturally, after the formation of the "gold" gene pool of the Ukrainian nation will forever remain outside the country.

According to international research, "Students - the image of the future", held in 2011 Gorshenin Institute in Ukraine, Russia, Kazakhstan and Poland, the homeland want to study 15.5% of the Ukrainian youth, at a time when 72.3% of Russians and 65, 9% of Poles are planning to pursue higher education in the country. (Omel'chenko, 2011)

Today, 80% of the students dream of Ukraine exchange for work abroad. Most students of Ukrainian universities do not associate their professional future with Ukraine. According to the Ukrainian-Polish sociological research, more than 80% of Ukraine has the objective to work abroad. (Omel'chenko, 2011)

In Ukraine, until recently, none of the higher educational institutions were represented in the world rankings of universities, except in the Webometrics.info rankings, where in the year 2012 the "most successful" Ukrainian school was on 713th place. On the same list, in the year 2013, the most successful Ukrainian National

¹ Regression - from Lat. Regressus - return, the reverse movement

Pedagogical University MP Dragomanova took 80th place. (Ranking web of universities, 2013)

As for the two most prestigious international rankings, Shanghai ranking (ARWU, 2012) and the rating of "Times" (Times, 2012), the Ukrainian universities are not available to all.

Corruption and bribery have penetrated into all areas of higher education, is ignoring the "norm." Investing in public schools learning process (the upgrade logistics - repairs, furniture, books to pay for the work of cleaners and security guards of educational institutions) have long been laid on the shoulders of parents. As noted, "Education today came out of the scope of the traditional allocation of resources and become a big business." (Poplavskaya & Poplawsky, 2002)

CONCLUSIONS

What are the steps needed to take the Ukrainian system of education to regain the prestige and respect, and human capital - the ability to develop?

Authors strongly believe that if the Ukrainian universities wish to gain competitiveness and prestige, and the human capital of the faculty gain the ability to replicate and accumulate, they must:

- Completely and permanently eradicate corruption and bribery, which have penetrated into all areas of higher educational institutions of Ukraine, first of all, due to the extreme plight of Ukrainian scientists and professors through low wages and poor quality of life:
- To raise the wages of the teaching staff to the international level (for example, today, PhD, assistant professor in the Ukraine receives salary of 350 - 400 USD, at a time when Poland teacher with a Master's Degree and a post receives wages of 2700 - 3000 PLN (more than 1000 USD); in Turkey - from 1000 USD and above. A scientist with a salary of 350 - 400 USD cannot have a competitive human capital! Thus, the higher wages of teachers and scientists to meet international standards for scientists and educators can meet all the needs of the

community and they play in and the accumulation of human capital;

- To promote and finance the publication of Ukrainian researchers in international scientific journals, study tour to promote Ukrainian teachers, study and implementation of international experience in Ukrainian universities;
- To introduce a requirement for teachers of Ukrainian universities - knowledge of English, the language of international communication, and create the conditions for effective teaching of English teachers at universities. For example, this condition is required for all university professors in Turkey;
- To develop digital libraries, English-language sites of universities, international Internet conference, exchange of students and teachers;
- Actively locate studies of university teachers on the sites, which will lead to more productive work, the growth of informal contacts and researchers from different universities from different countries, which will undoubtedly have a positive impact not only the reputation of the universities, but also in their places in the global rankings;
- Introduce and actively promote not formal, but really needed the national economy scientific topics that can be implemented in practice. In this direction, is to borrow the experience of Brazilian Universities (holding, by the way, a leader in global education rankings!) That perform government contracts, to prepare examinations of national importance - for those wishing to join the public service in this country. Such examinations are transparent and accessible to every citizen of the country, thus preventing any manifestation of corruption in government offices. It is this system of government confirms the motto of Brazil: "Order and Progress." In our opinion, these are the steps to be taken in Ukraine, that science and education are to work for the development of the Ukrainian society, not existed in parallel to each other;
- Abandon the stereotypes of the Ukrainian education system prevailing until now, where to this day the practice of traditional,

- long-outdated, even the Soviet system of teaching, and the transition to the international practice of teaching students to actively use modern information technology to improve the quality of education, the effective distance education; (Novosti distancionnogo obuchenija, 2012)
- To determine the age limit for employment of key management positions in higher educational institutions of Ukraine - for rectors and vice-rectors - 60 years, for heads of departments - 65 years - for example, such restrictions adopted in higher education institutions in Poland. Such a requirement would increase the competitiveness of higher education and to promote the flow of talented young scientists to the management of higher education institutions in Ukraine - and thus will contribute to greater integration of the Ukrainian education system to international standards of quality in higher education;
 - To establish contacts with international educational funds, (International education fund, 2012) for training opportunities, training, comprehensive development of Ukrainian educators, teachers and scientists to the accumulation of human capital to the level of foreign teachers. We are convinced - just in case the teacher is formed and fully developed - it is able to teach a student!
 - Initiate and create really necessary joint international research projects with foreign research laboratories, research centers, universities, Techno polis and technology parks, international research funds, (International Visegrad fund, 2012) and mutually beneficial to both sides of the scientific process, which could improve the material well-being and allowed to reproduce and accumulate quality human capital, so necessary Ukraine;
 - Reduce the number of Ukrainian higher educational institutions to 3-4, citing the principle of educational quality, not quantity. In this case, the main goal of the Ministry of Education and Science, Youth and Sports of Ukraine should be to preserve the quality of the human capital of Ukrainian scientists and teaching staff of higher education institutions, and not a complete "destruction", as it happens. Otherwise, ill-considered actions of officials may provoke a new wave of intellectual migration from Ukraine, which is fraught with irreversible consequences for science, education, and, ultimately, for the Ukrainian society as a whole;
 - Maximum release Ukrainian academics from a huge amount of paper, a primitive activity that kills "creative freedom", distracting them from everywhere possible to "create" - to create something new, creative - training courses, tutorials, new areas of research, and so etc. This will not only give the opportunity to develop human capital as scientists and academics, but also in time saves Ukrainian science and education of plagiarism that pervades the entire Ukrainian system of education and science. Overseas teachers of universities mostly taught by them by lectures, new items - in Ukraine through "paper bureaucracy" teachers are not able to be creative - just play the borrowed material from different sources;
 - To overcome gender inequality in higher education and science by creating the conditions for the opportunities for women to academic degrees, positions in universities and research centers, thereby bringing Ukraine closer to the international standards of human rights and freedoms.

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Received for publication: 27.01.2013

Accepted for publication: 29.03.2013

How to cite this article?

Style – **APA Sixth Edition:**

Bastos, O. A., & Koshulko, V. (2013, 07 15). The decline of human capital in Ukrainian education and science: experience of reversal. (Z. Čekerevac, Ed.) *MEST Journal*, 1(2), 106-113. doi:10.12709/mest.01.01.02.10

Style – **Chicago Fifteenth Edition:**

Bastos, Oksana Abreu, and Vladyslav Koshulko. "The decline of human capital in Ukrainian education and science: experience of reversal." Edited by Zoran Čekerevac. *MEST Journal* (MESTE) 1, no. 2 (07 2013): 106-113.

Style – **GOST Name Sort:**

Bastos Oksana Abreu and Koshulko Vladyslav The decline of human capital in Ukrainian education and science: experience of reversal [Journal] = Human capital in Ukrainian education and science // *MEST Journal* / ed. Čekerevac Zoran. - Belgrade : MESTE, 07 15, 2013. - 2 : Vol. 1. - pp. 106-113. - ISSN 2334-7058 (Online); ISSN 2334-7171 .

Style – **Harvard Anglia:**

Bastos, O. A. & Koshulko, V., 2013. The decline of human capital in Ukrainian education and science: experience of reversal. *MEST Journal*, 15 07, 1(2), pp. 106-113.

Style – **ISO 690 Numerical Reference:**

The decline of human capital in Ukrainian education and science: experience of reversal. **Bastos, Oksana Abreu and Koshulko, Vladyslav.** [ed.] Zoran Čekerevac. 2, Belgrade : MESTE, 07 15, 2013, *MEST Journal*, Vol. 1, pp. 106-113. ISSN 2334-7058 (Online); ISSN 2334-7171.



HEALTH INSURANCE SYSTEM IN SERBIA – QUALITY, REFORM, FINANCIAL SUSTAINABILITY

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JEL category: **D2, O14, O3, Q19**

Abstract

Constrained by difficult economic situation, the health system in Serbia is facing a great challenge, and in order to overcome it and handle the gap between possibilities and expectations, it is necessary to implement economic reform of health care sector in Serbia, i.e. its decentralization, which implies improvements in providing health services while trying to find a model of financial sustainability of health care system in Serbia.

One of the most essential impulses of society to its economic and general social development is the health of its population. In fact, in addition to being a social potential, health is to be considered as an economic potential of a country as well. The need to examine health from economic point of view, as well as in the sense of sustainable economic development, is gaining in presence in the newly made circumstances of an advancing economic crisis.

There is an evident gap in the social community between the expectations of health care beneficiaries who are used to high-quality services with considerably subsidized health care and the new situation where health care institutions dispose of no funds to ensure the necessary prerequisites for providing health care, with an obvious weakening of social interlinkage and a fading trust in health care institutions.

Any change in terms of scope, quality and prices of health care may and does runs into the wall of disapproval, even judgment; therefore, it is necessary to regulate and legally define health care quality standards in the health system of Serbia and thus precisely determine the quality of service provided and, at the same time, manner of payment, i.e. responsibility for the costs incurred.

In order to reach a financially sustainable health care system in Serbia, it is necessary to analyze different models of funding, implement rationalization and reorganization of methods of funding and reexamine the health insurance models in Serbia.

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The priority concerning the health system financing is the selection of the most adequate method of raising sufficient funds. There are numerous factors which will determine our choice of a particular

model of health care system funding in Serbia, among which the following are most important: degree of socio-economic development of the country, fiscal capacity of the country, methods and efficiency of fund raising, support from the political system in its feasibility.

Keywords: health insurance, quality system in health care system, health insurance in the world, models of funding, financially sustainable system

1 INTRODUCTION

Health is a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity – World Health Organization (1948). This definition equalizes to a considerable extent the notions of “health” and “wellbeing”, which implies both physical and mental health, but also social adaptedness and fulfillment.

During the past decade and last year, political and economic instability issues, followed by global economic crisis, cause the health care system in Serbia to become inadequate. In such circumstances, strivings for reconstruction and improvement of health care services in accordance with the population’s needs are difficult.

The health system in Serbia suffers from lack of funds and investments but, however, does provide basic services to the citizens. In the Republic of Serbia, health care is provided both through state and private sectors. The Law on Health Insurance of the Republic of Serbia governs compulsory and voluntary health insurance. The Republic Fund for Health Insurance (RFHI) is in charge of managing and providing the compulsory health insurance while voluntary insurance may be provided by the means of private insurance. Expenditures for health care in € per capita oscillated in the period 2006 – 2010 both in their total amount and in each of the components taken into account: the expenditures of the Republic Fund for Health Insurance, public expenditures and private expenditures for health care. In dinar amounts, health care expenditures rose, along with the stable share in GDP, after an increase in 2007. However, in 2009, due to a slower growth of health care expenditures, a negative rate of GDP and a more expressed decrease of dinar to Euro exchange rate, the total health care expenditures per capita in Euro were inferior to the year before. The total health care expenditures in

2010 in Serbia stabilized at the level of € 412, i.e. \$ 546 per capita. The expenditures incurred by the Republic Health Insurance Fund were € 240 per capita, while the public expenditures for health care were equivalent to € 255 per capita in 2010. The growth rate of private expenditures for health care in the considered period was higher in comparison to the other ones, but slowed down in 2009, so that in 2010 they also stabilized at the level of € 157 per capita. (IPH, 2012, pp. 19-63)

The share of total health care expenditures in GDP increased in 2007 for one percentage point and stabilized in the following years at 10.4%, with a slight increase to 10.5% in 2009. The share of health care private expenditures, after an increase by half a percentage point in 2007, preserved the level of 4% of GDP. The share of health care expenditure of the Republic Health Insurance Fund in GDP in the examined period was approximately 6% – it increased in 2007 by half a percentage point and slightly oscillated during the following two years. The share of health care public expenditures in GDP was 6.4% in 2010 with a similar changing pace in the examined period.

When it comes to allocations for health care expressed as percentage of GDP, Serbia is above the average of the European Union, with its 10.4% (9.88% in 2010), i.e. approximately at the level of Belgium, Austria, Greece and Bosnia and Herzegovina. Serbia allocates a relatively greater amount for health care (as percentage of GDP) than a variety of countries: Albania, Bulgaria, Croatia, Czech Republic, Estonia, Finland, Hungary, Latvia, Lithuania, Luxembourg, Montenegro, Poland, Romania, Russia, Slovak Republic, Macedonia, Turkey etc.

However, in comparison to the EU countries, some other European countries and the average in the EU countries, the Republic of Serbia allocates a small absolute amount of funds for health care. (IPH, 2012)

Unfortunately, low GDP of Serbia, in particular in conditions of crisis, points out that the real amount of money allocated for health is more than insufficient for the population's needs and for the system of health care institutions under current organization. Total incomes of the Fund for Health Insurance for 2009 were 1,864,370,458 EUR. Social contribution funds represent 69% of the amount while budget transfers from the Ministry of Health make 1.5%. Salaries for 104,000 employees had the largest percentage in the expense structure – 48%, costs of health care services (energy generating products, vaccines, medications, supplies) – 32%, prescription drugs – 13%, sickness benefits and travel costs – 2% etc. In 2009, the amount of 27,319,954.73 EUR was allocated from the Ministry of Health's budget for the Preventive Health Protection Program, which is 49% of the total budget of the Ministry. Capital investments are generally financed from the budget or from donations. (WHO, 2010)

Gross domestic product is the most important macroeconomic aggregate and indicator of economic development and macroeconomic stability as well. It is the measure of total economic activity of all resident institutional units, whereby both production of material goods and providing all kinds of services are taken into account. The GDP per capita was € 3,857 (\$ 5,277) in 2007, while in 2008 it attained € 4,445 (\$ 6,498). The following year, 2009, as a result of the world crisis, the majority of economic sectors experienced a considerable fall of activities and the overall economic growth rate was negative (-3.5%). The GDP growth rate in Serbia in 2010 was modest: 1.0%, whilst in 2011, the commenced growth continued, the rate being 1.6%. This growth was based primarily on the growth of industrial and agricultural production, building industry, transport and telecommunications, from the point of view of production and on the growth of investments, from the point of view of expenditures. Almost three fourths of GDP were generated by the so-called tradable sectors. The total GDP was estimated to € 31.143 billion. The GDP per capita was estimated to be € 4,290 (\$ 5,964) in 2011.

In 2011 the average net wage in Serbia was RSD 37,976, which is higher than in the previous year,

indexed in EUR. The effective growth rate of net wage in 2011 was 0.2%. (IPH, 2012)

1.1 Purpose of the paper

This paper was written to point out critical points in the health system of Serbia, problematic parts requiring analysis. It also compares it with differently organized health systems and finds new models of functioning through a necessary reform the health system in Serbia.

1.2 Methodology of work

This paper was written based on the experience gathered in direct professional contact both with beneficiaries of health care services and health care system staff and results gathered by a concrete research.

Statistical methods and modeling methods were used in the research since it deals with a social phenomenon, activities and conditions in the health care system.

Additionally, **deductive method** was also used, as well as analysis of particular forms of the subject of this paper. Further, in the conclusion phase on the phenomenon, **induction and synthesis method** was applied, and in order to gain conclusions on essential characteristics of particular manifest forms, **methods of concretization and abstraction** were used.

For a relevant comparison of health care systems and certain elements of health systems in other countries, **comparative method** was used.

2 HEALTH INFRASTRUCTURE (NUMBER AND EQUIPMENT OF HOSPITALS)

The national health system is organized on three levels. The term "health system" denotes activities which include health sector and a set of other sectors (economic and social) which altogether participate in providing health care to the population. (Tasić, 2002)

Primary health care is provided by 161 primary health care institutions and health infirmaries. Secondary and tertiary health care is available in 42 general hospitals, 15 specialized clinics, 23 independent institutions and clinics, 5 health centers and clinics, 4 clinical centers and 59 other health institutions. In 2011, the health care service of the Republic of Serbia employed 113,384 persons. 27,059 employees were with

university education. Of those, 21,030 (77.7%) are doctors, 2,227 (8.2%) dentists, 2130 (7.9%) pharmacists and 1672 (6.2%) are other professionals.

Of all the doctors, in the Republic of Serbia 5,669 are non-specialist doctors (27%), of whom 3,387 are medical doctors (16.1%) and 2282 are in specialist training (10.9%). The total number of specialists is 15,361 (73%).

The structure of employed doctors by sex is the following: 35.8% are male and 64.2% are female doctors. Of the total number of 2,227 stomatologists, 54.9% are specialists.

Health care institutions employ a total of 2130 pharmacists, of whom 340 (16%) are specialists.

In 2011, there was a total of 8268 health workers and associates with college education in health care institutions, of whom 4391 (53.1%) nurses-medical technicians. 49,930 health workers and associates have secondary education, of whom 35,490 (71.1%) are nurses-medical technicians.

Health care institutions employed a total of 27,676 non-medical staff, of whom 9465 (34.2%) administrative staff and 18,211 (65.8%) of technical staff. (IPH, 2012)

Private health sector is developed but not incorporated in the national health system.

Health insurance (preconditions and costs) –
An employee is entitled to health insurance based on temporary or permanent employment; also, retired persons are entitled to health insurance based on the contributions paid during working life. The employer is obliged to pay contributions to the RFHI and a health insurance booklet with extended validity will be issued to the insured person.

Unemployed persons and other categories – the first step is possession of an employment booklet with employment record; the second step is registration at the National Employment Service according to a person's place of residence. The third step is applying for health insurance at branch offices of the RFHI according to the place of residence.

Health insurance is free of charge for unemployed persons registered at the National Employment Service.

3 HEALTH SYSTEM FUNDING

In general, financing deals with the mobilization, accumulation and allocation of funds to cover the health needs of the people, individually and collectively. (Anon, 2010)

The financing function in health systems is defined by Murray and Frenk (2001) as "the process by which revenues are collected from primary and secondary sources, accumulated in fund pools and allocated to provider activities". Three subfunctions can be distinguished: revenue collection, fund pooling and purchasing. Revenue collection means the mobilization of funds from primary sources (households, firms) and secondary sources (governments, donor agencies). There are a number of mechanisms through which funds can be mobilized, varying by health systems context, e.g. out-of-pocket payments, voluntary insurance rated by income, voluntary insurance rated by risk, compulsory insurance, general taxes, earmarked taxes, donations from NGOs and transfers from donor agencies. In order to share and reduce health risks, funds can be pooled through various forms of health insurance. Purchasing is the allocation of funds to cover the costs (staff, durables and running costs) of specific health service interventions by health providers (institutional or individual) (Murray & Frenk, 2001). The way these subfunctions are organized and executed has an impact on the access to health services. (WHO, 2010)

It is essential to mention that a health care reform will not solve all the problems in the health system overnight because the state has no sufficient money to finance all the rights to health care prescribed by the law. The population of Serbia, guided by a long-lasting system of a health system of 'welfare', oversees the current difficult situation affecting the overall social system, along with the health system within it. Expectations go as far as taking for granted a health care which is absolutely free of charge, assuming that the health care system can and does solve all the health problems of people.

The amount of money generated from incomes (regardless of method of funding), mostly depends on the amount of money that a country is ready to allocate, in terms of other goals

(higher labor price) in order to increase the consumption within the health system. It is worth emphasizing that all sources of financing are, directly or indirectly, generated from citizens: financing from the State Budget, compulsory health insurance, private insurance, direct “out-of-pocket” payment, financing from community funds, donations, loans etc.

Methods of funding vary from Semashko to Bismarck model. The Semashko model, with universal right to health care free of charge and a centralized system was part of a planned economy with domination of specialized institutions. (WHO, 2013) The Bismarck model is a market-oriented model with decentralization (contract model), where primary health care acts as a gatekeeper to the system. (PNHP, 2013) This model features effect-based payments, evidence-based medicine and the capacity (excessive) is visibly reduced.

It is important to understand that all the money directly or indirectly originates from the citizens by:

- Financing from the State Budget
- Compulsory health insurance
- Direct payment ‘out-of-pocket’
- Financing from the community funds
- Donations, loans etc.

Health care in Serbia is mainly financed by mandatory contributions to a social health insurance scheme. The National Health Insurance Fund (HIF) is responsible for financing the system. Mandatory health insurance premiums are levied on salaries of employees (employer and employee pay equal portions) as well as from farmers and the self-employed.

Another source of financing is private expenditures for health, mainly out-of-pocket payments for medicines. Much private expenditure is related to medicines. In Serbia out-of-pocket payments for health (as a proportion of the total health expenditure) are relatively high. (WHO, 2001)

Private funding is more or less completely based on out-of-pocket payments and is supplemented by contributions from a small number of major companies which have (and fund) their own institutions which specialize in the treatment of occupational diseases and also provide primary

care services. More than 90% of public costs are financed through the Republic Health Insurance Fund (RHIF) or inter-departmental transfers via the RHIF. Similar coverage is envisaged for those who are entitled to health care services by military service providers.

Collected funds are centrally pooled by the HIF and redistributed in line with regulation for contracting with health institutions. The HIF is obliged to contract all health care services from delivery institutions that are on an official list.

Contracts with the HIF include a work plan developed by the Regional Institute of Public Health. Payments to providers are primarily based on inputs instead of service delivery. Thus, salaries of health care workers currently contain very few incentives for good performance. There are plans to change this system by contracting facilities and by paying health workers within a capitation-based payment scheme.

According to the ongoing process of decentralization in the PC - Primary care (sector, municipalities increasingly own facilities and equipment, and are therefore responsible for capital investments.

Service provision: The HIF guarantees access to a relatively broad package of health services to the entire population. Scope and content of care are legally defined and include preventive, curative, rehabilitative, inpatient and outpatient specialist care, and PC including prescription drugs, home care and medical transport. Despite the initial strong emphasis on PC, the system evolved such that curative services were largely carried out by specialists and in the hospitals. The frequent referrals by PC providers to the secondary and tertiary levels resulted in a loss of PC skills, to the point where not all physicians feel capable of performing the more comprehensive chosen doctor duties. (IPH, 2011)

A combined model of financing is mostly applied based on which the following is determined: how much money will be collected, who is responsible for financing, and who controls the funds as well as the possibility of cost increase control. Choice of a modality for financing the health system shall depend on several crucial items, such as: *degree of socio-economic development of the country,*

fiscal capacity of the country, efficiency of fund raising, political feasibility.

Health insurance system considerably differs from country to country. In many countries in the world there is no compulsory health insurance and the health care system absorbs resources by general taxing (Scandinavia and United Kingdom). There is also a form of voluntary private health insurance, offering the possibility of health care in private sector (private clinics and private departments, accelerated medical treatment in hospitals).

In the USA, health insurance is based on insurance policy type –market-oriented model. The influence of market orientation is evident also in countries such as Finland or Sweden. In these countries health care is financed from taxes and is tightly related to the public sector, which directs it towards objective and function of public organizations financed from taxes. (Timo & Janne, 2012)

Social insurance in Serbia (compulsory health insurance) is a model of obligatory social insurance, amounts of money paid being linked to the amount of income, whereby it requires contributions both from employers and employees. The service is free of charge for a patient on the spot where it is provided and the health care level is not connected to the contributions paid. Due to its connection to the income and lacking any connection with the benefit provided, it actually represents an alternative way of taxing. It could be replaced with higher taxes on personal incomes as well and on corporation incomes. The insurance does not cover all the costs of health care so that the burden falls onto general taxes. State or local budgets cover the costs of epidemiological control, medical staff and research. Construction and maintenance of facilities and purchase of equipment is the responsibility of the state or local budgets. The Government covers insurance costs for groups not earning any money – retired people, children, persons with disabilities, unemployed persons etc.

A great problem is that employers experiencing financial difficulties do not pay compulsory contributions to health insurance funds and the Government, not always giving adequate

payments for its contributions for those people who do not pay for themselves. Thus, a circle of debt is formed where funds do not make payments to hospitals, general practitioners and other health service providers, who, on the other side, delay payments for the costs to suppliers, such as companies delivering medications and energy generating products.

Social health insurance is a contract between the client, as part of the population, and the insurance, as part of the system, according to which the insurance refunds a particular amount to the insured person, or, most frequently, bears the costs issued by the health care provider, entirely or partly. There are two distinctive features between social and private insurance. Firstly, social insurance is compulsory. Everyone belonging to a certain group must be insured and must pay certain amount of money as contribution. Health contributions are paid according to the possibilities and health care is used according to the needs.

Generally, health care contributions are calculated as percentage of gross salary, regardless of the health risk. When a person (or a number of persons) pay(s) the contribution, they are entitled to certain benefits (health services, sick leave etc.). Secondly, social insurance and benefits are prescribed by law and sublegal acts. Therefore, this gives space to speak about social contract between the covered population and the system.

The insured persons consent to pay certain amount of money with the assurance that this money will be used in a fair and efficient manner in order to finance the health care for all those who are part of this system. Social insurance was not designed to provide universal coverage of population.

Some economists consider social insurance as a program financed out of taxes, mainly because paying contributions is mandatory. On the other hand, there are essential differences between the insurance financed out of contributions from general tax and the social insurance:

Social insurance is not a right of all people, it covers only those entitled to it and meeting the minimum of requirements in terms of contributions.

People understand that they pay premiums for contributions in exchange for the right to benefits. In other words, *benefits are not something provided by the state.*

The paid benefits are reserved for programs and separated from general tax.

Social insurance is expected to maintain its solvency and thus provide a higher degree of transparency and responsibility towards the beneficiaries. The capacity of social insurance, from the point of view of fund raising, depends on the possibility to raise money (contributions) by employers and employees covered by insurance. Experience has shown that social insurance can be efficient in countries with most of the activities in the formal sector and companies with 10 and more employees. (RHIF, Principi finansiranja, 2013) The only obligatory payment made by the insured persons, unless they are exempt from taxes, is the participation fee for those health services for which such payment is obliged to issue an invoice for each paid participation fee, as prescribed by the Republic Health Insurance Fund. If an insured person considers the participation fee, i.e. the health service, to be required for payment for no justifiable reason, he/she is entitled to submit to his/her competent branch office a request for refunding. The total amount of participation fee which an insured person can pay during a calendar year is limited to maximum half of the monthly salary, i.e. pension paid for the last month in the calendar year. For the insured persons receiving no monthly salary or pension, the amount is limited to maximum half of the average net wage in the Republic paid in the last month of the calendar year. Certain categories of citizens are exempt from paying participation fees for health services for which such payment is envisaged (e.g. examinations by the selected physician, medications with fixed fee or RSD 50, laboratory analyses, rehabilitation, percentage share in price of medical devices.) (RHIF, Participacija, 2013)

Financing from the State Budget – The Government receives its income from diverse taxes and fees, such as income tax, company income tax, value-added tax, etc. As for general tax, the total income generated from taxes is

used for financing a range of Government's activities. In such circumstances, the health system must compete for funds with all other programs and sectors financed by the Government, such as education, defense... Health is most often less important in comparison to certain other fields.

Private health insurance – Private health insurance means that people decide on voluntary basis if they will buy health insurance in order to provide safety in case of illness. This insurance can be purchased on individual or group basis. The advantage of private insurance lies in competitiveness, which stimulates efficiency in delivering health services. Private health sector is developed but not incorporated in the national health system.

Private health insurance may be purchased on individual or group basis. There is a growing interest for different forms of private insurance in the world. Primarily, private insurance can mobilize additional funds. Secondly, those who do not pay are not covered by the services, so there is no problem of tax evasion. Also, advocates of private insurance claim that people can choose which insurance plan they will take and a competitive market should respond to this situation with a wide range of products. One of the arguments in favor of private insurance relies on competitiveness aiming at improving efficiency. The pre-requisite is that competitive markets lower down the prices of health care. Additionally, those providers facing the issue of lower income will see this as a stimulation to reorganize their business, in order to reduce the prices. (RHIF, Principi finansiranja, 2013)

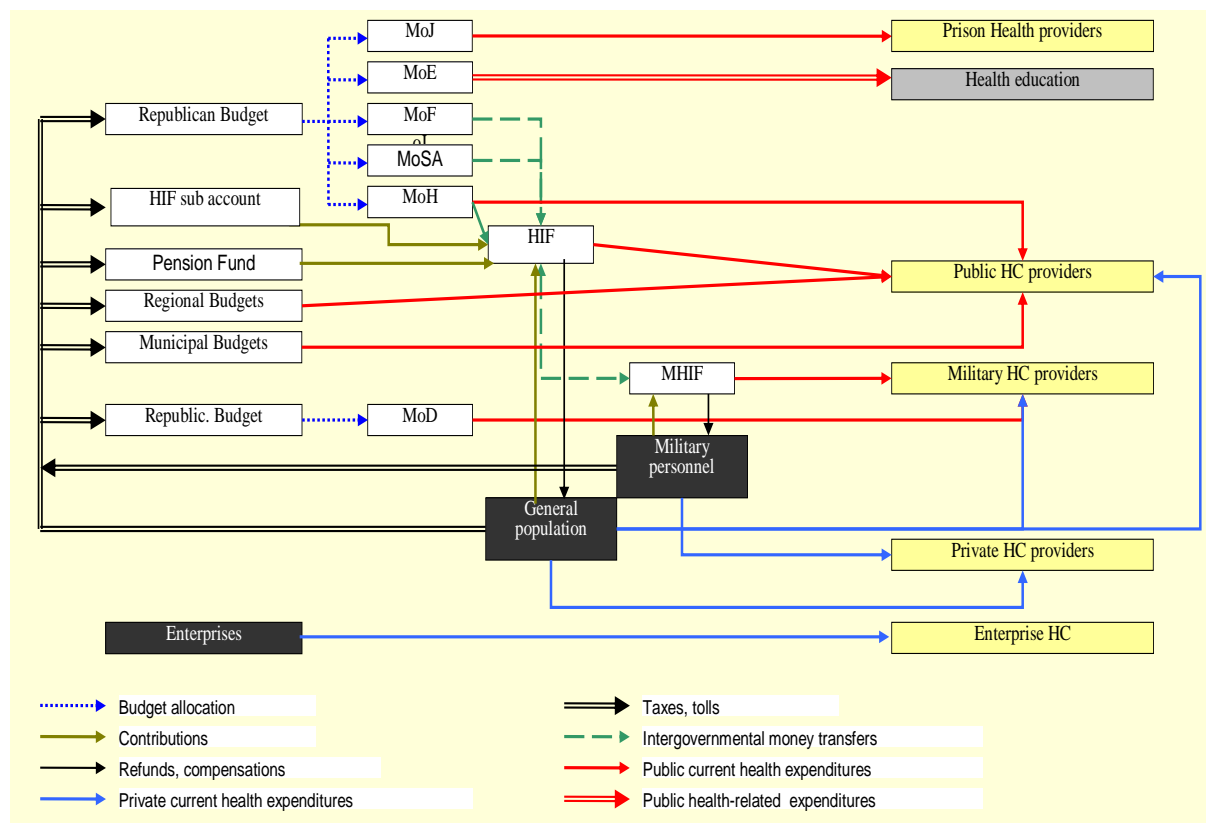
'Out-of-pocket' financing by beneficiaries – This model of funding envisages that individual patients pay directly 'out of their pocket' to the health service provider for the material and services they have received. These costs may not be reimbursed from the insurance. This form of financing considerably reduces unnecessary use of health services but also leads to collecting additional funds. This model is considered to be highly regressive toward persons with poor health and low incomes. This factor, among others, contributes to an increasing inequality in access to health care. (Walters & Suhrcke, 2005)

'Out-of-pocket' financing by beneficiaries –

This model of funding envisages that individual patients pay directly 'out of their pocket' to the health service provider for the material and services they have received. These costs may not be reimbursed from the insurance.

Financing by the local community –

is generally organized through control of the primary health care. Financing by the local community has limited capacities for raising higher amounts of money but is used efficiently in reaching important results in primary health care in poor and undeveloped countries.



Graph 1 Money flow in Serbian health system (Gajić-Stevanović, 2009)

3.1 Common problems of health care system

Problems affecting our health system are to be found in both internal and external environment.

The most common problems are marked with financial issues but there are also numerous weaknesses in terms of organization and functioning of health care:

- non-functionally organized health service,
- management lacking necessary managerial skills and adequate management education,
- inadequate method of health service payment and vague method of financing the health institution,
- needs and priorities in health care are poorly planned;

- large percentage of non-medical staff in health institutions and medical management (without necessary managerial competences),
- poor quality IT system,
- all power in health and health institutions is centralized and belongs to state/political party organizations and institutions,
- health capacities beyond the frameworks of economic possibilities of society, outdated equipment and degradation of buildings dealing with health,
- low salaries for medical staff, which results in low professional satisfaction, lack of motivation for a high quality and efficient work;
- absence of quality assessment of health work;
- pharmaceutical mafia, absence of national drug policy and inadequate control;

- inadequate way of fund allocation with priorities and levels of health care;
- health system management does not correspond to the modern concept of health system organization, particularly in terms of planning;
- absence of timely and correct information serving as support for decision making and budget control, which diminishes transparency of the overall health care system.

Health service providers in primary health care receive standard payments per capita for the patients they register. Problems with such an organization are evident because payments in primary health care do not change based on the quality and quantity of the services provided, which engenders the tendency encouraging referral of patients to hospitals or units for specialized treatment. This destimulates the decision on focusing health care on primary level, i.e. the decision to provide major part of health services in primary health care, which is more efficient and appropriate.

3.2 Health care quality

All countries face challenges to ensure access, equity, safety and participation of patients within the available resources, and to develop skills, technology and evidence-based medicine. In the reform of health systems and providing services, most countries assign crucial role to improvement of health care quality and introduction and standardization of the health quality system.

A very important and necessary component of health care and each activity implemented in health and medicine in general is *quality*, which is impossible to examine separately from two other components: *scope of activities* and *costs*, which are tightly interconnected. A special attention is paid to quality in periods with limited resources for health care and budgetary constraints and quality is specially emphasized in periods of its absence.

High quality medical care is explained most comprehensively by Ovretveit's definition (involving organizational, political and financial interests): High quality health care is "...fully meeting the needs of those who need the service most, at the lowest cost to the organization, within limits and directives set by higher authorities and purchasers". (Ovretveit, 1995)

Therefore, a high quality medical care is not the one achieved at any price, but the one that – by meeting the patients' needs together with professional needs and goals – makes use of the resources in the most efficient way. Finally, health care cannot be of good quality if it fails to meet legal, ethical, contractual and other obligations. This definition is the starting point of the conclusion that high quality health care is a result of opposite requirements of different interest groups.

Quality in health must be analyzed and implemented in three dimensions:

1. *degree of possibility;*
2. *level reached by providing services to beneficiaries;*
3. *success in satisfying certain needs of the system and the beneficiary.*

Key determinants of the dimensions of a high quality health care are: efficiency, accessibility, efficacy, continuity, equity, acceptability, timeliness, appropriateness, availability, safety, effectiveness...

In order to achieve representativeness of the health care system, it is necessary to implement strategies of work quality and safety improvement of both patients and health workers. Reaching this objective implies necessity of elimination or at least reduction of several potential identified irregularities, such as:

- a) unequal delivery of quality in different health services,
- b) time of waiting for certain medical procedures and interventions,
- c) beneficiaries' dissatisfaction regarding health services received,
- d) inefficient use of health technologies,
- e) insufficient skillfulness for using modern information technologies as well as out-of-date information system,
- f) dissatisfaction of health care system staff,
- g) bad quality of health services increases costs in the health system,
- h) impermissible varying score in outcomes related to the health of the treated patients.
- i) It is difficult to reconcile different attitudes, points of view and expectations concerning quality degree between legislation makers in health, funders, health workers, management of medical institutions and patients, as crucial links in the chain. The

interests of the mentioned groups are always mutually opposed.

It is not difficult to conclude why the topic dealing with the quality of health care is complex to such an extent and why introduction of quality system in health has such a slow progress.

4 NECESSITY OF HEALTH SYSTEM REFORM

Basic goals of reform are:

- basic goal of the reform is bringing the health system to the state of optimal functionality in order to attain highest positive effect on health condition of the population within the available resources;
- equity in using and financing the health care system; allocative, technical and administrative efficacy of the health care system;
- financial and institutional sustainability of the system;
- constant improvement of quality of work and services offered to beneficiaries;
- acceptability of the health care system to beneficiaries and health service providers
- increasing health system efficacy through rational and available resources,
- application of modern medical technologies.

Proposals for directions of reform implementation:

- Legal system and state authorities must accept the attitude that health care is the primary system in functioning of a country. A nation of poor health is incapable of reaching economic or any kind of development.
- Property transformation (with assessment of state and social interest in health and the share which will be ceded to the private sector).
- Higher efficacy in implementation and control of compulsory health insurance payments as well as establishment of voluntary and private health insurance. Legal system should incorporate proper measures which would penalize avoiding payments to the Republic Fund for Health Insurance.
- Control of medical drug consumption and establishing drug consumption policies (fight against illegal activities of the pharmaceutical mafia);
- Skillful management of health organization managing structures with adequate

management education). Management according to the modern conception of health system organization, with emphasis on planning; It is considered that top management of a company needs a plan to explain certain values of planning to their directors. (Kotler, 1988)

- Increasing participation of insured persons in the amount of 15–20% (percentage share in price of implants and medical devices...)
- Integration of private practice into financing and into the health care system itself, Policy of public and private sector cooperation is the key for a successful cooperation and credibility; (MMFRSG, 1999)
- Decentralization – the basis of the health care system is to be transferred and primary health care is to be stressed out (municipality level). This will lead to mobilization of additional funds from the local level; Political parties' influence on decisions made in the health care system will decrease; financial risk is shared equally by the municipality and health administrative regions. (Lasley, 1991)
- Emphasis on preventive instead of curative medicine.
- Implement better quality control of health services provided;
- Include private practice in citizens' primary health care based on subcontracting;
- Reorganize hospital capacities (five beds per 1,000 inhabitants);
- Dental health care ought to be restored to 50% of funding by the Fund for Health Insurance based on principles of humanity and an obvious decrease in dental health of the nation;
- Modernize health information system because timely and reliable information are the key of the health care system reform and a basis for decision-making, managing, planning, monitoring and implementation of reforms. The national information system should be an information-communication system serving for managing the health care system and be a synthesis of all information system networks established by health institutions, insurance funds and regional centers.

CONCLUSION

Health is one of the most important assumptions for a prosperous life of population and this must be acknowledged as a priority of health care development strategy. ***The health of the population of Serbia is of key interest for the***

state and the most relevant item of an accelerated political and economic development. Health policy should represent the basis for legal and action programs, with the aim of improving efficacy and quality of health care and integrating health system in the European and global process of health development.

Health problems also affect functioning of family, community and society in general, and the quality in providing health services represents the pillar of safety for all social groups; therefore, upgrading standards and quality criteria in health legislation is indispensable and urgent.

The problems of the current system may cause considerable negative consequences for citizens and their families. Medical science along with costs for treatment and prevention grow faster than the economic basis of society. Thus, it is necessary to introduce adequate forms of health system financing which will provide access to the necessary health care, and simultaneously distribute the financial risk so that the population avoids being financially threatened to a considerable extent in case of illness.

A considerable improvement of health care can be achieved by a planned restructuring of the existing resources.

Finally, one must not forget that health is not financed solely from the Fund for Health

Insurance. From one side, the amount of paid services which are not covered by the Fund in the state health sector was 6,635,989,021.29 RSD in Serbia in 2010 and special programs for increasing this amount must be developed. Also, a very important problem of the health care system in total is the fact that private health institutions are not integrated in the system of primary, secondary and tertiary health care. The turnover of 3033 private health practices (1268 infirmaries and 1765 dental practices) was 12,274,899,205 RSD in 2010, which is only a part of the money, bearing in mind incomplete fiscalization and tax records of the private sector's work.

The contribution to improvement of health system is to be given by health education and preventive measures decreasing risk factors and diseases among the population. It is necessary to make careful, planned and concrete efforts to establish mutual understanding between institution and its public – patients, i.e. environment. (Pavlović, 2003.)

The global economic crisis is a reality but at the same time a potential pretext for continuing a longtime unreasonable and inefficient functioning of health care. Health care must be integrative and health must become a "joint venture" in order to genuinely improve health outcomes and health services. (in (Stambolović, 2008)

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Received for publication: 03.12.2012
Revision received: 05.03.2013
Accepted for publication: 29.03.2013

How to cite this article?

Style – **APA Sixth Edition:**

Gavrilović, A., & Trmčić, S. (2013, 07 15). Health insurance system in Serbia – quality, reform, financial sustainability. (Z. Čekerevac, Ed.) *MEST Journal*, 1(2), 114-126. doi:10.12709/mest.01.01.02.11

Style – **Chicago Fifteenth Edition:**

Gavrilović, Ana, and Snežana Trmčić. "Health insurance system in Serbia – quality, reform, financial sustainability." Edited by Zoran Čekerevac. *MEST Journal* (MESTE) 1, no. 2 (07 2013): 114-126.

Style – **GOST Name Sort:**

Gavrilović Ana and Trmčić Snežana Health insurance system in Serbia – quality, reform, financial sustainability [Journal] = Health insurance system in Serbia // MEST Journal / ed. Čekerevac Zoran. - Belgrade : MESTE, 07 15, 2013. - 2 : Vol. 1. - pp. 114-126. - ISSN 2334-7058 (Online); ISSN 2334-7171.

Style – **Harvard Anglia:**

Gavrilović, A. & Trmčić, S., 2013. Health insurance system in Serbia – quality, reform, financial sustainability. *MEST Journal*, 15 07, 1(2), pp. 114-126.

Style – **ISO 690 Numerical Reference:**

Health insurance system in Serbia – quality, reform, financial sustainability. **Gavrilović, Ana and Trmčić, Snežana**. [ed.] Zoran Čekerevac. 2, Belgrade : MESTE, 07 15, 2013, MEST Journal, Vol. 1, pp. 114-126. ISSN 2334-7058 (Online); ISSN 2334-7171.



JOB ANALYSIS AS A CROSS-SECTION FUNCTION OF HUMAN RESOURCE MANAGEMENT

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© MESTE NGO

JEL Category: **J2, J28, O1, O15**

Abstract

Job analysis is the key function of human resource management, which results from the cross-sectional character of this function, i.e. it has a direct impact on organisational structure formation and subsequent human resources planning in organisations. The essential fact related to job analysis is its need to carry it out before any activity from the sphere of human resource management functions, since its result has a significant impact on all these functions. It is therefore necessary to summarize the information collected from job analysis in the form of job description and job requirements specification, and ensure their practical implementation in the organisation. Questionnaire research we conducted at School of Economics and Management in Public Administration in Bratislava over the last two years was focused on finding out whether and in what extent organizations operating in Slovakia focus on job analysis, as comprehensive focus of organisations on job analysis is substantial.

The research implied that approximately 40 % of the interviewed organisations do not carry out job analyses at all, while relation comparison implies a significant influence between the size of organisation and job analysis execution.

Keywords: job analysis, cross-section function, organisations operating in the Slovak Republic, human resource management

1 INTRODUCTION

Human resources in an organisation represent the whole human potential. It comprises not only

the number and structure of employees but also aspects like education and culture, interpersonal relationships, ability to cooperate, perception of social and ecological factors of the environment, etc. Systematic creation and usage of human potential is a precondition of building and development of strengths and competitive

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advantages of an organisation. That is all possible only on the grounds of systemically framed human resource management orientating employees so that they achieve essential strategic aims and objectives of their organisation (Kachaňáková, 2011).

Working potential of organisations is most significantly influenced by how the department of human resource management, personnel department, personnel professional, respectively employee in charge of human resource management can fulfil two following essential tasks (Kachaňáková, 2011):

- ensuring of a necessary number of employees in requested professional and qualification structures and in dynamic compliance with strategic objectives of the given organisation,
- harmonisation of employee behaviour with strategic objectives of the organisation.

Effective fulfilment of these tasks requires a broad range of various activities denoted as human resource management functions. These essential functions include job analysis, recruitment and selection of employees, distribution of employees, education and development of employees, career management and talent management, evaluation of performance, remuneration of employees, working relationships and working conditions. Our research analysed how and to what intension organisations operating in Slovakia focus on individual functions. This contribution will present results of the research focused on job analysis.

Priority focus within human resource management functions needs to be on job analysis, since within its scope the organisation ensures systematic collection and evaluation of information on job content, conditions of its performance and requirements imposed on people occupying these positions as well updating of all information, and it is also a basis upon ensuring of other human resource management functions (Blíšťáková 2009).

In order to justify comprehensive focus of organisations on job analysis, the questionnaire research we conducted at School of Economics and Management in Public Administration in Bratislava over the last three years was focused

on finding out whether and in what extent organisations operating in Slovakia focus on job analysis.

2 JOB ANALYSIS

Job analysis can generally be characterized as a systematic process of collection, evaluation and summarization of information on individual works and preconditions of their performance. The objective of job analysis is to collect information on tasks, methods, duties, rights and connections to other horizontally and diagonally related positions within organisational structure, as well as to get information on the need and level of physical and psychical dispositions of the employee who will occupy the given position. It is subsequently necessary to evaluate collected information from the viewpoint of present needs and strategy of the organisation and, what many organisations forget about, from the viewpoint of present technologies which can not only significantly facilitate work but also decrease its time demand. Collected information needs to be summarized in the form of job description and specification of requirements on the given employee, and its implementation in performance of the given work thus needs to be ensured.

Job description can be characterized as a written report including, besides essential overview, purpose and objective of the work, individual spheres of activities and responsibilities creating the job content or also social and physical nature of surrounding environment. It is normally expressed by the way of behaviour, i.e. what a person does, what abilities they use in performance of their work, judgements they make and factors they take into consideration in doing so. Organisational conditions and the way of work performance of successful employees have a major impact on the job description. The job description should provide reasons for activity and behaviour of the given employee, i.e. it has to be clear on its basis what the given person at the given position does and by what means. It also determines the amount of working time necessary to fulfil individual activities, duties the employee has to fulfil sporadically, or whether a risk occurs upon the work performance. On the grounds of elaborated job description, a type of person suitable for the given work is determined,

i.e. specification of requirements on the employee is elaborated (Kachaňáková, 2011).

Specification of requirements on the employee, respectively on the jobholder can be characterized as a written report formulating the profile of competent person (professional, social and emotional competence) regarding performance of the given work. It is a profile of human abilities and qualities, including e.g. education, specific abilities, practical experience (general, professional), physical and psychical preconditions of the work performance, dispositions, interests, etc. Upon its elaboration, it is necessary to be aware of the fact that it is supposed to specify requirements on an employee, not to describe an ideal employee. For this reason, it is appropriate to formulate such requirements as basic and preferred (Kravčáková, 2011).

Justification of job analysis mainly results from the fact that job analysis is a cross-section function of human resource management, which means that it has a direct impact on organisational structure creation and subsequent human resources planning in the given organisation. Recruitment and selection criteria are defined on its basis. It has a significant impact on subsequent adaptation of employees, particularly to working and social conditions, when, on its basis, employees are familiarised with all future co-workers, not only the immediate ones. Job analysis has a not negligible role in education of employees, particularly in case of occurrence of new technology able to facilitate work. Last but not least, job analysis has a significant role in creation of safe working conditions and ergonomic environment, since the set of conditions affecting a person in the working process has an impact on their performance.

Ensuring of ergonomic environment in work performance has a positive effect not only on health of employees and their physical and psychical condition but, as the research proved, it also has a significant impact on economic results of the organisation (Stachová, 2012). As the given implies, in case job analysis is not elaborated, respectively it is elaborated inconsistently or during a long time, serious problems occur in all spheres of human resource management.

3 CHARACTERISTICS OF THE RESEARCH

The research was conducted over 2011 and 2012, always from February to May. The questionnaire was distributed to organisations with 50 and more employees. Our basic presumption upon specifying the target group given by the size of organisation from the viewpoint of minimum number of employees was that organisations with less than 50 employees do not have standardized and formally established approaches towards human resource management, and thus neither towards its individual functions. Collection, sorting and subsequent summarization of obtained information from the research were conducted from June to September each year. Mathematical and statistical methods were used upon processing of information, their analysis and comparison, and qualitative methods were subsequently used upon their identification and evaluation.

340 respondents participated in the 1st and 2nd phase of the research. Summary size structure of the interviewed organisations is provided in Table 1, implying that organisations with the number of employees from 50 to 300 were most represented in the research each year.

Table 1. Size structure of the analysed organisations

Number of employees in the organisation	50 - 300	301 – 1,000	1,001 – 5,000	over 5,000
Share of organisations in % – 2011	70	21	7	2
Share of organisations in % – 2012	72	20	6	2

Source: own research

4 ANALYSIS OF PRESENT STATE

With regard to the fact that job analysis mainly provides information for creation and description

of working positions, for specification of demands imposed on employees and for creation of their competence profile, our research focused on

finding out whether organisations carry out job analysis, for which positions and in what time intervals, respectively for what reasons. As entity carrying out job analysis can significantly influence its result, we were also finding out who in organisations is in charge of carrying out of the analysis and what method of information

collection is used for this purpose. In finding out of the focus of organisations on job analysis, we were also analysing awareness of managing employees in human resource management, who should participate in it but mainly initiate it. The results implied that organisations focus on this function only in approximately 60 % (Table 2).

Table 2. Carrying out of job analysis

Carrying out of job analysis	Share of organisations in %	
	2011	2012
Yes, we carry it out	59	62
No, we do not carry it out	41	38

Source: own research

In organisations carrying out job analyses, we subsequently focused on finding out the comprehensiveness of its carrying out, and thus we were finding out for which positions job

analysis is conducted. Organisations were least concerned with managerial positions analyses (Table 3).

Table 3. Carrying out of job analysis for individual working positions

Working positions for which organisations carry out job analyses	Share of organisations in %	
	2011	2012
Management	60	56
Specialists	66	69
Administrative employees	63	70
Manual workers	61	67

Source: own research

In case organisations carry out job analysis, we were interested in what the impulse for that is, respectively in what intervals it is conducted. Organisations most often marked creation of new

working positions as the impulse, and organisations carrying out the analysis regularly most often marked the yearly interval (Table 4).

Table 4. Reason for job analysis carrying out, respectively its frequency

Reason for job analysis carrying out, respectively its frequency	Share of organisations in %	
	2011	2012
Upon creation of working positions	55	53
Upon change of job content	45	45
Upon personnel audit	24	24
Regularly: - yearly	14	15
- half - yearly	8	4
Other	4	2

Source: own research

Source: own research

In finding out which employee, respectively department carries out job analysis in the organisation, we found out that a direct superior

of the employee whose job is being analysed is most often involved in this activity (Table 5).

Table 5. Performers of job analysis

Who carries out job analysis	Share of organisations in %	
	2011	2012
Direct superior	78	84
Employee occupying the given position	12	15
External agency	10	9
Department of human resource management / personnel department	10	8

Source: own research

Method of carrying out an analysis has a significant impact on any analysis from the viewpoint of time as well as the viewpoint of quality level. Therefore, our research also

focused on finding out what methods were used in job analysis. Organisations most often use the interview method (Table 6).

Table 6. Usage of individual methods in job analysis

Methods used in job analysis	Share of organisations in %	
	2011	2012
Interview	62	60
Questionnaire	43	27
Observation	28	49
Other	6	4

Source: own research

5 EVALUATION OF PRESENT STATE

Job analysis is the key function of human resource management, which results from so called cross-sectional character of this function. The most essential fact in relation to job analysis is its need to carry it out before any activity from the sphere of human resource management functions, since its result has a significant impact on all these activities. The answers of organisations to question whether they deal with job analysis implied that approximately 40 % of them do not carry out job analysis at all. Based on the aforementioned results, we can state that these organisations do not realise its importance. We were subsequently finding out whether the size of organisation has an impact on carrying out of job analysis. For this purpose, we compared this relationship in the form of a table

(Table 7) and we found out that the size of organisation has an impact on carrying out of job analysis. We suppose that this relationship is caused by several factors. One of them is the fact that bigger organisations have their mother organisation abroad and take over its habits, processes and norms, also regarding job analysis. We consider the fact that smaller companies, where the owner is also a personnel professional, do not realise this need as another significant factor. As these owners stated in the research: "I know the content of work my employees perform well and in detail, since I was performing it myself at the time of establishment of the organisation. Job analysis would only be additional work for me." In our opinion, these two factors have the most significant impact on carrying out of job analysis.

Table 7. Relationship comparison of the approach of organisations to carrying out of job analysis and the size of organisation

Share of organisations in %		Organisations carrying out job analysis	
		2011	2012
Size of organisation	50 – 300	53	58
	301 – 1,000	68	66
	1,001 – 5,000	87	90
	over 5,000	100	100

Source: own research

Within the research, we also focused on finding out whether organisations carry out job analysis comprehensively, i.e. for all employees or only for some categories (management, specialists, administrative employees, manual workers). The answers implied (Table 3) that only 35 % of the interviewed organisations declaring carrying out of job analysis carried it out comprehensively for all employee categories in 2011, and this number even decreased to 28 % in 2012. Most of organisations carry out the analysis only for several working positions.

Regarding organisations carrying out job analysis, we were interested in the reason, respectively frequency of carrying out of job analysis. Organisations mostly (more than 50%) carry out the analysis upon creating of a working position. This answer is the most frequent, however organisations could mark more than one of the options, which resulted in the fact that some organisations are waiting for the audit, or a term when they normally carry out the analysis and do not carry it out flexibly when needed.

As far as creation of a new working position is concerned, it is necessary to define working tasks, rights and duties so that the given employee can carry them out effectively. It is therefore necessary to define competencies (education, abilities and attitude). Creation of a new working position is at the same time a process of creation of specific conditions for it, while respecting needs, rights and duties of other employees in organisational structure of the organisation. Creating of a working position needs to be dealt with almost constantly, in cases of changes in objectives of the organisation; change, respectively modification of used technologies; innovation implementation; change of offer on the labour market; as well as in many other cases (Koubek, 2006). The aforementioned implies the importance of job analysis in relation to the given situation, which is a reason why we consider passivity of organisations in such case as significantly negative also because of its relation to other human resource management functions, particularly the subsequent recruitment and selection of employees for newly-created working positions. 55 % in 2011 and 53 % in 2012 out of the whole analysed sample of 340

organisations answered positively, which represents only less than 25 % in both years.

Similar negative result appears in the second option, where 45 % of respondents stated in both years that they carry out the analysis in case of a change of job content, while it is necessary to point out mainly its interconnection with other function of human resource management – education of employees, since only on the grounds of change of job content defined in advance is it possible to educate employees systematically and prepare them for the change. Practical experience points out the fact that the best results in the sphere of education are achieved when education of employees is conducted continuously. It results from the fact that if human resource management is supposed to fulfil demanding tasks related to formation of adequate working potential effectively and in accordance with goals of the organisation, a functional system of employee education, responding to constant changes of environment and leading towards enhancement of their performance has to be its component.

In finding out the frequency of job analysis, we arrived at a conclusion that approximately 10 % of organisations carry out the analysis regularly with the minimum annual frequency and at the same time they deal with it upon creation of new working positions as well as upon change of job content. Such behaviour of organisations is considered as desired.

After finding out the reason and frequency of carrying out of job analysis in organisations, we were further finding out who carries it out. Organisations could mark more than one option (Table 5). Low figures (12 % - 15 %) in the option that the analysis is conducted by the employee occupying the given position were surprising in answers of organisations. It is due to the fact that the employee working at the analysed position is considered as the most significant source of information in job analysis. Such employee is most commonly able to point out insufficiencies, reveal problems as well as possibilities of streamlining of the job. This discrepancy was clarified after analysing of answers to question what methods organisations use in the analysis (Table 6). Organisations stated interview as the most preferred analysis method. Interconnection

of this fact with the most frequent answer in identification of the analysis performer implies that 60 % to 62 % of organisations carry out job analysis through an interview between the employee working at the analysed position with their direct superior. The given fact clarifies the low figure stating that only 12 % - 15 % of organisations use the employee occupying the given position to carry out the analysis (within the questionnaire completion, employees of the department of human resource management marked only a direct subordinate as the performer, not the employee at the analysed position at the same time. However, as long as superiors carry out job analysis through an interview it is obvious that the employee at the analysed position participates in it). This finding is considered as positive, since when the analysis is conducted by the superior with the subordinate, loss of information which the employee at the given position has does not occur, on the contrary, room occurs in such case for an immediate discussion between participants in the interview and searching for possibilities

how to solve the found problem, respectively possibilities how to streamline performance at the given position. It is appropriate when such interview is combined with the questionnaire method. In such case, it is desired that employee working at the analysed position as well as their direct superior complete a questionnaire focused on job analysis in advance, while they both have a room to consider individual answers or mark facts necessary to discuss during the interview. In case it takes place regularly once, respectively twice a year, it is suitable to connect this interview with motivation, respectively carrier interview, since information found in job analysis can immediately be used in creation of education and carrier growth plans, or be interconnected with evaluation and subsequent remuneration of employees. Combined comparison of organisations using interview and questionnaire methods implied that these methods are concurrently used by only 30 – 33 organisations, representing less than 10 % of interviewed organisations (Table 8).

Table 8. Comparison of organisations carrying out the interview job analysis with organisations carrying out the questionnaire analysis

Numbers of organisations in:		Questionnaire job analysis	
		no	yes
Interview job analysis 2011	no	52	24
	yes	93	33
Interview job analysis 2012	no	57	28
	yes	96	30

Source: own research

6 CONCLUSIONS

Job analysis can generally be characterized as a systematic process of collection, evaluation and summarization of information on individual works and preconditions of their performance. Collected information subsequently needs to be summarized in the form of job description and specification of requirements on the given employee, and its implementation in performance of the given work needs to be ensured. Justification and importance of job analysis mainly results from the fact that job analysis is the cross-section function of human resource management, which means that it has a direct impact on organisational structure creation and subsequent human resources planning in the organisation.

The research we conducted at School of Economics and Management in Public Administration in Bratislava in organisations operating in Slovakia implied that approximately 40 % of organisations do not carry out job analysis at all, as well as the fact that only slightly more than 40 % of interviewed organisations declaring that they carry out job analysis carry it out comprehensively for all working positions. The research implied that most of organisations only carry out the analysis for several working positions.

Practical justification of the given research part is predominantly seen in analysing of the behaviour of organisations operating in Slovakia towards directing and advancing in the sphere of human resource management. On the grounds of our

presentation of collected results, managements of organisations have an opportunity to compare their own present states within the given sphere to states declared by interviewed organisations, and on its basis, to consider possibilities of its enhancement. We also consider as necessary to

continue in this research so that individual approaches can be enhanced, modified, streamlined and developed on the grounds of new information obtained from the interviewed organisations.

Acknowledgements

The article is related to Grant Agencies of VSEMs project, project No. 3/13, The Key Functions of Human resource management in the Context of Development of Organisations Operating in the Slovak Republic and Czech Republic.

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Received for publication: 02.04.2013

Revision received: 03.05.2013

Accepted for publication: 12.05.2013

How to cite this article?

Style – **APA Sixth Edition:**

Stachova, K. (2013, 07 15). Job analysis as a cross-section function of human resource management. (Z. Čekerevac, Ed.) *MEST Journal*, 1(2), 127-135. doi:10.12709/mest.01.01.02.12

Style – **Chicago Fifteenth Edition:**

Stachova, Katarína. "Job analysis as a cross-section function of human resource management."
Edited by Zoran Čekerevac. *MEST Journal* (MESTE) 1, no. 2 (07 2013): 127-135.

Style – **GOST Name Sort:**

Stachova Katarína Job analysis as a cross-section function of human resource management
[Journal] = Key function of human resources management // MEST Journal / ed. Čekerevac Zoran. -
Belgrade : MESTE, 07 15, 2013. - 2 : Vol. 1. - pp. 127-135. - ISSN 2334-7058 (Online); ISSN 2334-
7171.

Style – **Harvard Anglia:**

Stachova, K., 2013. Job analysis as a cross-section function of human resource management. *MEST Journal*, 15 07, 1(2), pp. 127-135.

Style – **ISO 690 Numerical Reference:**

Job analysis as a cross-section function of human resource management. **Stachova, Katarína.** [ed.]
Zoran Čekerevac. 2, Belgrade : MESTE, 07 15, 2013, MEST Journal, Vol. 1, pp. 127-135. ISSN 2334-
7058 (Online); ISSN 2334-7171.



SECURITY PLAN AS A PART OF CRITICAL INFRASTRUCTURE PROTECTION

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JEL category: **K3, K32**

Abstract

Critical infrastructure protection and its elements is a strategic task not only of the European Union, but also of the Slovak Republic. For this reasons the Slovak government has adopted the Act No. 45/2011 on Critical Infrastructure in 2011. This legislation implemented Council Directive 2008/114/EC on the identification and designation of European critical infrastructures and the assessment of the need to improve their protection. The Act regulates the subject matter of the Act, definitions, organizations and competence of state administration in the area of critical infrastructure, sectorial and cross-cutting criteria, procedure for determining of the critical infrastructure elements, the obligations of the owner/operator, security plan, contact point between the owner/operator of the critical infrastructure element and the relevant Member State authority, the contain of the sensitive critical infrastructure protection related information, removal the element from the sector, administrative offence. The Act provides a stage of the process determining of European critical infrastructure elements and development of a security plan, sectors and sub-sectors of critical infrastructure and the List of transposed legally binding acts of the European Union in four annexes. The Act enacts to owner/operator of critical infrastructure elements the obligation to process security plan and to proceed according to the security plan in case of disruption or destruction of the element. According to the Act on critical infrastructure the content of security plan especially contains description of the possible ways of element threat, disruption or destruction. It describes vulnerability of element and security measures for its security. The methodology of processing of the security plan is the aim of this article.

Keywords:

critical infrastructure, protection, elements, security plan, integrated security system, burglar resistance

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1 INTRODUCTION

The Slovak Republic has the high developed economy. For this reason it is dependent on technology, power energy etc. Sources of the mentioned dependences are objects having a great importance for all our society. They required above-standard protection. The inclusion in elements of critical infrastructure provides this type of protection. The elements of critical infrastructure are subjected on convention security threat too, as other building used for business or services. There are mainly natural disasters, accidents, catastrophes and crime actions of singles or groups. For example the disruption of key objects of critical infrastructure from the reason of terrorist attack, natural or technological disasters would cause of a human life loss, moral damages (objects with national symbolical value) or a disorganisation of society.

2 DEVELOPMENT OF THE CRITICAL INFRASTRUCTURE PROTECTION IN DOCUMENTS OF THE SLOVAK REPUBLIC

The situation on the world has required of a protection and defence valuation of critical infrastructure on the national level. It has shown the building of isolation state formation or components is not a suitable solution. It is necessary to build an integration system. In this system individual components are capable cooperate and involve operationally in a solution of crisis situations, they are capable connect their effort according to the extent and the nature of the threat. The subject with the critical infrastructure protection and defence are considered in the Slovak Republic:

- international partners, international organisations,
- the government, public administration,
- regions,
- state economical subjects,
- private economic subjects.

After adopting of documentations of the European Union (for example The Council Directive 2008/114/ES) the Slovak Republic has realised fundamental measures for the its critical infrastructure protection. For the codification of the problem of critical infrastructure no existing in laws, its protection was only considered with the

connection of the infrastructure defence according to the Act No. 319/2002 Coll. on the Defence of the Slovak Republic. (Zákon č. 319/2002 Z. z. o obrane Slovenskej republiky v znení neskorších predpisov, 2002) However the defence infrastructure does not involve all subjects creating critical infrastructure according this law. It only involves subjects serving for security of the state in war period.

For this reasons the Slovak government has adopted “*The Conception of Slovak Critical Infrastructure protection and defence*” (next called “Conception”) in 2006. Goal has been:

- a) to definite the terminology,
- b) to sagest sectors of national infrastructure, which are used for the definition of critical infrastructure sectors,
- c) to specify criteria for determining of critical infrastructure elements,
- d) to specify principles and instruments for critical infrastructure protection and defence elements,
- e) to sagest the solution for the protection of classified information (a list of classified information for private sector,
- f) to outline of a security research direction,
- g) to formulate conclusions and recommendations.

The conception was primarily focused on area of security and defence of critical infrastructure against terrorism as the most important factor. It accepted the need of a security comprehensive understanding of natural disaster, industrial accidents, physical wear of objects (networks), the lack of strategic reserves and raw materials, the using of weapons of mass destruction, a spread of contagious disease.

It defined the critical infrastructure as those part of nation infrastructure (chosen organisations and institutions, objects, facilities, services and systems) which destroying or putting to out of service caused by risk factor, will cause a threat or disruption of political or economical state running, or life threat and inhabitants health.

It considered as a sector of critical infrastructure the activity part which a failure (reversible or irreversible) caused by terrorist attack, will cause a threat or disruption from some of area of state security, for example:

- political or economical running of state or public administration,
 - state defence,
 - life, health or property of inhabitants,
 - transports, informative and communicative system,
- h) environment. (Konceptcia, 2006)

The critical infrastructure protection and defence in the conception was focused mainly on these the most probable attack:

- *direct action* – the direct armed physic attack carried out by armed terrorist group,
- *bomb attack* – the attack, which is generally carried out by an individual or a small group using non conventional explosives (not airplane bombarding),
- *CBRN attack* – the attack using chemical, biological, bacteriological or radioactive materials,
- *cybernetic attack* – the attack focused on the destroying of information and dates, hacking of computer system and programs generally by internet,
- *informative operations* – attacks, which wants to get or to abuse information, influence of processes founded on information (for example influence of informative system in such way that it seems to be all right, but it works with manipulateable dates) and its own information and system to protect. (Konceptcia, 2006)

Basic instruments of critical infrastructure protection and defence became:

- prevention of hazards (using mechanical barrier, public notification system, regime measures, controls, inspections, simulations, exercises and professional practices),
- risk reduction of threat of existence and stability of element (using technical facilities for discourage or detection, activities of security forces),
- avert and eliminate the consequences of the risks of attack (ensuring of alternative operations, replacement of damaged element of critical infrastructure etc.). (Jasenovec & Dvořák, 2012)

The Slovak Republic has adopted “*The National Programme for the critical infrastructure protection and defence of Slovak republic*” (next called “National Programme”) in 2007 for the creating of condition to guarantee of the security of critical infrastructure.

The goal of the elaboration of National Programme was an evaluation of actual condition and an identification of the most important assets, and the determination of program steps for an improvement of it protection and defence. (Národný program pre ochranu a obranu kritickej infraštruktúry v Slovenskej republike, 2007)

It has been identified and fully-fledged 9 major sectors and 14 subsectors of critical infrastructure:

- Water,
- Food,
- Health,
- Energy (subsectors: electro energy, gas production, oil production, mining and metallurgy industry),
- Information and Telecommunication,
- Transport (subsectors: road transport, rail transport, air transport and waterways transport),
- Public Policy and Homeland Security (subsectors: Security emergency services – civil emergency services, Fire department and Emergency medical services, Police, Military),
- Industry (chemical, pharmaceutical industry),
- Finance (subsectors: payments systems, accounting system and settlements of transaction by financial instruments). (Národný program pre ochranu a obranu kritickej infraštruktúry v Slovenskej republike, 2007)

The ensuring of selected assets critical infrastructure protection had been necessary to lay out in a law.

The Act No. 45/2011 Coll. on Critical Infrastructure has been adopted by National Council of the Slovak republic on February 8th 2011. It had laid out the organisation and the scope of the public administration departments for critical infrastructure, the procedure of critical infrastructure asset selections and the

responsibility for disruption. (Zákon č. 45/2011 Z. z. o kritickej infraštruktúre, 2011)

The essential goal of the critical infrastructure law is the improvement of the present critical infrastructure protection against the increasing threat of terrorist attack.

Considering these facts the law had:

- a) To determine the structure and scope of the public administration departments for critical infrastructure.
- b) To adjust the process of critical infrastructure asset selections. They will be important buildings for the functioning of a society and economy. Some of them, they have cross-border importance (for example the disruption or destruction of them would have significant cross-border impact, outside of the territory of the Slovak Republic.
- c) To define tasks of natural and legal persons, which as the operators of critical infrastructure assets, they will be responsible for that.
- d) To determine the sectors of critical infrastructure in which individual elements will be selected.
- e) To solve the administrative-legal relationship in violation of this law. (Šimák, 2012)

In this law there is declared the one part of the critical infrastructure system is the defence infrastructure too. It serves for the ensuring of state defence adjusted in the accordance with the special law.

State administrative bodies for Critical infrastructure are the Government of Slovak Republic, The Ministry of the Interior or other state administrative bodies which will have responsible for some critical infrastructure sector. They will classify critical infrastructure elements in the critical infrastructure sectors.

The Government of Slovak Republic is required to approve:

- Conception documents of a critical infrastructure development.
- Criteria to including and excluding of critical infrastructure elements.
- Central register of critical infrastructure elements.

- Fulfilling of contact point tasks for the protection of the European critical elements in relation with Member States of European Union and European committee. (Zákon č. 45/2011 Z. z. o kritickej infraštruktúre, 2011)

Competent Ministries are empowered to carry out the public administration, controls including.

The cross-cutting criteria are provided by the law based on supposed:

- 1) Number of threatened person (the number of death and injured person).
- 2) Economic influence consisting of:
 - a) Economic loss.
 - b) Deterioration in the quality of goods.
 - c) Deterioration in the quality of provided services in the public interest.
 - d) Negative influence on environment.
- 3) Influence on inhabitants, it is the disruption of the deterioration in the quality of inhabitants according to:
 - a) Seriousness of failure of goods supply and its recovery time.
 - b) Seriousness of failure of provided services in the public interest supply and its recovery time.
 - c) Availability of goods supply substitutes.
 - d) Availability of provided services in the public interest supply substitutes.

The law provides for 8 sectors of critical infrastructure (Table 1.).

A condition for an including of critical infrastructure element is a fact of satisfying almost one sectorial criterion and one cross-cutting criterion.

The operator is obligatory to protect against disruption and destruction his or her critical infrastructure element. For fulfilling this task he or she is obligatory:

- a) to implement the security plan, this must be reviewed and updated regularly,
- b) to inform his or her employees with the content,
- c) to practise at least one or more time a model situation of disruption and destruction element threat according to security plan,
- d) to follow the security plan in the moment of disruption and destruction element threat.

Table 1. Sectors and sub-sectors of the Critical infrastructure

Sector	Sub-sector
Transport	- Road transport - Air transport - Waterways transport - Rail transport
Electro-communicatios	- Sattelite communication - Networks and services of fixed-line and mobile electronic communications
Energy	- Mining - Electroenergy - Gas production - Oil and oil products production
Information and communication technologies	- Informational systems and networks - Internet
Post	Providing of post services, post payments and procurement activities
Industry	- Pharmaceutical industry - Metallurgical industry - Chemical industry
Water and atmosphere	- Meteorological service - Water buildings - Drinking water supply
Public health	

(Zákon č. 45/2011 Z. z. o kritickej infraštruktúre, 2011)

According to law the operator may request financial contribution for fulfilling tasks executing security measures for elements protection. (Šimák, 2012)

3 SECURITY PLAN

A Security Plan is a legal instrument for the protection of critic infrastructure element. The operator has to possess and update regularly a security plan for each critical infrastructure element. The low establishes the content of the security plan to the ensuring of critical infrastructure protection, in particularly:

- Description of various way of threats of disruption and destruction, vulnerable spots of element and security measures for it protection.
- Security measures for it protection, mainly mechanical barrier, technical security measures, security elements of informational system, physical security, organizational measures, control measures and their mutual combination. (Vidriková & Boc, 2013)

The range of security measures for protection of critical infrastructure element is determined according to assessment of disruption and destruction of element.

Elaboration process of the security plan

The security plan is elaborated in this way:

1. Definition of essential element installation.
2. Evaluation of risks, threat of disruption or destruction individual element installation, its vulnerable spot, expected consequences of element function by the disruption or destruction and continuity of element activity.
3. Selection of main security measures for element protection. These are divided in:
 - e) Permanent security measures as investments and the processes for element protection.
 - f) Extraordinary security measures, which are used according to the intensity of the threat of element disruption or destruction.
4. Definition of principal security measures for element protection.
5. The security plan is consulted by members which cooperation is expected by the element protection. (Zákon č. 45/2011 Z. z. o kritickej infraštruktúre, 2011)

The minimal method for the creating of the security plan of the critical elements protection is written in the appendix n.2 of the Act No. 45/2011Coll. under the letter C, the Act states the accepting of permanent security steps for the securing of element security. Using:

1. mechanical barriers,
2. technical security measures,
3. security elements of information systems,
4. organizational measures laying stress upon the knowing and warning, and the crisis management,
5. professional preparation for person securing the element protection,
6. control arrangements for the keeping of permanent security steps. (Zákon č. 45/2011 Z. z. o kritickej infraštruktúre, 2011)

The necessary condition for the elaboration of the security plan is executing of:

- a) Analyse of security environment (external environment, internal environment).
- b) Identification and evaluation of security risks, resulting from the security environment analyse.

3.1 Analyse of external security environment of critical infrastructure element

Analyse has to identify source of hazards and threats, which in macro or micro environment are located.

External security environment:

1. *Geographic characteristic* - unequivocal location:
 - Earth coordinates of critical infrastructure elements.
 - Connection and location among other critical infrastructure elements (mountain region, by floods threat region etc.).
2. *Hydro meteorological characteristic* - a factor influencing work environment if the work is performed outdoor. The important factors are: climatic condition, precipitations, floods, snow disasters, possibilities of fire.
3. *Demographic statistics* - consists from the population data (a sex, an average age, a nationality, marital status, migration). It can be supplemented by economic development indicators (employment, unemployment, a salary, an industry, a transport etc.).
4. *Characteristics of antisocial actions* are consisting of social statistic data of criminality and offences. This data are obtained from Registered-statistic system leaded by Police, or from the Statistical Office of the Slovak Republic. For the security analysis it is necessary to evaluate the data about the individual types of crime acts and about the number of attacks. These are:
 - a) General criminality.
 - b) Economical criminality.
 - c) Other criminality. (Vidriková, 2012)

3.2 Analyse of external security environment of critical infrastructure element

The goal of analyse of internal security environment of critical infrastructure element is the achievement of the basic summary of the

condition and the security structure. The structure of the security is determined by the ensuring of the protected interest:

- physical security,
- technical security measures, in particular:
 - Mechanical barriers.
 - Alarm system:
 - a) Electrical security system.
 - b) Camera system.
 - c) Access control system.
- organisational measures.

Some of the listed elements can absent. In the order to achieve the objective it is not important if the security of protected interest is secured by all listed elements. It is fundamental to acquaint, which elements for the security of protected interest are used, for which purpose and which quality. (Vidriková & Boc, 2013)

3.3 Identification and assessment of security risks

The goal of the security risks identification is to determine:

- all important types and sources of security risks and treats in the relation with the protected critical infrastructure element or with the interest and the security environment,
- assumption of the origination of an every security risk.

The main task of the security risks identification is the elaboration of a *risks register*. There are listened all supposed risks in the register, which has or can have a connection with the protection of the evaluated protected interest (or critical infrastructure element).

To every considered security risk it is necessary to assign the importance, corresponding to its significance. The process of the importance determining we mark as the evaluation of security risks. The evaluation of security risk is an expression of its size. It depends on the probability of the occurrence of unwanted phenomenon.

The result of the identification and consecutive risks evaluation is a *prioritizing*. So it is a determination of the most probable danger, which the protected element is exposed, if the conditions for the source of society non desirable event (fire, directed against society activity, lightning, natural disasters, exceptional events

etc.) To every risk will be received steps for its acceptance. (Šimák, 2012)

4 RESISTANCES OF THE CRITICAL INFRASTRUCTURE ELEMENTS

The effective bringing down of security risks is possible to achieve with the complex of steps having the preventive and effects on the risks. The substance of it is the using of technical security measures, persons for the physical security and organized – executive steps in the same time. These elements represent *integrated security system*.

The structure of integrated security system is consists from the mutual relationships between the subsystem created by technical security measures, subsystem of organizational measures and subsystem of physical security. Individual subsystems of the protection interlock, they depend on each other and they are synergic (figure 1).

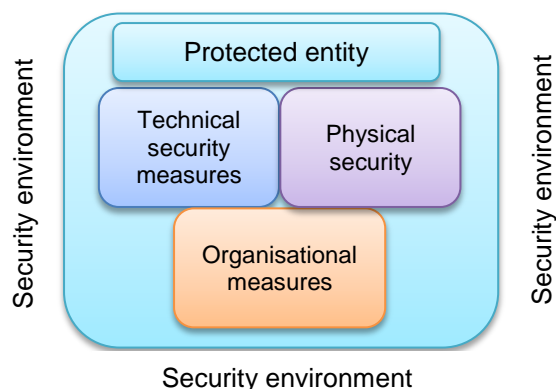


Fig. 1 Integrated security system (authors)

The quality of security by technical security measures can be determined by *burglar resistance*.

The burglar resistance is the time Δt to need for break through burglar resistant construction products. It is the time which the disturber needs for the breaking through the mechanical barriers. It is determined as

$$\Delta t = t_2 - t_1 \quad [\text{min}] \quad (1)$$

where

Δt – Time needed for breaking the mechanical barriers,

t_1 – Time of the starting of breaking the mechanical barriers,

t_2 – Time of breaking the mechanical barriers.

Using mechanical barrier equipments it is determined the minimal value of burglar resistance of infillings and the secure storages units.

The calculation of infilling burglar resistance

It applies for the infillings (windows, doors, grilles etc.) that minimal time needed for breaking through is set by their resistance classes. If we multiply this time two or three time, obtain the real time for breaking through of specific infilling. Minimal time of breaking through of infillings is set in technical standard (e.g. the STN EN 1627 which set the requirements and classification of characteristics “Burglar resistance” Pedestrian doorsets, windows, curtain walling, grilles and shutters. (STN EN 1627, 2011)

Table 2. Technical standards setting the mechanical barriers

Mechanical barriers	Number of standards
Secure storage units, safes, strongroom doors and strongrooms	STN EN 1143-1
Windows, doors, shutters	STN P EN 1627
Cylinders for locks	STN EN 1303
Security glazing	ČSN EN 356

(authors according to technical standards)

In these standards there are defined e. g. coefficients of used tools, burglar resistance for specific burglar resistant construction products. For the calculation there are used resistance classes, the real time of burglar resistance (T_{vi}). As the example we can introduce the requirements for resistance classes of manual burglar attempts – infillings according to STN EN 1627. There are six resistance classes defined, their values are in table number 3.

Table 3. Resistance classes of infillings
(STN EN 1627, 2011)

Resistance classes	Tools	Resistance time (min.)	Total time of the test (min.)
1	Without manual burglar attempts		
2	A	3	1 5
3	B	5	2 0
4	C	1 0	3 0
5	D	1 5	4 0
6	E	2 0	5 0

The calculation of infilling burglar resistance of secure storage units

By the secure storage units, the real time T_{vl} is determined by the calculation, it is necessary to characterise specific type of secure storage units, its classification in safety class (number of the resistance classes is determined by 0 ÷ XIII (STN EN 1143-1, 2012), the classification of used tools, using of coefficient burglar resistance and coefficient of testing time.

$$T_{vl} = [(V_R - BV) : C_1] \times (2\psi 3) \quad (2)$$

[v min; RU; RU/min]

where

- T_{vl} – real time of burglar resistance,
- V_R – value of burglar resistance of secure storage units defined in resistance units (RU),
- BV – basic valuation of tools, numerical values is defined in resistance units for each tool,
- C_1 – coefficient of burglary resistant for secure storage unit,
- $(2\psi 3)$ – coefficient of raising of test time,
- RU – resistance units, burglary resistance, it sets as 1 minute long using of tool with the tool coefficient equal to one, with the basic valuation equal to 0.

According the real burglary time we can determine the *risk of object treatment*. (so-called *coefficient of risk*) – R .

$$R = \frac{T_{vl}}{t_z} > 1 \quad (3)$$

where

- R – risk of object treatment,
- T_{vl} – real time of burglary resistance,
- t_z – time of intervention unit.

From the equation (3) is evident that the higher the coefficient R is, the real treatment of protected element will be smaller. Time of the intervention is individual and depends on various factors (e.g. the distance to the protected object, physical fitness, weather condition i.e.). From the statistics of the private security services and police forces is evident that the intervention time ranges from 2 to 20 minutes.

We will determine the calculation of infilling burglar of secure storage units for a strong-box with security class V, which according the tables has a burglar resistance $V_R = 220$ RU. Breaking throw the secure storage units will be realised using two different tools in the same time. There are used electrical angle grinder of the power 750 W with diamond disk which has according the table $BV_1 = 35$ RU and oxygen cutting torch $BV_2 = 28$ RU. With the coefficient of burglary resistance of secure storage unit $C_1 = 10$ RU/min (resistance units/min) is the resistance time:

$$T_{vl} = [(V_R - BV) : C_1] \times (2\psi 3)$$

$$T_{vl} = [(220 - (35 + 28)) : 10] \times 2,75 = 5,7 \text{ min}$$

Calculated time is obtained with the test of burglary resistance (in lab). The real time for breaking through of specific infilling is three time higher, that is 17,1 min. The time of intervention unit is $t_z = 5$ min, according to (3) we can mathematically determine a *coefficient of the object risk*:

$$R = \frac{T_{vl}}{t_z} = 17,1 / 5 = 3,42$$

We can determine the real time of burglar resistance and the coefficient of risk for the other mechanical burglar resistant construction products. In real conditions of the mechanical burglar resistant construction products design

there is necessary to do it comply with the follow methods:

- to set all incoming routes into consideration that the offender can used to achieve that protected interest (from the perimeter, starting and ending internal environment),
- to calculate maximal time (T_{vlmax}) and minimal time (T_{vlmin}) of burglar resistance of used mechanical barriers for the security of protected interest,
- to set t_{zmax} (maximal time of intervention unit),
- to set total coefficient of object risks R according to supposed moving of offender, the road which had the minimal real time of burglar resistance and the maximal time of intervention unit

$$R = \frac{T_{vlmin}}{t_{zmax}}$$

- if $R \leq 1$ it is necessary to change the design of mechanical barrier (with the higher coefficient of resistance C_1).

For the determination of rout setting (the shorter according to T_{vlmin}) is good to use Dijkstra's algorithm for the shortest path. (Mach, 2012)

For the design of technical security measures we must consider the fact that every mechanical barrier is possible to breaking through. Every mechanical barrier varied according to breaking time T_{vb} energy input a technical equipments B_v ,

according to these is set security resistance grade of objects R . By these parameters is defined the passive security, which is influenced by mechanical resistance and the quality of used materials. A similar procedure can also be applied to other types of protection, using mechanical barriers.

5 CONCLUSIONS AND DISCUSSION OF RESULTS

Authors of the paper refer to possibilities of the methods for the determination of obtainable or designed condition of burglary resistance of used components for interest entity protection. We assume that the determination of existing and designed condition of burglary resistance it would be a starting-point for judgement and design of mechanical barriers of perimeter, shell, spatial, or subject protection of critical infrastructure element (or its part). Object of the paper is the increment of quality for critical infrastructure element protection. Authors recommend examining the burglary resistance in design of technical measures. We suppose the increment of investment in these elements protection with previously mentioned step. The aim of this article was initiate a discussion about the importance of burglar resistance as a one of the key measurable values of resistance of protected assets.

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Received for publication: 11.04.2013

Revision received: 20.06.2013

Accepted for publication: 29.06.2013

How to cite this article?

Style – APA Sixth Edition:

Boc, K., Vidrikova, D., & Figuli, L. (2013, 07 15). Security plan as a part of critical infrastructure protection. (Z. Čekerevac, Ed.) *MEST Journal*, 1(2), 136-145. doi:10.12709/mest.01.01.02.13

Style – Chicago Fifteenth Edition:

Boc, Kamil, Dagmar Vidrikova, and Lucia Figuli. " Security plan as a part of critical infrastructure protection." Edited by Zoran Čekerevac. *MEST Journal* (MESTE) 1, no. 2 (07 2013): 136-145.

Style – GOST Name Sort:

Boc Kamil, Vidrikova Dagmar and Figuli Lucia Security plan as a part of critical infrastructure protection [Journal] = Security plan and critical infrastructure // MEST Journal / ed. Čekerevac Zoran. - Belgrade : MESTE, 07 15, 2013. - 2 : Vol. 1. - pp. 136-145. - ISSN 2334-7058 (Online); ISSN 2334-7171.

Style – Harvard Anglia:

Boc, K., Vidrikova, D. & Figuli, L., 2013. Security plan as a part of critical infrastructure protection. *MEST Journal*, 15 07, 1(2), pp. 136-145.

Style – ISO 690 Numerical Reference:

Security plan as a part of critical infrastructure protection. **Boc, Kamil, Vidrikova, Dagmar and Figuli, Lucia**. [ed.] Zoran Čekerevac. 2, Belgrade : MESTE, 07 15, 2013, MEST Journal, Vol. 1, pp. 136-145. ISSN 2334-7058 (Online); ISSN 2334-7171.



MULTIPLE INTELLIGENCE THEORY AND ITS APPLICATION IN THE FOREIGN LANGUAGE CLASSROOM

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JEL category: **I2, I20, I21, I29**

Abstract

Howard Gardner's theory of multiple intelligence which appeared in the 1980's, was a revolutionary work that changed traditional perspective on human mind and learning. In the beginning, the theory was approached with doubt, since it opposed the belief that intelligence was an inherited, single entity, measured by IQ tests. According to this theory, there are eight types of intelligence which are to a certain extent present in each individual, and can be developed with practice. This means that there are different types of learners who are, depending on their type of intelligence, able to adopt certain materials more efficiently than others. The imperative of the theory was the change of curriculum and its adjustment to all eight types of learners. In accordance with this fact, many educators, who recognized the differences in learning among their students, applied this theory in order to enhance the quality of teaching. The purpose of this paper is to show the importance of this theory in ESL, as well as many different possibilities of applying it in a classroom. The attention will also be paid to some activities suitable for eight types of intelligence which can be used in the FL classroom. The topics that this paper is exploring could be interesting not only to English teachers, but to all educators.

Keywords: Howard Gardner, Multiple intelligence theory, education, FL classroom

1 INTRODUCTION

Howard Gardner's theory of multiple intelligence presents a significant contribution to cognitive science and a popular approach which points out that all students are unique. In accordance with this theory, many methods of understanding and facing the differences between people have been developed lately. (Richards & Rodgers, 2001) The theory about eight different types of intelligence has been developed as a response to

the understanding that individual cognitive differences should be recognized and approaches to them developed in a classroom. With the help of his coworkers, Gardner has identified the following types of intelligence: logical-mathematical intelligence, verbal intelligence, musical intelligence, bodily-kinesthetic intelligence, interpersonal intelligence, intrapersonal intelligence, spatial intelligence and naturalistic intelligence. (Gardner, 1985) Gardner understood these different types of intelligence as tools which each individual has in order to save new information and make them more meaningful and more approachable. Each of

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these types of intelligence has equal significance. None of them is considered better or more important than the other. The only question imposed is: to what extent an individual possesses each of them, and what are their chances to develop some of them? Every one of us has all of these types of intelligence, but some of them are more developed or more prominent than the others. The features common for all eight types of intelligence are: autonomy, changeability and susceptibility to development. (Armstrong, 1994)

Gardner's theory has originated as a reaction to traditionalistic and rigid view on education since, traditionally, teachers are trained and used to teaching all the students in the same way, without minding their mutual differences. One of the most important improvements in education in the last decades has come from extensive research conducted in the field of learning styles. The conclusion was that all students have different profiles of learning. Joy Reid points out some of the dimensions that have been explored in the field of language study and those are: multiple intelligence, perceptive styles of learning, analytical and global learning and reflective and impulsive styles of learning. (Reid, 1998) The paper will explore some of the advantages of raising awareness among students concerning their styles of learning, with a remark that motivation and interest in the process of learning increases students' responsibility for their own process of learning, creating close connection between them in a classroom. Efficient foreign language learning is the biggest challenge for each teacher. The paper will also try to define and explain Gardner's theory on eight types of intelligence and make an overview of its application in the EL classroom. The starting point for this analysis lies in the fact that students learn English in many different ways, which should be considered in the process of lesson planning. In accordance with this, there is a tendency to adjust the education process to each individual and thus make it more interesting, easier and of better quality.

2 WHAT IS INTELLIGENCE AND HOW IS IT MANIFESTED?

Gardner's theory of multiple intelligence that appeared in 1983 supported the idea of many different autonomous kinds of intelligence, which resulted in different ways of understanding the human mind. This theory grew apart from the attitude that intelligence should be measured with standard tests. Furthermore, Gardner started

following how people around the globe developed the skills they had, which were very important for their lives. As he points out, it is very significant for us to recognize and support all kinds of human intelligence as well as all combinations of two or more types of intelligence. People differ a lot, primarily because they possess different combinations of intelligences. If we realize this, our chances to face numerous problems that happen in the world will increase. (Gardner, 1985)

There is probably no aspect of the modern psychology less understood than intelligence. The notion of intelligence has a powerful effect on a person's social status, educational abilities and a choice of career. Although a lot of attention is dedicated to intelligence, most of us are not able to define it. There is not only one, objective criterion by which intelligence is determined in public or psychology. In most cases, intelligence is accepted and defined as a result on traditional test of intelligence, created by Alfred Binet. Binet's discovery became familiar as an "intelligence test" and had success all over the world. It is true that IQ tests predict results at school with certain accuracy, but when it comes to prediction of professional results and success after the formal education, they are quite unreliable. (Gardner, 1985) Public has generally accepted the theory that intelligence is measured with intelligence tests.

Confusion concerning intelligence also exists in psychology. Part of the confusion concerning psychological definition of intelligence results from the fact that there are several psychological perspectives on intelligence. For example, in modern psychology, the term intelligence can be defined in two ways. The first way is the use of intelligence for practical purposes, such as writing books or designing a new computer. The second way is the use of intelligence in mental processes which would cause intelligent acts. On one hand, there is an assumption that each intelligent act is connected to unique mental process. On the other hand, it seems that each separate mental ability is the foundation of all intelligent achievements. (Kail, 1985) According to one opinion, Mozart was born with the talent for writing music. According to second opinion, Mozart's music is the result of time and place in which he lived and created. In other words, Mozart was at the right place in the right time to develop unique mental processes needed for writing music. This would mean that anyone could have written what he wrote. (Arnold &

Fonseca) None of the two opinions is acceptable in practice.

Gardner's theory suggests alternative definition of intelligence which is based on different approaches and points of view on human mind. Gardner primarily suggests pluralistic perspective on mind, recognizing many different aspects of knowledge, considering the fact that people have cognitive power and cognitive styles. (Gardner, 1985) This view on intelligence shows that the final number of mental processes leads to a bunch of intelligent human activities and actions. This kind of intelligence is most noticeable in the process of solving problems. According to Gardner, the problem solving skills permit an individual to take a certain path in order to achieve certain goal. Creation of a final product is crucial to gaining knowledge and its transfer, or expressing certain points of view or feelings. Solving problem situations vary substantially from writing a story to making a pair of shoes. The products also vary from scientific theories, musical compositions to successful political campaigns. (Gardner, 1985)

A question about connection between learning styles and multiple intelligence is very important in education, since even today, many teachers (in this case only English teachers will be referred to) are still unsure about it. They are very often prone to equating multiple intelligence with learning styles. For example, perceptive styles of learning, such as visual and kinesthetic are very often confused with spatial and bodily-kinesthetic intelligence. In order to separate these two concepts, an example about two persons who want to develop their musical intelligence can be used. One of them can go to a store and buy a disk of their favorite music, take it home and listen to it, trying to play what they heard. The second person buys the music, reads and studies it, after which he tries to play the music. Both persons are working on development of their musical intelligence in two different ways. Learning style of the first person is auditory, while the learning style of the second person is visual. (Schumann, 1997) Therefore, learning styles are different approaches or ways of learning. Learning style can vary from task to task.

Multiple intelligence theory was formed in the light of biological origin. Before he came up with the list of eight types of intelligence, Gardner consulted several different sources. He wanted to make a clear distinction between intelligence on one, and talent or skill on the other hand. In his endeavor to do so, he was deliberately provocative in word choice. He identified several

basic criteria that each type of intelligence has to meet in order to be designated as intelligence.

The first criterion is a study of brain damage. When people suffer brain damage as a result of the injury, one type of intelligence is often damaged. For example, if a person suffers damage to the left frontal lobe, their linguistic intelligence can be severely damaged. That person may have problems with reading, writing, and speaking, but will still have the ability to do mathematical calculations, to dance and to sing. What Gardner in fact suggests is the existence of eight autonomous brain systems. According to his assumption, if one loses the ability in one area while others are spared, it means that the existence of only one type of intelligence is impossible.

The second criterion are exceptional individuals. We often notice a high level of intelligence that some people possess. Some of these individuals can calculate huge numbers in their heads, or they can play a piece of music after hearing it only once. Scientists are people who demonstrate an incredible ability in one type of intelligence, while they are usually very weak in others.

The history of development is the third criterion. Each intelligence has its own developmental history, its gradual growth during childhood, its peak period in the course of a few years, and finally, the period of gradual decline. Musical intelligence, for example, reaches its peak early and linguistic intelligence can reach that peak very late.

Next criterion is evolutionary history. Each intelligence has its roots in the evolutionary history of man. For example, archaeological testimonies support the existence of early musical instruments. On the other hand, the drawings in the Lascaux caves are good examples of spatial intelligence.

Psychometric findings is the next criterion. Support to the theory of multiple intelligences can be found in many of the standard tests. Weschsler's intelligence scale for children involves sub-tests, which are based on a number of different intelligences.

Psychological tasks is the sixth criterion. We can look into a psychological study and make sure that the separate types of intelligence exist. For example, individuals can improve a specific skill, such as solving arithmetic problems, but they do not need to know how to read. Similarly, individuals may remember words or names very

well, which does not have to be a case with faces. The tasks seem independent from one another.

The last criterion is a system of symbols. All types of intelligence are subjected to symbolization. There are, for example, different kinds of languages such as spoken and written language, graphical languages, computer languages, ideographic languages. Only those types of intelligence that met most or all of the above mentioned criteria, were labeled as intelligence by Gardner. (Gardner, 1985)

3 EIGHT TYPES OF INTELLIGENCE

Having established the main criteria of intelligence, Howard Gardner has identified seven types of intelligence, and since then has added eighth. This list is by no means final. As Gardner points out, the importance is not in the number of intelligence types but in the plurality of intellect. (Gardner, 1985) Each person has a raw biological potential. All people are different when it comes to different profiles of intelligence that they are born with, and the ways in which these profiles develop. Weinreich claims that many people are surprised by certain categories of intelligence that Gardner has chosen, because they never think of them as associated with intelligence. These categories are thought about more like the talents or abilities. (Weinreich, pp. 47-65)

Bodily-kinesthetic intelligence is the ability to use the body for expressing ideas and feelings and solving problems. This includes physical skills such as coordination, flexibility, speed and balance. A teacher of a foreign language can help their students develop their bodily-kinesthetic intelligence by providing opportunities for physical challenges during the class.

Intrapersonal intelligence is the ability of a person to understand themselves, their own strengths, weaknesses, moods, desires and intentions. This includes skills such as understanding how the individual is similar to or different from others. At the same time, this kind of intelligence implies a good control of emotions, and the knowledge of what to do and how to act when an individual is angry or sad. A teacher can help students develop their intrapersonal intelligence by allowing them to express their preferences and to find their own learning styles.

Interpersonal intelligence is the ability to understand the feelings, moods, motivations and intentions of others. This includes skills such as

pragmatic responses to other people and gathering of people on joint projects. A teacher of English as a foreign language can help students develop this ability through activities which involve them in problem solving situations.

Linguistic intelligence is the art of using words in both written and oral communication. This intelligence includes skills such as memorization of information, persuasion of others to assist in carrying out a task. People with linguistic intelligence are highly skilled speakers, good in debates and discussions, who learn by memorizing words. They are very good at learning foreign languages and the language structure. A teacher can help students develop linguistic intelligence by providing a variety of materials for reading, listening and writing, and creating more opportunities for interaction among students.

Logical-mathematical intelligence involves good skills in handling numbers as well as good logical reasoning. Occupations of engineers, doctors, scientists, mathematicians and economists usually apply to this type of intelligence. A teacher can help students develop logical-mathematical intelligence by bringing instruments for experiments, by letting them play with numbers or use simple machines and computer programs. Students should be encouraged to think about cause-effect relationships.

Musical intelligence is the ability to feel the rhythm, pitch and melody. People with prominent musical intelligence show greater sensitivity to sound, rhythm and music. They have good hearing, they sing well, play instruments and compose. At the same time, they have well-developed language skills, and commonly use sounds as the means of memorizing. This type of intelligence applies to occupations of a musician, composer, singer, orator, or writer. A teacher encourages the students by letting them make their own rhymes and music during the class.

Spatial-visual intelligence means a good orientation in space, good observation of lines, shapes and colors. For visually intelligent students in the English language class will be best if a teacher provides materials such as maps, where students have to locate an object that has some connection to the unit. People with advanced visual-spatial intelligence are very good architects.

Naturalistic intelligence refers to nature, connection with it as well as understanding of it. People with strong naturalistic intelligence easily recognize and classify plants, animals and

minerals. Best occupations for this type of intelligence are biologists, agronomists, farmers and gardeners. Students can develop naturalistic intelligence by focusing their attention on the world outside the classroom.

The theory of multiple intelligences at first was developed as a report on human skills and knowledge that could have been subjected to empirical tests. When Gardner wrote his crucial piece of work *Frames of Mind* in 1985, he believed that his work will be interesting only to people who were dealing with developmental psychology. However, developmental psychologists were not very interested in *Frames of Mind*, they ignored it. It is interesting that this work attracted teachers. It seems that the theory of multiple intelligence indicated many educational issues worth considering. In 1994, Thomas Armstrong (Armstrong, 1994) synthesized these ideas about multiple intelligence into four key points that educationists believed the most interesting in this theory:

1. Each person has all eight types of intelligence. For each person eight types of intelligence work together in a unique way. Some people have majority, most or all of the eight types of intelligence very well developed. All of these types of intelligence are very well developed within a small group of people. However, some people have very low level of the eight types of intelligence, while majority of us are in the middle, with few well developed intelligences, and few very bad developed intelligences.
2. Intelligence can be developed. Gardner claims that all human beings have the capacity to develop all eight types of intelligence to a high level, with proper encouragement, instruction and practice.
3. Intelligences work together in complex ways. None of them has an independent existence. Intelligences are always interacting with each other, and they can evolve. For example, to make lunch, one has to read the recipe (which requires linguistic intelligence), then to double or triple the ingredients depending on the number of people who eat (mathematical intelligence), and to prepare a menu which satisfies the guests (interpersonal intelligence).
4. There are many different ways of being intelligent. There is no standard number of features that one needs to possess in order to be considered intelligent. For example, there are people who are not very good at dancing but are very skilled in construction. Both of these

activities require possession of bodily-kinesthetic intelligence.

With his theory of multiple intelligence, Howard Gardner has not made a curriculum or a model to be used in schools. Educators and teachers have taken this theory with the agreement to apply it to the curriculum in the USA. (Hoerr, 1997) All that has been stated so far is very helpful for the English language teaching profession, because the theory of multiple intelligence helps in understanding the diversity that is found in students, and finding a way to encourage these differences in a classroom. Language teachers are responsible for creating a curriculum which provides them with a material to point out the differences during the lessons. Much of what we include in the programs of foreign languages is based on tradition. English teachers are expected to know the methods of teaching and testing, theory, grammar, etc. Therefore, many curricula include courses in all these areas. Educational program, on the other hand, is expected to include teachers in the latest and most creative pedagogical courses of foreign languages. When new concepts and ideas are adopted, teachers will have the task of integrating them into existing programs.

4 APPLICATION OF THE THEORY OF MULTIPLE INTELLIGENCE IN THE CLASSROOM

The biggest challenge for any foreign language teacher is the use of Gardner's theory during the class. This is never an easy task, mainly because of the often large number of students in a classroom, and their difference in age. A good teacher should constantly be aware of this and adjust their lesson plans to the needs of each individual. However, in practice, as always, it is very easy to state and accept something, but it is much more difficult to implement it. The theory of multiple intelligence offers the teachers of English as a foreign language a way to try and find their techniques of teaching, constantly keeping in mind the differences among people. (Gutloff, 1996) There are lots of ways to follow this theory in order to present the teachers with the ways of applying it in the classroom.

As it was already pointed out, Gardner believes that all people possess many types of intelligence, but differ in their combinations and amounts. The lack of any kind of intelligence can be improved during the training and practice. The theory of multiple intelligence does not dictate the teachers what and how to teach, but it provides a

good basis for creating a curriculum which would help them to become better at teaching. (Campbell, 1997) Education becomes successful only when the differences between students are understood, analyzed and the materials adjusted to them. Therefore, a successful teacher, the one who actively responds to these differences, will help all students to discover and develop their talents and advantages. By accessing the theory of multiple intelligence, language is not seen as limited to the linguistic perspective, but it encompasses all aspects of communication. (Richards & Rodgers, 2001) In accordance with this, foreign language teachers should not regard themselves only as language teachers. They should also take the role of a facilitator, observer, creator of curriculum and instruction, researcher, analyst, and conductor. Several criteria for good organization of English lessons will be briefly mentioned here, along with suggestions of activities for each individual intelligence.

Well planned lessons would have to meet some of the criteria such as diversity, flexibility and connectivity. (Richards & Rodgers, 2001) Since each individual has a unique cognitive profile, there is no single formula for teaching. In fact, there may be as many models of lectures as there are teachers. Language teachers can use Gardner's theory as an introduction to the lesson, or it can be used throughout the class. It can be used every day or occasionally. The courses can be planned either alone or in cooperation with other colleagues. No matter which option you choose, the methods should be adapted to the teaching unit. One of the goals of multiple intelligence pedagogy is that foreign language students become creators of their own experience in learning, in order to be goal-oriented and therefore more fulfilled and happier. (Richards & Rodgers, 2001)

Intelligence is best manifested in the process of solving problems in everyday situations. In the process of language learning, good activities in a class are applicable to the context of real life, because we need to emulate. Therefore, students often gladly take the roles and identify with the situations. Two activities that will be described here can be applied during a foreign language class. One of these activities is related to the group activity based on the eight types of intelligence. The teacher organizes eight "cells," or centers for learning in the classroom, which correspond to the different types of intelligence. Students are divided into eight groups and each group spends certain time on each station. After a while, students swap their groups in a specific

order for a limited period of time. In this way, all students face their weaknesses and strengths concerning language learning. They exploit their intelligence in a creative way, because at the same time they observe and work with their peers who have experienced various degrees of intelligence from them. In this way students learn from each other. (Arnold & Fonseca, p. 24)

Another way to activate and engage students in foreign language learning are projects. Students' projects can be based on a curriculum or a teaching unit, with the aim of promoting independent learning. During the projects, students learn to ask questions relevant to the research, to identify the different sources, to initiate and implement activities. By working on these projects, students engage several types of intelligence. What is probably even more important, by initiating and developing projects of their choice, students acquire great autonomy of learning skills. (Brown, 1994)

One of the tendencies in teaching English as a foreign language is to help students gain knowledge and information. Therefore, selection of appropriate materials and creative use of them should be the main demand of foreign language teachers. Multiple intelligence theory is a challenge for teachers of foreign languages, not just in terms of lesson plans and activities, but also in terms of searching teaching materials. As far as materials and teaching aids are concerned, they can be different, such as books, articles, pictures, DVDs, VCRs or cassettes. Here are some suggestions of the activities for different types of intelligence that could be applied in a foreign language classroom. The proposals were put forward by Jane Arnold and Carmen Fonseca. (Arnold & Fonseca, p. 25)

Students with logical-mathematical intelligence like problem solving situations, challenges and working on projects. The most suitable questions for this group of students are: "How would you solve this?, What would a scientist say about this problem?" The best activities for students with this kind of intelligence are displaying records, statistical analysis, devising puzzles, comparing and contextualizing material and classifying ideas. (Gardner, 1985) Students will enjoy the scientific work. Famous people with this type of intelligence as Plato, Bill Gates, Michael Pupin.

As far as spatial intelligence is concerned, students should have access to activities that will allow them to take pictures, arrange, build mazes, design, build and draw. The best questions for them are: "How would you present

it with a chart!" English lesson activities that will stir up the students with strong spatial intelligence are making mind maps, or rearranging things in the room. Famous person with this type of intelligence is Steven Spielberg.

A student with developed musical and rhythmical intelligence is sensitive to sounds and has the ability of responding to them. Memory games, or converting an essays or a film into a musical are the best activities for this type of students. In presentations they use music to highlight the meanings. To develop this type of intelligence the most suitable activities are so-called jazz songs (jazz chants) which use jazz rhythms to illustrate the natural stress and intonation in the English language conversation. They are an innovative and exciting way of developing speaking and listening skills, using everyday language structures. Famous people with this type of intelligence were Mozart and Leonardo Da Vinci.

For students of a prominent bodily-kinesthetic intelligence will be a real pleasure to participate in sports, picnics, or role-playing. Since they enjoy moving, the use of body is very important for them in the learning process. These students should be allowed to change the seating position, rearrange things in the classroom, simulate, or use pantomime. The question that they should be asked is: "How do you react to that?". Famous people with this type of intelligence are Meryl Streep and Martina Navratilova.

Students with strong linguistic intelligence like to have interesting graphics, posters and slogans, in their surroundings. They are sensitive to language and sarcasm, especially to contempt. They should be allowed to read dialogues, use assertions, teach other students and be involved in a discussion. A good question for them is: "What is your opinion?" They express in the best way through the presentation of their own experiences, group interaction, writing and speech-making, creative writing, and creating crossword puzzles on a particular topic. They like to talk, to argue, tell jokes, reflect, and a teacher is to exploit this fact. Famous people with strong linguistic intelligence are Socrates and Matija Bečković.

Since interpersonal intelligence means the capacity of negotiating, making teams, listening to others and influencing on them, students with this kind of intelligence should be given the opportunity to participate in as many classes of group work and cooperative learning. These students do not like to work independently and the best question for them would be: "What have

we learned today?" In contrast to those with strong interpersonal intelligence, students with intrapersonal intelligence are characterized with self-reliance and individual work. Too many questions, activities and forcing to join the group, will create resistance in these students towards the subject. These students are usually very rare in the classroom and they like to enjoy their solitude, according to which they should be allowed to work independently. A teacher could engage these children to explore independently, specifying the topics that are not covered by the lesson. In this case, intrapersonal students would share their findings or results with the rest of the group in some of the next classes. The most appropriate questions to boost their desire to study are: "What would you do if you were the author of today's lesson? How would you feel if ...?" Famous people with strong intrapersonal intelligence who liked to enjoy their solitude and individuality were Ivo Andrić and Socrates.

In order to help children develop naturalistic intelligence, English language teachers should take their students to nature where they could collect leaves, rocks, bugs, flowers, etc. These activities are very interesting to both younger and older students. A teacher can ask students to recognize different types of plants in the schoolyard, to learn different names of animals, or collect pictures of animals in order to acquire new vocabulary.

5 CONCLUSION

In lessons of English as a foreign language it is possible to motivate students by activating multitude ways of their thinking and using the tasks related to different types of intelligence. Providing a variety of language activities that stimulate different types of intelligence numbered by Gardner, enables the engagement of memory "routs" which are necessary in a long-term learning. A teacher does not have to provide the activities for all types of intelligence in one language lesson, but he should find an approach that will incorporate each of these types of intelligence in the process of his teaching. Students' belief in successful participation in a task can be affected with the way teachers present material to them. The theory of multiple intelligence is a useful tool in planning activities for a foreign language class, challenging for both students and teachers. The moment students become aware of their abilities, their confidence and self-esteem will increase, and lead them to success in a foreign language learning.

Application of Gardner's theory has been debated in the process of education. An ideal learning should imply the development and growth of an individual in all aspects. For this reason, in today's language learning, it is not enough to insist only on linguistic competence and communication. Gardner explains the social benefits of applying this theory saying that if we can mobilize the full range of human ability, not only will people feel better and more competent, but also more engaged and more able to connect with the rest of the world for the sake of the collective good. (Gardner, 1985) These Gardner's words have deep meaning, because

our society requires multilingual citizens who are able to set and achieve goals, who know how to find the information needed for learning outside the classroom, who know how to collaborate, who are generally efficient, and can solve multiple problems in every possible context. The application of multiple intelligence theory in the classroom can help to achieve these goals. As this paper points out, we should realize the importance of different approaches to individuals in foreign languages teaching, in order to achieve high-quality, long-lasting and better foreign language acquisition.

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Received for publication: 02.05.2013
Revision received: 03.06.2013
Accepted for publication: 29.06.2013

How to cite this article?

Style – **APA Sixth Edition**:

Čukić, S. (2013, 07 15). Multiple intelligence theory and its application in the foreign language classroom. (Z. Čekerevac, Ed.) *MEST Journal*, 1(2), 146-154. doi:10.12709/mest.01.01.02.14

Style – **Chicago Fifteenth Edition:**

Čukić, Sanja. "Multiple intelligence theory and its application in the foreign language classroom." Edited by Zoran Čekerevac. *MEST Journal* (MESTE) 1, no. 2 (07 2013): 146-154.

Style – **GOST Name Sort:**

Čukić Sanja Multiple intelligence theory and its application in the foreign language classroom [Journal] = Multiple intelligence theory in FL classroom // *MEST Journal* / ed. Čekerevac Zoran. - Belgrade : MESTE, 07 15, 2013. - 2 : Vol. 1. - pp. 146-154. - ISSN 2334-7058 (Online); ISSN 2334-7171.

Style – **Harvard Anglia:**

Čukić, S., 2013. Multiple intelligence theory and its application in the foreign language classroom. *MEST Journal*, 15 07, 1(2), pp. 146-154.

Style – **ISO 690 Numerical Reference:**

Multiple intelligence theory and its application in the foreign language classroom. **Čukić, Sanja.** [ed.] Zoran Čekerevac. 2, Belgrade : MESTE, 07 15, 2013, *MEST Journal*, Vol. 1, pp. 146-154. ISSN 2334-7058 (Online); ISSN 2334-7171.



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