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Obsah+Contents

Ekonomie

Economics

- 4 | **How Much Will I Earn? Expectations versus Reality**
Kolik budu vydělávat? Očekávání versus realita
Jana Šimsová, Alice Reissová
- 21 | **The Migration Process of Romanians to Andalusia, Spain. Focus on Socio-Economic Implications**
Migrační proces Rumunů do španělské Andalusie. Zaměření na socioekonomické implikace
Raluca Mariana Grosu, Vasile Dinu
- 37 | **Growth Disparities among Regions of the Visegrad Group Countries: An Evidence of Their Extent and Nature**
Růstové disparity regionů zemí Visegrádské skupiny: jejich rozsah a příčiny
Pavel Zdražil, Petra Applová
- 55 | **Green Growth and Use of EU Structural Funds in Baltic States, Czech Republic and Slovakia**
Zelený růst a využívání strukturálních fondů EU v pobaltských státech, České republice a na Slovensku
Dalia Štreimikienė, Asta Mikalauskienė

Ekonomika a management

Business Administration and Management

- 73 | **Knowledge Transfer in a Knowledge-Based Economy**
Transfer znalostí ve znalostně orientované ekonomice
Hana Urbancová, Lucie Vnoučková, Šárka Laboutková
- 87 | **A Novel Sorting Method Topsis-Sort: An Application for Tehran Environmental Quality Evaluation**
Nová metoda vícekriteriálního rozhodování Topsis-Sort: aplikace pro hodnocení teheránské kvality životního prostředí
Hassanali Faraji Sabokbar, Ali Hosseini, Audrius Banaitis, Nerija Banaitiene
- 105 | **Value Allocation – Contribution and Risk to the Reliability of Financial Reporting**
Alokace hodnoty – příspěvek a nebezpečí ke spolehlivosti finančního účetnictví
Adela Deaconu, Sorana Crisan, Anuta Buiga

- 120 | **The Influence of Trust on Collaborative Relationships in Supply Chains**
Vliv důvěry na vztahy založené na spolupráci v dodavatelských řetězcích
Sonja Mlaker Kac, Irena Gorenak, Vojko Potocan
- 132 | **Local Economic Impact of the White Night Festival in Košice**
Lokálny ekonomický vplyv festivalu Biela noc na mesto Košice
Peter Džupka, Miriam Šebová
- 142 | **The Toyota Production System – Czech and Nippon Cultural Perspectives**
Toyota Production System – česká a japonská kulturní perspektiva
Richard Brunet-Thornton, Michal Koža, Vladimír Bureš
- 157 | **The Reporting of Non-Financial Information and the Rationale for Its Standardization**
Vykazovanie nefinančných informácií a dôvody jeho štandardizácie
Peter Krištofik, Marzanna Lament, Hussam Musa

Finance

Finance

- 176 | **Financial Transaction Taxation in Agent-Based Simulation**
Zdanění finančních transakcí v multiagentní simulaci
Roman Šperka, Irena Szarowska
- 188 | **Stochastic Model of Short-Term Prediction of Stock Prices and Its Profitability in the Czech Stock Market**
Stochastický model krátkodobé predikce cen akcie a jeho ziskovost na českém akciovém trhu
Milan Svoboda

Informační management

Information Management

- 201 | **Formalized Qualitative Modeling of Online Trust: Introduction of the Method and a Detailed Example**
Formalizované kvalitativní modelování důvěry na internetu: Úvod do metody a podrobný příklad
Štěpán Veselý, Mirko Dohnal

Různé

Others

- 214 | **Notices and Instructions for the Authors of the Articles**
Pokyny pro přispěvatele

HOW MUCH WILL I EARN? EXPECTATIONS VERSUS REALITY

Jana Šimsová, Alice Reissová

Introduction

Work is a very important part of human life. Young people think about their future employment on the labour market and choose their future jobs according to many criteria. Sometimes they choose according to the field they are interested in, in other cases their choice could be influenced by their parents. Motivation for the job choice can be different, but very often the aspect of salary plays an important role, i.e. the salary, which one could expect in a given profession.

We were primarily interested in the issue to what extent the expectations of young people are realistic. Up until now most studies have dealt predominantly with returns on investments into education. For example Walker and Zhu (2011) examined estimations in the light of the impact, which university education can have on the future level of salaries according to the studied field in the UK. Delaney, Harmon and Remond (2011) were examining the interaction between the socio-economic status and the level of education and the expectations for future returns from university education in Ireland. They came to the conclusion that there are significant differences in expectations with respect to differing socio-economic cohorts. Students with low socio-economic status expect discrimination upon their entry into the labour market and that is why the returns on investments into education could be underestimated. The issue of returns on investments into education has been dealt with by a number of authors throughout the entire world, e.g. Menon compares the diversity in the perceived rate of returns in Cyprus (Menon, 1997), and in China, vast research was carried out by Hartog, Ding and Liao (2014), who questioned university students in Beijing. In Europe, this issue has been dealt with by Marsikova and Anchor (2006). They

stress in their work that a significant role can also be played by differing systems of university education. They compare the Czech Republic, where students can study free of charge at public colleges and universities or at private tertiary schools, where they pay school fees. On the other hand, there are relatively few private universities and colleges in the UK, but school fees are paid in public tertiary schools as well. In their conclusions, the authors come to the finding that the expectations for profit and the rate of returns differ according to both gender and country. Nevertheless students are rather optimistic and perceive a higher education as an advantageous investment. These findings are in accordance with most undertaken studies.

The issue of returns on investments is closely related to the aspect of salary expectations on the part of students and the level of reality with respect to these expectations. Also this topic has been elaborated in a number of studies, but predominantly in the USA.

The level of starting salary, which students expect, has been examined by Maddocks and Poole (2009). They compared the reactions of students to the average data, stated by PayScale. The expectations of students (both men and women) were higher than the real level of wages, whereby men expected higher salaries than women. Similar results were found by Heckert and Wallis (1998), but lower expectations were stated by women possessing only a bachelor level of education. On the other hand, women, who want to continue their studies, do have similar expectations to men.

Betts in his research posed questions to some students from the University of California in San Diego regarding the estimate salaries for different working positions. The difference between their estimates and reality fluctuated around 20%. The estimates on the part of senior students were more realistic than those

of freshmen. The family context and the level of parents' salaries also influenced the reality of the expectations (Betts, 1996). The fact that the expectations evolve during the course of students' studies is referred to also in other studies. The conclusion that expectations of senior students are more realistic is presented by Botelho and Pinto (2004), who carried out research among the students of the College of Business and Economics, at the University of Minho, Portugal.

Some studies, on the contrary, state that students usually underestimate their future salaries. For example Carvajal found that such underestimation may be closely related to ethnicity. In his study, the respondents were students at the Florida International University in Miami. He came to the conclusion that Hispanic students expect a lower salary than "the others". Another interesting finding was that in the students' eyes, the factor of age was overestimated. (Carvajal et al, 2000).

Another study, emanating from the USA, was presented by Dominitz and Manski (1996). In the framework of their research, students should have stated their expectations for salaries, which they would be able to earn, after finishing different levels of education. Although the authors themselves point out that their research sample of respondents was small and somewhat idiosyncratic, in their conclusions they state that students were well informed about the real wages and that they believed that investments into education pay off. An interesting finding was also the fact that students have a tendency to overestimate the current level of salary imbalance in the American society.

Similar conclusions could be found in Europe, in Webbink and Hartog work, who examined the responses on the part of Dutch students. They state that especially the students of social sciences, economics, health studies, agriculture and technical fields have very realistic estimates. According to their conclusions, students of foreign languages overestimate their future salaries and students from higher income families are also more optimistic. (Webbink & Hartog, 2004)

Jerrim points out that even if the issues of salary expectations have a significant value for the theory of human capital and public policy, they are nonetheless paid relatively small attention. In his study, which he carried out

among tertiary students in the UK, he states that students overestimate their starting salaries by roughly 15%. This discrepancy does not always have to be detrimental. It may lead to a higher effort in the finding of a job. The expectations of a higher salary do not necessarily have to mean that students have inadequate information about the real situation on the labour market. It may be related to an inaccurate estimate of the employment position, for which they will be accepted. (Jerrim, 2011)

The absence of empirical studies in the area of expected incomes is also pointed out by Brunello. He carried out the first major supranational research regarding salary expectations in European tertiary schools among students of business and management. The research was carried out in several European countries. A sufficiently adequate research sample was achieved in Italy, Germany, Austria, Switzerland and Portugal; whereas in other countries the samples were smaller. They found that the level of the expected salary is in correlation with gender, age and seniority. Women expect substantially lower salaries and worse working conditions than men. An important factor is also that of family background; this was shown to play an important role. Another interesting finding was that students, studying at tertiary schools with demanding entrance exams, have higher expectations than their colleagues from private schools. (Brunello, Lucifora, & Winter-Ebmer, 2004)

The databases of scientific articles present only a small amount of information regarding the salary expectations of those students from Middle and Eastern Europe. A comparative study of salary expectations among Swiss and US students has been carried out by Wolter. It is obvious from his conclusions that the high imbalance in the USA and high homogeneity in Switzerland have been overestimated by students. For their future, American students expect a higher growth in wages, whereas Swiss students are more conservative. (Wolter, 2000)

We could find some data from Middle and Eastern Europe in supranational studies, which have been carried out by renowned consulting companies. For example, international research with regard to students and graduates "First steps on labour market" has examined the differences between the average gross salary and that level of salary expected by students.

The most significant divergence was found in Poland (expected salary is 492 Euros higher), then comes Slovakia (394 €), and in the Czech Republic the difference is 224 €. The smallest differences were in Latvia (275 €) and Lithuania (218 €). (Deloitte, 2011)

The German institution Trendence, which specializes in employer branding, personal marketing and recruiting, carries out yearly different investigations among pupils, students and graduates from the entire world. In the year 2014, they carried out research labelled "Graduate Barometre", in which 11,500 graduates participated. The results show that Czech graduates are more modest than their counterparts from the neighbouring countries from the eastern bloc (Slovakia, Hungary, Bulgaria). The average expectations are around 30,000 CZK (1,100 €) per month. (Czech graduates "modest" regarding starting salaries, 2014). This is a higher sum than the average salary in the country. And we think that this is also higher than employers are willing to offer most graduates. That is why we will deal not only with the expectations of graduates but we will also compare them to the real offer on the part of their future employers.

The above stated facts prove that the issue of expected salaries on the part of students is important not only for the development of human capital and public policies (Jerrim, 2011), but also with regard to real demand on the part of future employers, which is reflected by commercial consulting companies, such as Deloitte or the German company Trendence.

1. Methodology

1.1 Formulation of the Aim and Research Questions

The main aim of our work was to verify whether the grade and branch of studies have influence on the expected level of salaries and to what extent the expectations of students are realistic in relation to the real offer of employers. We have adapted this broader aim into individual research questions. These studies undertaken have suggested that the level of education may be an important factor (Dominitz & Manski, 1996; Delaney, Harmon, & Remond, 2011; Heckert & Wallis, 1998; and others). That is why we have examined **whether there are differences in salary expectations with regard to the bachelor and master level of students**. We suppose that students from the

master level will have higher expectations than those from the lower, i.e. bachelor level.

Another factor, which may influence the expected level of the salary, may be the field studied (Webbink & Hartog, 2004; Ettedge & Nunamaker, 1993). The second research question thus concentrated on the finding **whether there are differences in salary expectations in students from varying study programmes**. We selected the programme of corporate economics and management and social work. We suppose that there is a certain impact with regard to the field studied and not only in the case of the starting salary, but also with regard to advancements during the course of employment.

Most studies, which deal with salary expectations on the part of students, work on one hand with primary data and question students and compare the responses to the secondary data (e.g. the average gross salary in a country or for an individual profession, panel research in households and so on.) The exceptionality of our work is in the fact that we compare primary data, derived from students to those primary data derived from individual potential employers. And that is why we have chosen two completely different study programmes (economics and social work) and thus we were forced to create two completely different sets of employers (firms and organisations).

The third research question, which we pose, is **whether there are significant differences in gross starting salaries, which employers are able to offer graduates**. We suppose that organisations will offer lower starting salaries than firms. The fourth research question is **related to the following level of real growth in salaries**. We also suppose that firms will offer a faster growth than organisations. The last research question is from our point of view the most interesting. We are interested in the **direct confrontation between the real offers of employers and the students' expectations**. We suppose that students of both study programmes will be more optimistic, i.e. their expectations for both starting salaries and salary advancements will be higher than those salaries offered by employers.

1.2 Sample Description and Data Collection

To be able to answer the formulated research questions, we had to create four representative samples. Two samples are formed by students

(economic field and social work) and two samples are created by potential employers (firms and organisations). For economics students, a representative sample was a selected group of potential employers from the area of business i.e. profit sector. For social work students, it was a group of organisations, i.e. non-profit sector.

Data collection was carried out in the form of personal inquiries during two periods, in April and September 2013. In each period both students and potential employers were questioned. Both groups were asked the same questions. Students were asked about their expectations for the level of their gross starting salary, their gross salary after a year of employment and after three years from the beginning of their employment. Employers were asked about which gross starting salaries they pay to graduates of the given studies, after one year and three years after starting the job. The level of the gross salary was in all those questioned categorized into six groups. They are less than 15,000 CZK; 15,000–19,999 CZK; 20,000–24,999 CZK; 25,000–29,999 CZK; 30,000–49,999 CZK and 50,000 CZK and more.

In April 2013, data collection was carried out among students studying economics at the Faculty of Social and Economic Studies at the Jan Evangelista Purkyně University in Ústí nad Labem and among the firms located within the area of the Ústí region. The sample was created on the basis of quota selection. Quota characteristics were the size of the firm according to the number of employees and the main area of activity (industry, trade, services, construction, and agriculture). On the whole, 329 students and 187 firms were questioned. Because we were interested in the expectations of students concerning their future jobs, only the second and third year students of bachelor and master levels were included in the sample. First year students were not included. We excluded them in accordance with the conclusion of the study, which found out that they do not have realistic expectations about their future jobs and this fact could distort the results (Botelho & Pinto, 2004). Examining the results of questionnaires, 20 questionnaires filled out by students were excluded and 38 questionnaires filled out by firms were excluded as well. The reason for that was an incomplete questionnaire or the lack of positions for the graduates.

In September, a questionnaire research among students of social policy and social work at the Faculty of Social and Economic Studies at the Jan Evalista Purkyně in Ústí nad Labem was carried out and also among organisations working in social areas and employing social work graduates within the Ústí region. Once again, only the second and third year students were included in the sample. After excluding incorrectly filled out questionnaires, the research sample of students was comprised of 81 units and the research sample of employers of 135 organisations.

The data were processed and evaluated by means of MS Excel and STATISTICA. χ^2 test for independence, homogeneity test, odds ratio and logarithmic-linear models were used as statistical methods.

2. Results

The results are presented in three subchapters. In the first part, expectations of students were analysed, and in the second an analysis of the employers' offer was carried out. In the third part, students' expectations and the real situation of employers were compared.

2.1 Students' Expectation

We will concentrate on the students of economics first. The selected sample was created by 309 students. Out of these, 160 students studied bachelor degree and 149 studied master degree.

Table 1 shows the absolute and relative frequencies of their responses. They were their expectations for their gross starting salary, gross salary after one year and after three years. Looking at the table, we can see that expectations of bachelor and master degree students do not differ very much. Modal categories are the same for those two groups. 41% of bachelors and 46% of masters expect their gross starting salary to be in the range between 15,000 and 19,999 CZK. The gross starting salary of more than 50,000 CZK was not expected by any of the students. A similar situation is in the case of the expected salary level after one year. The modal category is the same for both groups, and in comparison with the starting salary it rose into 20,000–24,999 category, which is expected by 39% of bachelor students and 41% of master students. We do not find big differences even in their expectations of the gross salary after three years; however the

bachelor students are a little more optimistic. The modal category is the same for both groups again and it has shifted to the range 25,000–29,999. The lowest category was not selected by any of those questioned.

We were interested in whether the response to all three questions is influenced by the level of respondents' studies. The χ^2 test for independence was carried out. In the gross starting salary, the p-value is 0.178989.

In case of the gross salary after one year, it is $p=0.564898$ and after three years it is $p=0.359074$. All p-values are lower than 5%. The test thus did not confirm that the level of expectations of the salary is influenced by the type of students' studies.

Our first prerequisite that students of master level will have higher expectations than their counterparts from master level cannot therefore be confirmed.

Tab. 1: Absolute and relative frequencies of the expected gross salaries among students of economic programmes

Expected salary in CZK			Less than 15,000	15,000–19,999	20,000–24,999	25,000–29,999	30,000–49,999	50,000 and more
Expected gross starting salary	Bachelor	n_i	13	65	59	22	1	0
		f_i	0.08	0.41	0.37	0.14	0.01	0
	Master	n_i	11	68	50	14	5	1
		f_i	0.07	0.46	0.33	0.09	0.03	0.01
Expected gross salary after one year	Bachelor	n_i	1	28	63	49	19	0
		f_i	0.01	0.18	0.39	0.31	0.12	0
	Master	n_i	2	32	60	43	10	2
		f_i	0.01	0.21	0.41	0.29	0.07	0.01
Expected gross salary after three years	Bachelor	n_i	0	2	29	61	56	12
		f_i	0	0.01	0.18	0.38	0.35	0.08
	Master	n_i	0	7	36	52	43	11
		f_i	0	0.05	0.24	0.35	0.29	0.07

Source: own

Note: n_i means absolute frequency; f_i means relative frequency.

The same questions were asked to students of bachelor programme: Social policy and social work. 81 students responded on the whole. The results are shown in table 2.

In table 2, we can find that the questioned students of social work were more modest than their counterpart colleagues studying economics. We compare now just the bachelor degree students. In the gross starting salary, the modal category is the same, gross starting salary between 15 and 20,000 is expected by 41% of economics students and 52% of social work students. In the case of the salary after one year, the situation is similar. Most questioned students from both groups expect a salary between 20–25,000 CZK. A difference appears in the case of gross salary after three

years of employment. 61% of the questioned students of economics expected 25–30,000 CZK, whereas most students of social work (30%) expect the salary of 20–25,000 CZK. We were interested in whether the differences between those two groups are statistically significant. The test of homogeneity was carried out. In the case of gross starting salary p-value is $1.789498 \cdot 10^{-5}$, in the case of salary after one year it is $1.11846 \cdot 10^{-7}$, in the case of salary after three years it is $1.15569 \cdot 10^{-11}$.

In all three cases the p-value was lower than the common levels of significance and that is why we reject the homogeneity between the groups. The test proved that students' expectations in the case of starting salary, the salary after one year and after three years of

Tab. 2: Absolute and relative frequencies of the expected gross salaries among students of social policy and social work

Expected salary in CZK		Less than 15,000	15,000–19,999	20,000–24,999	25,000–29,999	30,000–49,999	50,000 and more
Expected gross starting salary	n_i	21	42	14	4	0	0
	f_i	0.26	0.52	0.17	0.05	0	0
Expected gross salary after one year	n_i	12	27	29	10	3	0
	f_i	0.15	0.33	0.36	0.12	0.04	0
Expected gross salary after three years	n_i	3	17	30	20	8	3
	f_i	0.04	0.21	0.37	0.25	0.1	0.04

Source: own

Note: n_i means absolute frequency; f_i means relative frequency.

employment are influenced by the fact, as to whether they study economics or social work.

The second research question, **whether there are differences among expectations of students of different study programmes, was confirmed. We can thus say that the type of study programme is one of the important factors influencing the level of expected salaries.**

We were further interested to determine the rate of advancement expectations of the students within the first three years from starting the career. Six salary categories were assigned increasing ordinal numbers. The expectations for the salary advancements for each respondent were acquired by deducing selected ordinal numbers of categories. We distinguished three types of salary advancements, zero growth, the growth by one category and the growth by two or more categories. We introduced marking A, B, C to make it simple.

- A – expected growth in salaries within the first year.
- B – expected growth in salaries within the following two years (2nd and 3rd year).
- C – expected growth in salaries within the three years from the beginning.

The situation of the expected salary advancement in cases A, B, C for students of economics and social work is shown in figure 1.

Figure 1 shows that after one year of employment, the salary growth by more than two categories is not expected by any student of social work. In all considered changes in salary levels, the students of economics are more optimistic than their counterparts from

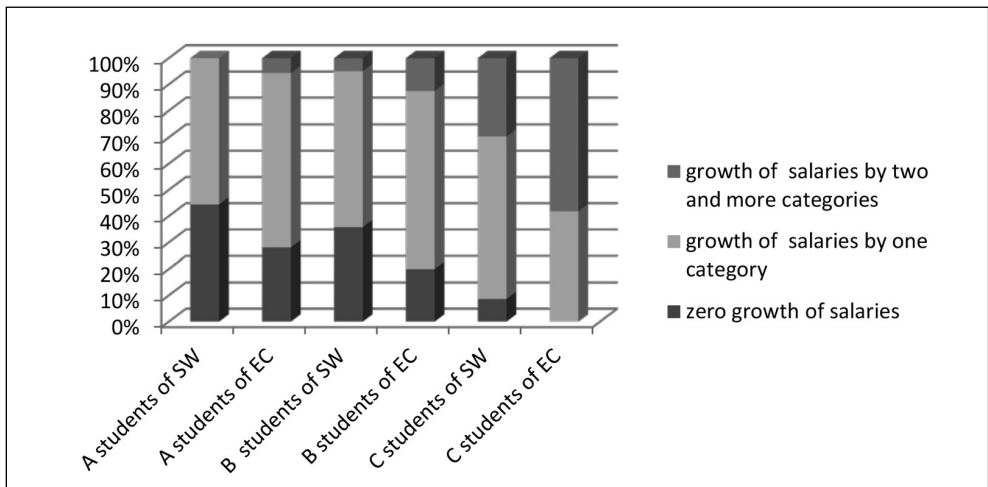
social work. During the first three years, all students of economics expect advancements in salary by at least one category. Most of them (precisely 58%) expect the growth by at least one considered income category. On the contrary, there are some students of social work (more than 8%), who do not expect any salary advancement during the first three years of their employment.

For confirming the statistical significance of the observed deviations, the test of homogeneity for both groups was employed. In the case of change between the gross starting salary and gross salary after one year the p-value was 0.00745, in the case of change after one year and after three years, it was 0.01135 and in case of change between gross starting salary and gross salary after three years it was $4.07533 \cdot 10^{-6}$.

All p-values are lower than 5%. On the level of significance of 5%, we reject the homogeneity of the division of both students' groups. It means that **differencies in advancement expectations significantly differ in all observed periods.**

We further grouped the values stated in tables 1 and 2 in such a way so that we got two salary categories. The first salary category is the gross salary of up to 19,999 CZK, the second is the gross salary of 20,000 CZK and higher. In other words, we added up the first two values in columns to reach the first data and the remaining values to reach the second data. This way, an association table was created. The salary categories will now be lower (till 19,999 CZK) and higher (20,000 CZK and more) of the gross payment. Firstly, we

Fig. 1: Relative frequencies of the growth of salaries expected by students of economics (EC) and social work (SW)



Source: own

will calculate ratios – higher gross salary (2nd category): lower gross salary (1st category). At first we will count these ratios for both examined groups of students. These ratios are called odds. This way we can express that in the case of the gross starting salary the students of economics estimate their odds for gross salaries in a higher category 82:78. Among students of social work, these odds are 18:63. Subsequently, we will calculate the quotient of these odds. This way we found, which group of students expects a higher chance for a higher salary. And this convenience can be quantified.

These odds ratios for expected gross salaries of students from the economics and social work fields are presented in table 3. In this table, we can see the odds and odds ratios for acquiring the expected gross salary in a higher category by both groups of students. **The graduates of economics expect 3.68 times greater odds for their higher starting salaries than those graduates from social work. In the case of the salary after one year of employment, these students see their odds for acquiring the salary of over 20,000 CZK 4.18 times higher than those students from social work. And in the case of the gross salary after three years of employment, the students of economics expect these odds as even 25.9 times**

higher than those students from social work.

These odds ratios were calculated from empirical data that is why they are empirical odds ratios. They are estimates of the theoretical odds ratios. Provided that the theoretical odds ratios equal zero, both groups see their odds the same way. An estimate of odds ratios could be acquired from a logarithmic-linear model, from which we also get the intervals of the reliability of these odds ratios. From table 3, it is obvious that in all three examined questions, the value 1 is outside the 95% interval of reliability and that is why **the stated odds ratios are statistically important.**

2.2 The Real Situation among Employers

The same questions were posed both to students and their potential employers. The employers of economics graduates are generally referred to as firms and the employers of social work graduates will be generally referred to as organisations.

From the responses of employers of economics and social work graduates, we attained information as to which real wages they could offer to their employees. We were enquiring about the level of the gross starting salary, the salary after one year and after

Tab. 3: Students' odds for higher expected salaries

Question	Odds for higher offered salaries			Interval of reliability	
		Odds	Odds ratio	2.50%	97.50%
Expected gross starting salary	Students of economics	1.05	3.68	1.97	6.13
	Students of social work	0.29			
Expected gross salary after one year	Students of economics	4.52	4.19	2.33	7.66
	Students of social work	1.08			
Expected gross salary after three years	Students of economics	79.00	25.9	7.27	165.34
	Students of social work	3.05			

Source: own

three years of employment. Table 4 shows the absolute and relative frequencies of the individual responses to these three questions. From the table we can see that already in the gross starting salary, the situation is different. Whereas 54% of questioned organisations offer the graduates a gross salary of up to 15,000 CZK, 48% of questioned firms offer the graduates a gross salary in the range between 15 and 20,000 CZK. Even in the salaries after one year of employment the difference is visible. All questioned organisations offer a maximum

salary 25,000 CZK. And out of these, 62% offer salaries in the second category, i.e. between 15 and 20,000 CZK. The most frequented category among the questioned firms is between 20 and 25,000 CZK (42%). A difference can also be seen in the salaries after three years from the beginning of employment. Whereas none of the questioned organisations offers a salary of more than 30,000 CZK, among those questioned firms 19% offer salaries from 30 to 50,000 CZK and 2% offer even a salary in the category 50,000 and higher.

Tab. 4: Absolute and relative frequencies of the gross salaries offered by employers

Offered salary in CZK			Less than 15,000	15,000–19,999	20,000–24,999	25,000–29,999	30,000–49,999	50,000 and more
	Questioned							
Offered gross starting salary	Firms	n_i	18	71	53	7	0	0
		f_i	0.12	0.48	0.36	0.05	0	0
	Organisations	n_i	73	57	5	0	0	0
		f_i	0.54	0.42	0.04	0	0	0
Offered gross salary after one year	Firms	n_i	6	39	63	37	4	0
		f_i	0.04	0.26	0.42	0.25	0.03	0
	Organisations	n_i	38	84	13	0	0	0
		f_i	0.28	0.62	0.1	0	0	0
Offered gross salary after three years	Firms	n_i	1	14	50	52	29	3
		f_i	0.01	0.09	0.34	0.35	0.19	0.02
	Organisations	n_i	16	85	31	3	0	0
		f_i	0.12	0.63	0.23	0.02	0	0

Source: own

Note: n_i means absolute frequency; f_i means relative frequency; firms – potential employers of economics students (profit sector); organisations – potential employers of social work students (non-profit sector).

In order to find out whether these differences are statistically significant, we tested the homogeneity of both groups. The p-values of the gross starting salary, the salary after one year and the salary after three years reached the following values: $2.82263 \cdot 10^{-18}$, $2.2293 \cdot 10^{-24}$, $4.07466 \cdot 10^{-30}$.

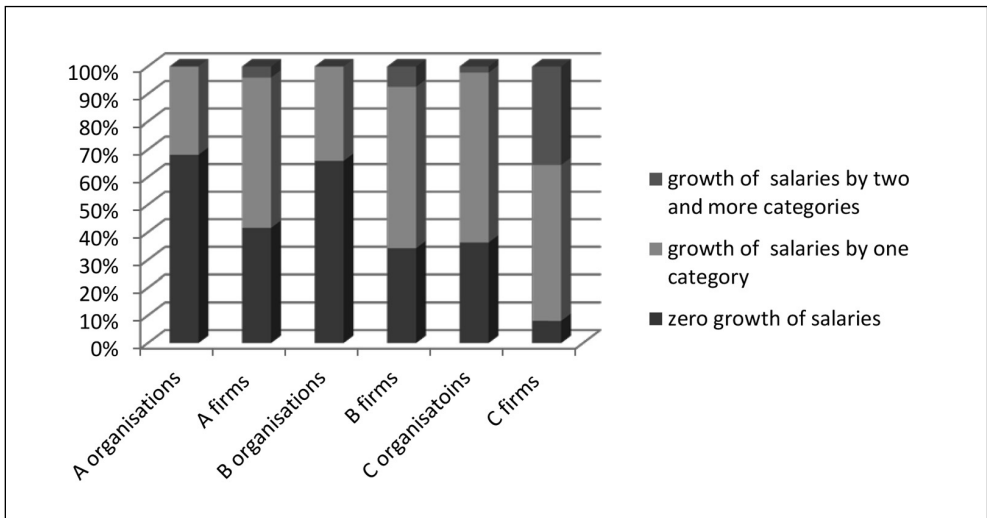
All the stated p-values are smaller than the common levels of significance and that is why we can confirm that the division of salary categories differ in both groups of employers. **The level of the offered salary is influenced by the fact, as to whether they employ graduates of economics or graduates of social work study programmes.**

The results present an answer to our third research question. We found out that there are significant differences in the gross starting salary, which firms and organisations offer. The type of employer is another important factor.

We were further interested in the frequency of these changes in salaries offered by organisations and firms. In a similar fashion as with students, we considered three types of growth of the level of salaries and marked them A, B, and C. The results are shown in figure 2.

From figure 2, we can see that **organisations are more reluctant to increase the graduates' salaries in the course of the first three years than firms.** Whereas more than 30% of organisations do not offer any increase in the course of the first three years from the beginning of employment (marked C), in the case of firms just 5% are without any advancement in salaries. We can further see from figure 2 that organisations do not offer any advancement in salaries even after one year from the beginning of employment, and after another two years they do not offer any increase by more than one observed category. With firms, the situation is different. It is obvious from graph 2 that some units (exactly 4%) of firms offer an increase in salaries by two or more observed categories already during the first year of employment. For confirmation of this difference with employers from the profit and non-profit spheres, we tested whether these differences are statistically significant. We used the homogeneity test. The p-values in the case of changes between gross starting salary, the salary after one year and the salary after three years are as follows: $1.08934 \cdot 10^{-5}$, $5.74624 \cdot 10^{-8}$, $2.16757 \cdot 10^{-14}$.

Fig. 2: Relative frequencies of the growth of salaries offered by firms and organisations



Source: own

Note: firms – potential employers of economics students (profit sector); organisations – potential employers of social work students (non-profit sector).

All p-values are smaller than the common levels of significance. **The test proved that the advancement in graduates' salaries in all observed periods (during the first year of employment, during the following two years and during the first three years from the beginning of employment) in organisations and firms differ.**

Lastly we stated values presented in table 4 and grouped them in an association table the same way as with students, we created two wage categories: the gross salary of up to 19,999 CZK and the gross salary of 20,000 CZK and higher. So we added up the values

of the first two wage categories and the values in the remaining columns. Firstly, we calculated odds, thus the ratios = higher gross salary: lower gross salary for both observed types of employers. Thus we can claim that the odds for economics graduates to get a salary at a higher category are 60:89 in firms, whereas in organisations these odds for graduates are 5:130. Subsequently, we calculate the odds ratio. Thus we find out which employers are more advantageous and we can quantify this advantage. These odds ratios for gross salaries offered by firms and organisation are presented in table 5.

Tab. 5: Odds of employees for higher offered salaries

Question	Odds for higher offered salaries			Interval of reliability	
		Odds	Odds ratio	2.50%	97.50%
Offered gross starting salary	Firms	0.67	17.6	7.4	51.7
	Organisations	0.04			
Offered gross salary after one year	Firms	2.31	21.7	11.44	44.06
	Organisations	0.11			
Offered gross salary after three years	Firms	8.93	26.54	14.08	53.03
	Organisations	0.34			

Source: own

Note: firms – potential employers of economics students (profit sector); organisations – potential employers of social work students (non-profit sector).

The graduates from the economic branches have with their employers approximately 17.6 times higher odds for attaining a higher starting salary than those graduates from the social work study programmes with their employers. We can further see from the table that firms offer their employees after one year of employment a 21.7 times higher odds for a salary of over 20,000 CZK than organisations. And in the case of the salary offered after three years of employment, these odds are even 26.54 times higher.

From table 5 we can see that in all three observed gross salary categories, the value 1 is outside the 95% interval of reliability and that is why the stated odds ratios are statistically significant.

Our following research question, where we supposed that firms would offer not

only a higher starting salary, but also faster advancements than organisations, is thus confirmed.

2.3 Students versus Employers

In the final part, we were interested in the finding to what extent the expectations of students and offers by employers differ in the case of gross starting salary, the gross salary after one year and after three years of employment. We will concentrate firstly on the students of economics (of both bachelor and master levels) and their employers. From tables 1 and 6 we can see that in all three categories, the modal category is the same for both groups.

In a similar fashion, as in the preceding cases, we were examining whether the salary categories are for both observed groups, i.e. for employers and students, frequented in the same way. We used the homogeneity test.

The results of p-values for the gross starting salary, the salary after one year and the salary after three years are as follows: 0.015844836, 0.004647, and $1.91156 \cdot 10^{-5}$.

In the case of the starting salary, we reject homogeneity at the level of 5% of significance, but at the level of 1% of significance the homogeneity cannot be rejected. The situation is not unequivocal. In the case of the salary after one year and after three years of employment, the homogeneity of samples of students and employers can be rejected at common levels of significance.

Now let us concentrate on those students from social work and their employers. We want to ascertain whether the expectations of graduates and the reality salaries offered by employers differ. In the same way as in the previous cases, we used the homogeneity test. The resulting p-values are: $1.72065 \cdot 10^{-6}$, $3.62463 \cdot 10^{-11}$, $4.48857 \cdot 10^{-14}$.

All p-values are significantly lower than the common levels of significance. The test proved that the division of salary categories between students and their employers differ.

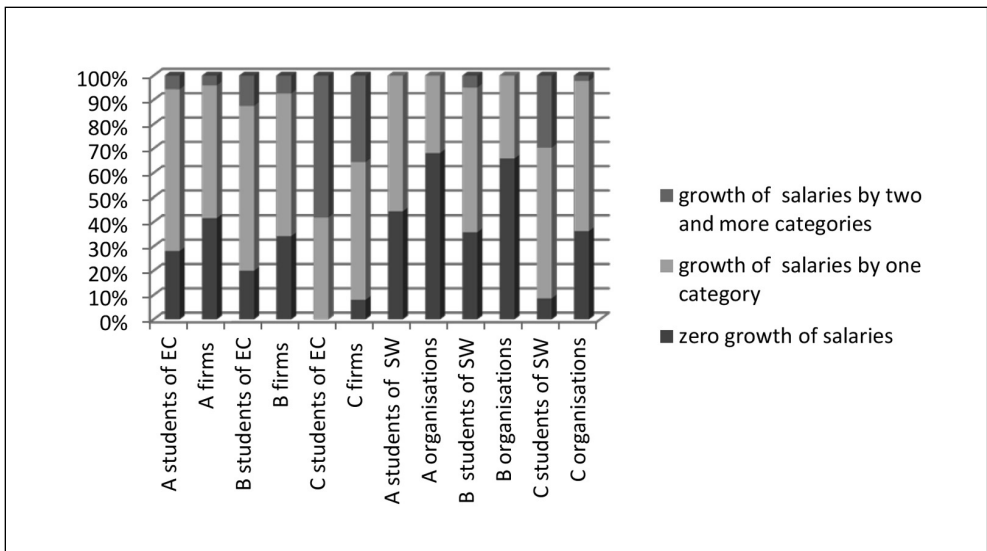
We further compared the view at the salary growth in students and their employers. In

a similar fashion as in previous cases, we marked the three types of the salary growth by A, B, and C and pictured them in the following figure 3.

In the case of expected changes in salaries within the first year of employment (A), we can see from the graph that in both cases the opinions of students and employers do not differ very much. Employers are a little more reluctant to increase the salaries than the students of both groups expect. The greatest differences are to be found in the situation marked C, the changes throughout the whole three year period from the beginning of employment. Within the group of students of economics, there is not any single student who does not expect any advancement. But a certain small percentage of the firms questioned admit such a situation. **Among the students from social programmes, their expectations for the increase in the level of salaries are for the first three year period significantly more optimistic than those on the part of their employers.**

We further tested the homogeneity of the samples of students and their employers. The results of the test are shown in the following table 6.

Fig. 3: Relative frequencies of the salary growth in firms, students – economists, organisations and students – social workers



Source: own

Note: firms – potential employers of economics students (profit sector); organisations – potential employers of social work students (non-profit sector).

Tab. 6: Results of the homogeneity test among students and employers

	p-value (social work)	p-value (economics)
Change between the gross starting salary and the salary after one year	0.0005981	0.0475512
Change between the gross salary after one year and the gross salary after three years	$1.66882 \cdot 10^{-5}$	0.0022851
Change between the gross starting salary and the gross salary after three years	$1.41598 \cdot 10^{-10}$	$2.07895 \cdot 10^{-7}$

Source: own

The first column with p-values is related to the students from social work and their employers, i.e. organisation. The second column with p-values presents results of the homogeneity test of the samples of students from the economic branches and their employers, i.e. firms. We will devote our attention firstly to the students from economics and their employers from the point of view of their expectations for the salary increase in the first year of their employment. The p-value is, in this case, very close to the 5% level of significance. That is why we are justified in claiming that in this case we did not succeed in determining the difference with regard to the expectations for the salary increase throughout the first year of employment. All other presented p-values are significantly lower than the 5% level. That is why we can claim that at this level of significance we have demonstrated differences in expectations on the part of students and their employers with regard to the salary advancements during the first three years of their employment. And by means of the look at the empirical data we can see that students are in all cases more optimistic than their employers. The expectations of students are higher than their employers offer.

The last research questions were related to the direct confrontation between the real offer by employers and the students' expectations. We supposed that the students from both study programmes will be more optimistic, i.e. the expectations for both the starting salary and salary advancements will be higher than their employers' offer. Concerning the starting salary, it is ambiguous in the case of economics students and we cannot claim that their expectations are in the area of

the starting salary significantly statistically different from their employers' offer. In contrast to this, the expectations on the part of students from social work are statistically different from their employers' offer. Concerning the salary advancements, the situation is for both groups the same. Both future economists and social workers have higher expectations than the real employers' offer is.

3. Discussion

In the framework of our study, we dealt with salary expectations on the part of tertiary school students and their direct confrontation to the offer by their potential employers. The main factors, which we considered, were the level of tertiary education (bachelor versus master level) and the field of study. We intentionally have chosen two different study programmes, economics and social work. It is however obvious that there are a number of other factors, which may influence students' expectations.

One of the main factors could be gender. There have been many studies proving that there are certain gender differences. For example the comparison of salaries in the USA, Canada and Great Britain showed that women in biological sciences earn less than men. Also certain differences in the level of salaries on the part of different racial and ethnic groups were noticed (AIBS Salary Survey Results Available, 2002; Salary Expectations, 2004).

There are a number of studies, which deal with gender differences. For example in Ireland, an extensive study was carried out, where significant differences in the expected salary were found in both short-term and long-term horizons. Women expect in both cases significantly lower salaries than men (Delaney,

Harmon, & Remond, 2010). On the contrary in the USA, an interesting finding has been published, which reveals that women and men expect similar starting salaries, but women anticipate significantly lower incomes within the following years, even assuming they are continuously employed after finishing schools (Blau & Ferber, 1991). Another American study nevertheless stresses the salary differences (Heide, 2012). The Australian labour market also reveals salary differences (Li & Miller, 2012). A Dutch study pointed out the fact that in the course of time there appear many favourable changes with respect to the benefit of women, even though women still earn less than men (Fransen, Platenga, & Vlasblom, 2012).

An important study in Slovenia, which has dealt with gender differences not only in salaries, but also concerning entrepreneurship, comes to the conclusion that differences could arise according to the type of profession, which is for a certain gender specific, and presents also the fact that women have a lower tendency to go into business than men (Tominc & Rebernik, 2003). Even in the case of self-employed people, there are significant differences between the earnings of men and women (Hundley, 2001). Another study on the basis of data from Great Britain points out the fact that lower incomes in women appear especially when women take care of children (Dolton & Makepeace, 1987). It is thus evident that the factor of gender is one of the important variables, which may influence salary expectations. One of our research samples (students of social work) was created predominantly by women. This was given by the fact that this study programme is selected almost exclusively by women. So we were not able to carry out gender comparison within the framework of our research, even if this would be very interesting.

Besides gender, there are many other variables, which may be relevant to the level of salary, which we did not touch in our research. International studies, which examine the influence of body weight on the level of the salary, are extremely interesting (Brunello & D'Hombres, 2007). In several European countries (Portugal, Spain, Austria, Denmark, Belgium, Ireland and Finland) the researchers found out that an increase in body mass index by 10% causes a decrease in the level of income for men by 3.27 % and 1.86% for

women. Another study examining the relation between BMI and household incomes speaks more to the detriment of women (Villar & Guintana-Domenque, 2009).

There are many factors, which may influence the salary. In Germany another study was carried out, which examined whether the body height could also influence the salary level (Heineck, 2005). It is but not completely clear, whether the physique does not primarily have influence on the work performance and only as a secondary factor on the salary level.

A number of other factors have already been mentioned in the introductory part of our article – a significant role is played by the social context, the level of the parents' education and parents' incomes. In addition to this, some personal characteristics of an individual may also play an important role. More ambitious students have higher aspirations, aim at higher working positions and value their mathematical abilities, and have higher salary expectations than those who fear their failure to find a job (Khosrozadeh et al., 2013).

It is however clear that in the framework of one study it is not possible to analyze all variables which may influence the results. But it shows that not all factors have been thoroughly examined in this area and there is a space for further research.

Conclusions

In our research, we examined the expectations of university students from two different study programmes: economics and social work, and the reality of wage policy of their potential employers. We asked the students questions about the expected gross starting salary, gross salary after one year of employment and after three years of employment. The same questions were posed also to potential employers for the above mentioned graduates. The gross salary was divided into six categories. And we compared as to what extent the expectations of students differ from the real offer by employers. By means of the homogeneity test, the differences in the division of both types of students samples were ascertained (i.e. students of economics and social work) and their potential employers (i.e. firms and organisations) in all three questions. Only in the case of starting salaries, the expectations of the economics students and their employers

differ at the level of 5% of significance (not at the level of 1%).

When comparing the expectations and reality of the salary level of advancement during the first three years of employment, the students from economics were more optimistic than those from social work. It was demonstrated that firms offer their employees a faster salary increase than organisations. We further proved that the students from social work have their expectations for a higher salary at a level higher than organisations offer. The students from economics had a more realistic look at the salary increase in the case of the first year of employment. The difference between their expectations and the reality offered by firms was not demonstrable at lower levels of significance. But in the case of salary increase throughout the whole period of three years from the beginning of employment, even those students appear to be more optimistic.

When we calculated the odds ratio, we managed to find a 95% interval of reliability for these odds by means of a logarithmic-linear model. With regard to the question asking about the level of the starting salary and the salary after one year, it was not demonstrated that the students of economics and firms estimate their odds for salaries of a higher category differently. In all other cases the difference was proved and quantified.

Generally speaking, the students from economics are more optimistic and at the same time more realistic than those from social work. Those students from social work have less realistic expectations both with regard to the question of the salary increase and in its level after three years of employment.

Firms are towards the graduates starting their employment more generous in the course of the first three years, with respect to both the level of salaries and salary increase, than are the organisations, the employers of social work graduates.

As we have shown in the introduction, studies were published, which claim that students have realistic expectations concerning their future salaries (Dominitz & Manski, 1996; Webbink & Hartog, 2004 and others). Some authors though suggest that the expectations on the part of students are overevaluated by approximately 15% (Jerrim, 2011). The results of research Graduate Barometre state that Czech students expect the salary of about

30,000 CZK, i.e. 1,100 €. (Czech graduates "modest" regarding starting salaries, survey, 2014). Our investigation revealed that a salary like this is really offered by less than 20% of firms, which employ the economics graduates and primarily after three years from the beginning of employment. Organisations, which employ social work graduates, will not offer such a salary even after three years. It is thus obvious that the study field has a great impact on the level of the future salary and that the students adjust their expectations during the course of their studies. The expectations on the part of students from social work are lower than those of their counterparts studying economics and in spite of that, with regard to the offer by their potential employers, still less realistic.

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HOW MUCH WILL I EARN? EXPECTATIONS VERSUS REALITY**Jana Šimsová, Alice Reissová**

When choosing a career, the issue of the following employment on the labour market and related level of the salary plays an important role. There are many studies which deal with the findings with respect to students' expectations. The benefit of our work is that we compare these expectations to the real offer by potential employers. In the framework of our research, we have chosen two different fields of studies, on the one hand the students of economics, who find their employment in the entrepreneurial sphere, the second group was composed of students from social work, who target their careers at the area of social services and their employers will be predominantly non-profit organisations. We took a look as to whether there are differences between the expectations and the reality concerning both the starting salary and its increase during the first three years of employment and thereby grouped into two sections (profit and non-profit). Our conclusions reveal that the level of the salary depends on the field studied. The levels of the salary offered in the profit and non-profit sectors significantly differ. A significant difference is also obvious in the possible salary advancements in the course of the first three years of employment. The students of economics are more likely to estimate the level of their starting salary, but they count on faster advancements. On the other hand, potential employers of economics graduates do not offer such an increase. In the area of social work, i.e. in the non-profit sector, the difference between the students' expectations and the offers by their potential employers is even greater. The students from social work see their odds for higher salaries and their advancements more optimistically, than their potential employers are prepared to offer.

Key Words: *Expected salary, gross salary, salary advancement, university graduates, economics, social work, homogeneity test, odds ratio, logarithmic – linear models.*

JEL Classification: M5, I2, J23.

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THE MIGRATION PROCESS OF ROMANIANS TO ANDALUSIA, SPAIN. FOCUS ON SOCIO-ECONOMIC IMPLICATIONS

Raluca Mariana Grosu, Vasile Dinu

Introductory Remarks and Theoretical Basis

Former communist country, Romania plays an important role in the European Union (EU) in what concerns the migration phenomenon. Emigration represents an important part of the Romanian international migration. For example, a short descriptive analysis of the migratory flows in the EU member states between 2006 and 2010 accomplished by Grosu and Constantin (2011) revealed that Romania, along with Bulgaria, Estonia, Latvia, Lithuania, and Poland is an important provider of immigrants in the mentioned period for the EU countries. During the communist regime, emigration was practically the only form migration was manifested in Romania, and in present times this represents an important phenomenon with implications in all areas and at all levels – for example, families that suffer from separation, international problems associated to Romanian migrants in their countries of destination, etc. The instability of the political, economical, and even social environments in Romania determined and still determines more and more Romanians to search for better economical and social opportunities outside the borders of their country. During the last years, Spain and Italy were the most important receivers of temporary emigration from Romania. According to Suditu et al. (2013), Romania has signed a series of bilateral agreements on migration with Spain and both countries developed and implemented strong policies in the area. On the other hand, in Italy this aspect has not been accomplished, effects being strongly perceived in the dimension of the socio-economic effects – mainly negative and materialized in human traffic, ethnic conflicts, or black market development.

The fact that Spain and Italy are the most preferred countries for destination by the

Romanian emigrants is not very clear reflected in the official statistical data provided by the National Institute of Statistics in Romania, as this registers only data associated to permanent migration. However, more recent efforts are oriented towards emphasising the magnitude and the complexity of the international migration phenomenon in Romania. Both temporary and definitive migratory flows are aimed for registration. Based on the Population and Housing Census developed in 2011 and the Household Labour Force Survey, the most recent available data highlights that in 2012 the total number of emigrants was of 2.34 millions. Out of them, 46% were in Italy, 34% in Spain, 7% in Germany, 4% in the United Kingdom, 3% in Hungary, and 6% in other destinations (National Institute of Statistics, 2014). Also, an image closer to reality is reflected by the national institutes of statistics in Spain and Italy, as they register both temporary and permanent migratory flows. The data they provide outlines the importance Romania has among the main providers of immigrants for them. In both countries, Romanians are the most important community of immigrants.

During the last years, Romania along with Morocco represented the main suppliers of immigrants for Spain, and implicitly for Andalusia. In 2010 – the most recent data available at the moment when the research started – 831,235 Romanians residing in Spain were registered. They represented 14.46% of the total foreign population in Spain and 1.76% of Spain's population. In 2013, their number increased up to 870,258 (Instituto Nacional de Estadística, 2014); this was the most recent data available at the moment when the research ended in 2014. They are the most important community of immigrants in Spain. Andalusia, along with the Autonomous Community of Madrid, the Autonomous Community of

Valencia, Catalonia and Castilla-La Mancha is one of the most preferred autonomous communities for residence by the Romanians that emigrate to Spain. In Andalusia, in 2010, Romanians were on the third place among the foreigners residing in Andalusia, at a very short distance of the ones coming from the United Kingdom and Morocco. There were 93,169 Romanians, representing 13.23% of the total foreign population in Andalusia and 1.11% of the total population in Andalusia (Saseanu & Petrescu, 2011); in 2013 their number increased up to 102,352 (Instituto Nacional de Estadística, 2014).

In what concerns the pieces of research in the area provided by the scientific literature, it can be assessed that the phenomenon is not explored and researched to its real potential; many of its facets can be approached. Different investigation directions promoted in the scientific literature refer to motivation, networks, strategies, practices, migration policies, working conditions and other labor market implications, migration models, patterns of mobility and return, and social aspects (Bleahu, 2004; Ahonen et al., 2009; Elrick, & Ciobanu, 2009; Stan, 2009; Stanek, 2009; Marcu, & Gomez Nieto, 2010; Serban, & Voicu, 2010; Bradatan, & Sandu, 2012; Marcu, 2011, 2012, 2014; Moreh, 2014). Ones of the most researched autonomous communities are Madrid and Catalonia. Regarding Andalusia, pieces of research are in an incipient phase and they are mainly oriented towards the application of the Extended Model of Relative Acculturation, the relationships with education and consumption habits, and entrepreneurship (Navas Luque, & Rojas Tejada, 2010; Saseanu, & Petrescu, 2011, 2012; Saseanu, Petrescu, & Zgura, 2011; Dinu, Grosu, & Saseanu, 2015).

Based on a complex and comprehensive case study research carried out among Romanian immigrants in Andalusia, through this paper, we aim to provide a wide image on the migration phenomenon of Romanians to Andalusia and to bring a contribution to the enrichment of the scientific literature existent on this subject. Furthermore, in a framework characterized by the fact that "population growth and its consequences have a long-standing position at the centre of the scientific debate, with the primary goal of predicting trends and creating policies that reflect specific socio-economic conditions" (Škare, &

Blažević, 2015, p. 1036), we approach in this paper a series of socio-economic implications specific to the investigated phenomenon. In this context, we have structured the present paper in two main parts. The first one puts forward a series of methodological aspects associated to the carried out research and the second one outlines the main information resulted from its development. The paper ends up with a series of final considerations.

1. Methodological Aspects

Based on a series of information obtained from a very complex and comprehensive case study research carried out between 2011 and 2014, we developed this paper with the main aim to highlight a series of socio-economic implications on both the sending and the receiving countries, specific to Romanians' migration to Spain, in particular Andalusia region. In this context, we intend to raise awareness among policy makers in relation with phenomenon's magnitude and complexity, for its proper management.

We have developed a descriptive case study as we mainly focused on describing this phenomenon and the real-life context in which this took place (Yin, 2003), but we were also oriented towards carrying out a series of explicative pieces of research that aimed to establish, outline, and explain causal relationships between the obtained variables (Saunders, Lewis, & Thornhill, 2009). We have chosen this method for investigation in order to properly explore the phenomenon and to reveal its essence (Baxter & Jack, 2008).

The studied subject and the context in which this was placed referred to the Romanian immigrants in the autonomous community Andalusia, Spain. One boundary we have established for the study was in relation with the definition of the term "immigrant". We have based all our research on the definition provided by Eurostat (2011): "immigrants are people arriving or returning from abroad to take up residence in a country for a certain period, having previously been resident elsewhere. According to the 1998 United Nations recommendations on the statistics of international migration (Revision 1), an individual is a long-term immigrant if he/she stays in his/her country of destination for a period of 12 months or more, having previously been resident elsewhere for 12 months or more".

We developed the research starting from the basic question: *What are the main*

characteristics specific to the migratory process of Romanians in Andalusia? In addition, we also considered other secondary questions: *What is the general profile of the Romanian migrants to Andalusia? What are the main drivers associated with Romanians' migration to Andalusia? What is their working status in Andalusia, focusing on their entrepreneurial manifestations?*

Through the case study research we aimed to describe the fundamental characteristics specific to the migratory process of Romanians to Andalusia.

The present paper outlines information only in this sense, providing answers to the general research question and to the first two secondary questions.

Aiming to provide a wide image that may reveal multiple facets of the investigated phenomenon, we have used a variety of data sources and we have employed different methods of investigation. We carried out quantitative and qualitative pieces of research focusing our efforts on the following research techniques: questionnaire based survey, observations, semi-structured interviews, and informal discussions.

In what concerns the quantitative research, we carried out a questionnaire based survey among a representative sample of 270 Romanian immigrants in Andalusia – at a confidence level of 90%, out of a total of 93,169 Romanians residing in Andalusia according to the most recent data available at the National Institute of Statistics in Spain (Instituto Nacional de Estadística, 2011a) in 2011 when the research was initiated. As data could not be gathered for the entire population, the statistical inference based on the sample was necessary, and it was mandatory to have face-to-face contact with the respondents (Saunders, Lewis, & Thornhill, 2009), respondents were chosen using the simple random sampling technique.

Participants in the sample were asked to respond to a questionnaire that we have developed after reviewing the existing scientific literature and various research projects on migration and after having a series of preliminary informal discussions with Romanian immigrants in Andalusia. Taking into consideration the very high level of reluctance that immigrants manifest towards their active involvement in research projects, we have designed the questions in a manner

to facilitate immigrants' answers. Afterwards, in order to improve the initial version of the questionnaire, this was debated along with scholars and experts directly involved in issues related to the migration phenomenon, mainly members of the organizations in charge with immigrants. In order to identify the necessary time for filling in the questionnaire, to test the explicitness of the questions, and to identify if there are any ambiguous questions, we applied the questionnaire on a pilot sample of five Romanian immigrants in Andalusia. The final version of the questionnaire was composed of four parts, the present paper being based on the statistical and econometrical analysis of a series of information obtained from the first two parts, referring to general information associated to the respondents and to general information related to the migration process.

The qualitative pieces of research we have carried out consisted of observations, semi-structured interviews, and informal discussions.

We observed Romanian immigrants in Andalusia in various environments and also during the time we carried out the quantitative research. We had both the roles of observer as participant and of participant as observer, by case. For example, in case of the observation of Romanian immigrants at their jobs, at the place where busses were leaving to Romania, or at the special offices for immigrants' registration, our role was of observer as participant. On the other hand, while observing the Romanian immigrants at church or at supermarkets, our role was of participant as observer.

We also carried out 24 semi-structured interviews: ten face-to-face and 14 by telephone. Even though, based on our research aim, we had elaborated an interview guide in both Romanian and Spanish, there were situations when the number of questions addressed or the order in which they were addressed varied, based on interview's way of development. We mainly interviewed representatives of the Romanian authorities in Andalusia, of the Spanish authorities in charge with migration issues in Andalusia, of the Romanian Orthodox Church in Andalusia, of organizations in charge with Romanian immigrants in Andalusia, and Spanish entrepreneurs with Romanian employees, active in agriculture. In general, we carried out formal face-to-face interviews at the offices of the interviewees, no disruptive factors appeared during their development, and

they lasted, in average, for 17 minutes. On the other hand, the telephone interviews lasted, in average, for 21 minutes and no disruptive factors appeared during their development.

Furthermore, we have held over 70 informal discussions, both face-to-face and by telephone, mainly with Romanian immigrants, but also with representatives of the Romanian authorities in Andalusia, of the Romanian Orthodox Church in Andalusia, and of the organizations in charge with Romanian immigrants in Andalusia.

During the observations, the interviews, and discussions, we have taken 157 pages of notes. We have mainly written information received from the persons with whom interviews and discussions were held, elements of nonverbal language, facts, and personal sentiments in relation with various aspects approached during the research. We outline in the present paper a series of information – related to the characteristics of Romanians' migration process to Andalusia, with focus on its socio-economic implications on both the receiving and sending countries – obtained from the qualitative pieces of research which are mainly processed and explained using the inductive approach.

2. Main Features of Romanians' Migratory Process to Andalusia

In what concerns the sample's structure according to gender, this is quite equilibrated (55.6% females and 44.4% males). On the other hand, according to age, the sample outlines a remarkable presence of respondents aged between 26 and 45. To some extent, this aspect is not surprising as, in general – related to the migration process – the 26–40 age category is of high interest for the labor market and, in the same time, it is a category of already trained persons, with a developed working potential, innovative, flexible and easily adaptable to various conditions (Constantin, Vasile, & Nicolescu, 2004). Approached from the receiving country perspective, this category may generate, among others, two main implications on the labor market. One may be positive, respectively the vacant jobs in low skilled areas are occupied by this category, in general at low wages (lower than ever accepted by residents) and the other may be negative, respectively overcrowding the labor market, resulting in high rates of unemployment, mainly, among residents. In what concerns the sending country, the workers' migration negatively

impacts the labor market, mainly through generating vacancies in different branches.

Also, the migration of young people has a very important social impact on Romania. Children are left home by their parents and they are being cared for by their grandparents, or by only one of the parents in case s/he stays at home. Many of the children get involved in inadequate entourage, are abandoning school, etc. In the same time, young migrants leave behind their parents; many of them are old, living in the countryside with no other support. Being an important social problem that Romania faces, various TV campaigns have been developed by different national TV channels designed especially under the title of "Do you know what your child is doing? / Do you know what your parents are doing?" in order to raise awareness among migrants, Romanian citizens, and policy makers on this major social issues that can evolve to one of unprecedented dimensions.

Considering respondents' educational attainment, the vast majority of them (44.8%) has a high school diploma. Even if in Romania, according to the article 16 of the Law regarding the national education (Parlamentul Romaniei, 2011) "the general compulsory education is of 10 grades and it is composed of primary and secondary education", the majority of the respondents graduated 12, or even 13 grades. However, there are also respondents with a university degree (21.1%) or only with a primary education (16.3%). The migration of highly skilled individuals is a very important problem that Romania faces. Even if Spain is not among the major destinations preferred by the highly skilled Romanian migrants, there are many of them that chose this country. The poor working conditions and the very low level of the salaries, compared to other European countries, in different branches – for example education – determined and still determine many highly skilled Romanians to search for better job opportunities outside the borders of their country. This way, Romania loses important "gray" that could bring an important contribution to the country's development. Another issue related to the migration of educated persons is related to educational mismatch. Many Romanians with an university degree prefer to migrate to Spain in order to work in areas where higher education is not compulsory (such as agriculture – orange or strawberry harvesting –

housekeeping, child or elderly care, etc.) or in areas that do not have any relation with their education and training.

Taking into consideration ethnicity, the vast majority of the respondents (82.6%) are Romanians. However, it is important to remark the quite important percentage of 11.9 hold by the Rroma respondents. According to the information obtained from the qualitative pieces of research, Rroma immigrants from Romania represent an ethnic community with a different culture, with specific customs that needs a special attention and special conditions. No matter their ethnicity, 47.8% out of the respondents are married and 57.4% of them do not have children.

Respondents migrated from Romania, in general, in almost all the years subsequent to the fall of the communist regime until the moment when the research was carried out. Nevertheless, a higher share of migrants is registered in 2006. This fact may be correlated with a series of aspects specific to a prosperous period from economic perspective. The qualitative pieces of research revealed that 2006 was an auspicious year for the constructions and agricultural branches. Implicitly, the salaries in construction and agriculture in Spain were quite high, especially when compared to the salaries in Romania. In this context, many Romanians have decided to migrate to Andalusia to work in these branches in 2006.

The migration of the labor force caused a quite important disequilibrium on the Romanian labor market. For example, in 2006, a series of industries in Romania were confronted with a lot of difficulties in finding personnel for different jobs; constructions was one of the most affected. In order to meet the need for personnel, Romanian entrepreneurs had to hire immigrants, especially from China and Turkey (Horváth, 2007 quoted in Grosu, & Constantin, 2013).

Considering the geographical criterion, respondents emigrated from almost all the Romanian counties. Based on this geographical dispersion and diversity, we have grouped them according to the development regions in Romania. Thus, a higher presence of respondents (18.9%) form the South-East region (counties Brăila, Buzău, Constanța, Galați, Tulcea, and Vrancea) is remarkable. Based on the information obtained from the

qualitative pieces of research, many of the immigrants are coming from the countryside. Their migration, especially of the younger ones, lead – to some extent – to villages only with old population and, in some cases, even to villages depopulation and light extinction.

One of the reasons that could have led to the remarkable presence of immigrants from the South-East region may be represented by the fact that the South-East region is among the poorest regions in Romania. For example, according to the data provided by the National Institute of Statistics (2011), in 2009, the regional gross domestic product per capita was of 18,738.2 lei (lei is the currency of Romania). This way, the South-East region occupied the third place in a top of the regions with the lowest regional gross domestic product per capita, after the North-East region (14,649.3 lei) and the South-West Oltenia region (17,752.8 lei). According to the same source, in 2010, the South-East region took the second place in a top of the regions with the highest ILO unemployment rate in Romania, respectively 8.8%, after the Centre region (10.5%).

In what concerns the province of residence in Andalusia, half of the respondents live in the province of Seville. Also, an important share of the respondents (20.4%) has the residence in the province of Huelva, as outlined in Tab. 1. According to the information gathered through the qualitative pieces of research, the province of Seville was preferred by the majority of respondents as there is the capital of Andalusia, respectively Seville city. They considered that more vacant jobs could be found, especially in areas related to child care, elderly care, and housekeeping and in the agricultural sector – orange harvest. The province of Huelva was chosen for residence mainly for its job opportunities in the agricultural sector. Different from the province of Seville, in the province of Huelva, the harvest of strawberries was aimed; approximately 90% of the total production of strawberries in Spain is produced in the province of Huelva.

The previously mentioned statements related to the choice of the province of residence in correlation with the possibility to find a job – especially in the agricultural area – can be supported by the results outlined in Tab. 2. They advocate the fact that, in general, the first job of the Romanian immigrants in Andalusia was in the agricultural sector. With the main aim

Tab. 1: Respondents grouping by the region of origin in Romania and the province of residence in Andalusia

Region of origin in Romania	Absolute value	%	Province of residence in Andalusia	Absolute value	%
North-West	24	8.9	Almeria	10	3.7
Centre	35	13.0	Cadiz	13	4.8
North-East	34	12.6	Cordoba	23	8.5
South-East	51	18.9	Granada	12	4.4
South-Muntenia	48	17.8	Huelva	55	20.4
Bucharest-Ilfov	30	11.1	Jaen	3	1.1
South-West Oltenia	30	11.1	Malaga	19	7.0
West	18	6.7	Seville	135	50.0

Source: own representation based on the data obtained from the questionnaire

to statistically test the hypothesis according to which there is a correlation between the branch in which the job is and the province of residence – as resulted from the information obtained through the qualitative pieces of research – we have computed the nonparametric correlation coefficients Spearman and Kendall tau b between the two variables. For a significance level of 0.01, the correlation is significant (sig. = 0.000) and the correlation coefficients have a value of 0.220 (Kendall tau b) and of 0.242 (Spearman). The results highlight a positive,

direct relationship between the two variables, leading to the idea that the province of residence is positively correlated with the branch specific to their job.

In what concerns the working status respondents had in Romania before emigration, tab. 3 shows that the vast majority (43.7%) did not have a job. This was one of the main reasons for emigrating from Romania, as it will be presented in tab. 4. In Andalusia, at the moment when the research was carried out, it can be observed a relative equilibrated

Tab. 2: Sample structure according to the branch specific to the first job in Andalusia

Branch	Absolute value	%
Agriculture	96	35.6
Industry	10	3.7
Construction	24	8.9
Commerce	15	5.6
Hotels and restaurants	37	13.7
Transport	7	2.6
Education	6	2.2
Health and social assistance	22	8.1
Bakery	12	4.4
Cleaning / housekeeping	8	3.0
Auto	1	0.4
Alternative energy	1	0.4
IT	3	1.1
I came to Andalusia in order to study and not to work	28	10.4

Source: own representation based on the data obtained from the questionnaire

situation between the number of respondents without a job (31.5%) and the ones hired at a private enterprise (33%). Supported by the information gathered from the qualitative pieces of research, this aspect highlights the fact that affected by the economic crisis, enterprises have used redundancy as a survival means. Also, it is important to take into account the fact that when the research was carried out, Spain, and especially Andalusia were confronted with a very delicate situation in what concerns unemployment. According to Instituto Nacional de Estadística (2011b), in average, for the first two trimesters of 2011, in Spain the unemployment rate was of 21.09% and in Andalusia of 29.69%, this taking the second place in a top of the autonomous communities with the highest unemployment rate in Spain, after Canarias. An important economic effect associated to Romanian's immigration in Spain is strongly related to the labor market. Romanian immigrants were willing to take jobs that Spaniards were not interested in. For example, Romanians migrated to Spain and started working in agriculture in times when, in general, Spaniards were not interested in working in this area. Nevertheless, Romanian immigrants are perceived by many citizens of the host country as taking their jobs. Romanian immigrants are very appreciated as employees and many entrepreneurs do not want to fire them only to hire Spaniards instead. Also, they

have an important contribution to the revenues of the autonomous community through the taxation system. In general, Romanians are involved in legal activities and always pay their taxes with regularity.

Out of the respondents that before emigration were hired at a private enterprise, the vast majority was working in the commerce sector. The same field of activity was also preferred by the respondents that before emigration had a business in Romania. In Andalusia, the majority of the respondents hired to a private enterprise were working in the agricultural area. In what concerns the respondents that own a business in Andalusia or are in the process of developing one, the main preferred field of activity was commerce.

The main purpose for emigration from Romania to Andalusia was job seeking. This aspect may be in correlation with the fact that 43.7% of the respondents did not have a job in Romania when they decided to emigrate, as presented before. There is also a small share of respondents (6.7%) that immigrated in Andalusia for family reunification. The qualitative pieces of research revealed that this situation is mostly encountered in case of elderly people – that were retired and had children in Andalusia – or in case of the children that emigrated in order to follow their parents. In general, as a migration model we have identified that the female was the first to migrate;

Tab. 3: Respondents' working status in Romania and in Andalusia

Working status	Romania (working status before emigration)		Andalusia (working status at the moment when the research was carried out)	
	Absolute value	%	Absolute value	%
Hired at a private enterprise	71	26.3	89	33.0
Hired in a public institution	24	8.9	9	3.3
Hired at an NGO or at an association	3	1.1	7	2.6
Independent	20	7.4	42	15.6
Entrepreneur	5	1.9	4	1.5
In the process of business creation	2	0.7	4	1.5
Without a job	118	43.7	85	31.5
Student	16	5.9	19	7.0
Others (pupil and retired)	11(9+2)	4.1	11(8+3)	4.1

Source: own representation based on the data obtained from the questionnaire

the male was staying at home with the child. After a short period of time – in general, one year – after the mother succeeded in setting, to some extent, her new residence, the father along with the child emigrated from Romania to Andalusia in order to reunify the family. The case of the migrants for family reunification purposes is a very fortunate one. In general, migrants leave their parents and/or children in Romania generating important social problems, as mentioned in the beginning of this section of the paper. Also, there was a respondent that emigrated from Romania with the main aim to start a business in Andalusia. This is the special case of an entrepreneur that, urged by her friends – with a long living experience

in Andalusia – emigrated to Andalusia in order to start a business based on selling traditional Romanian food products as there was no other store in the area and the demand for such products was huge and unsatisfied (Saseanu, Petrescu, & Zgura, 2011). Unfortunately, entrepreneurship is not very pronounced among the Romanian immigrants in Andalusia, although the environment is very auspicious for the development of both opportunity and necessity driven entrepreneurship (Dinu, Grosu, & Saseanu, 2015).

Analyzing the main reasons for emigration from Romania, it can be assessed that the vast majority of the respondents emigrated as the money they earned in Romania were not

Tab. 4: Main reasons for migrating from Romania

	r1		r2		r3		r4		r5		r6	
	abs.	%	abs.	%	abs.	%	abs.	%	abs.	%	abs.	%
0	29	10.7	98	36.3	106	39.3	26	9.6	206	76.3	11	4.1
1	4	1.5	14	5.2	24	8.9	0	0.0	15	5.6	1	0.4
2	7	2.6	18	6.7	23	8.5	5	1.9	9	3.3	3	1.1
3	14	5.2	12	4.4	21	7.8	5	1.9	12	4.4	2	0.7
4	18	6.7	18	6.7	24	8.9	18	6.7	12	4.4	15	5.6
5	40	14.8	23	8.5	13	4.8	45	16.7	6	2.2	32	11.9
6	158	58.5	87	32.2	59	21.9	171	63.3	10	3.7	206	76.3
	r7		r8		r9		r10		r11		r12	
	abs.	%	abs.	%	abs.	%	abs.	%	abs.	%	abs.	%
0	122	45.2	120	44.4	205	75.9	226	83.7	134	49.6	116	43.0
1	36	13.3	20	7.4	14	5.2	17	6.3	9	3.3	15	5.6
2	30	11.1	19	7.0	3	1.1	6	2.2	10	3.7	32	11.9
3	31	11.5	41	15.2	8	3.0	13	4.8	11	4.1	32	11.9
4	12	4.4	21	7.8	11	4.1	2	0.7	21	7.8	37	13.7
5	13	4.8	15	5.6	7	2.6	2	0.7	22	8.1	16	5.9
6	26	9.6	34	12.6	22	8.1	4	1.5	63	23.3	22	8.1

Source: own representation based on the data obtained from the questionnaire

Note: abs. – absolute value

r1 – the money I earned in Romania were not enough for my sustenance or the sustenance of my family; r2 – in Romania, I was not finding a job; r3 – I was offered an employment contract in Andalusia; r4 – I wanted to earn more money; r5 – I was exposed to domestic violence; r6 – I wanted a better living; r7 – the job opportunities Romania offered to me, were very low compared to my expertise and training; r8 – I wanted to work in an environment where I could be appreciated to my true value; r9 – I wanted to study in Andalusia; r10 – I wanted to start a business in Andalusia; r11 – my family was in Andalusia and I wanted to be close to it; r12 – I had some friends in Andalusia and I wanted to follow them.

0–6 – Likert scale used in order to identify the intensity of the respondents agreement in relation with the provided affirmations (0 – total disagreement, 6 – total agreement)

enough for their / their family sustenance, they wanted to earn more money, or they wanted a better life. There are very few the situations when the respondents totally agreed with the fact that they emigrated as the job opportunities in Romania were very poor in relation with their training and expertise, as they wanted to work in an environment where they can be appreciated at their true value, or as they wanted to study in Andalusia (Tab. 4).

Considering the type of residence in Andalusia according to the time criterion, the vast majority of the respondents (83.7%) emigrated to Andalusia for an undetermined period of time. However, there are also respondents that emigrated to Andalusia for a determined period of time, in their case, this being somewhere between 5 months and 10 years. The information gathered via the qualitative pieces of research outlined that this is mainly the case of the persons that came to Andalusia with an employment contract or with a scholarship. However, no matter their type of residence, in what concerns their coming back intentions, it is a slight equilibrium between the ones that would like to come back to Romania forever, the ones that would like to come only to visit, and the ones that do not want to come to Romania anymore. By regrouping the respondents according to the positive character of the coming back intention, only 32.2% would like to come back to Romania forever, while the rest would like to stay in Andalusia. A similar situation is encountered in Karasavoglou, Alexiou and Zoumboulidis (2008) in case of a series of immigrants in Kavala, Greece that, in general, prefer to stay in Greece than to come back to their country of origin. The qualitative pieces of research revealed that even if, at the beginning respondents emigrated from Romania to work in Andalusia for a short period of time in order to raise money and to send money back home, after a while they did not have any intention to come back to Romania; furthermore they manifested intentions to bring their family in Andalusia – a part of it or the whole family. Remittances represent very important revenue for the families of the Romanian immigrants. In Romania, migration – especially through remittances – contributes to the reduction of poverty in different regions and, in the same time, to their development. Remittances encourage and sustain consumption; in general, the tendency

is to invest them mainly in education and in houses construction. Also, they contribute to the increase of the domestic savings. However, a factor with a more pronounced economic and social impact in Romania would be represented by the support of Romanian migrants' return. This could offer a competitive advantage to Romania, on the long run. Romanians that work in Andalusia became more specialized in various areas and they can bring new knowledge, skills, and competences developed in their country of destination that can be capitalized in different jobs in Romania or in entrepreneurial activities. Encouraging and fostering returnee entrepreneurship in Romania may lead also to developing a strong and very competitive country, generating important socio-economic positive impacts (Grosu, 2015), as entrepreneurship is widely recognized as “a key factor in the well-being of society and economic growth” (Tausl Prochazkova, Krechovska, & Lukas, 2015, p. 706) and as the “cornerstone of a modern competitive economy” (Tachiciu, 2015, p. 6).

As in the specific scientific literature, in general, gender and age are often encountered as significant variables in the migratory process, further on we have considered important their analysis and testing in case of the Romanian immigrants in Andalusia.

A review of the social research on the relationship between migration and immigrants' gender leads to the idea according to which immigrants' gender influences the main causes and consequences of the migratory process. There is a high interest among scholars in researching the characteristics of migrants according to gender, the adaptation process in the host country (in case of these two research directions, a special focus is put on female migrants), the main reasons that led to emigration, etc. (Curran et al., 2006). However, according to Mahler and Pessar (2006), in most researchers' outlook, gender is not investigated as a key constitutive element of the migratory process.

In what concerns migrants' age, the specific scientific literature provides different studies in which this is analyzed in relation with the migratory process from different perspectives. Among the most frequently encountered are the structure of immigration according to age (Greenwood, 2007) or the relationship between age at the moment of migration and immigrants'

educational attainment (Cortes, 2006; van Ours, & Veenman, 2006).

With the main aim to study the relationship between the different aspects related to migration as emigration purpose or the main reasons for migrating and gender and age, we have implemented a series of ANOVA analysis and we have tested the nonparametric correlation coefficients Spearman and Kendall tau b. The analyzed variables were established based on the questions in the questionnaire and they are presented and detailed in the next paragraphs.

Factor variables:

Gender – notation: *gender*; codification: 0 – females, 1 – males.

Age – notation: *age*; codification: 0 – under 16, 1 – 16–25 years, 2 – 26–35 years, 3 – 36–45 years, 4 – 46–55 years, 5 – 56–65 years, 6 – over 65.

Dependent variables:

Emigration purpose – notation: *purpose*; codification: 0 – work, 1 – studies, 2 – family reunification, 3 – business start-up.

Reasons for migration – notation: *r1, r2, r3, r4, r5, r6, r7, r8, r9, r10, r11, r12*; codification: 0, 1, 2, 3, 4, 5, 6 (for each one, according to Likert scale). Each reason for migration, from *r1* to *r12*, is explained and detailed in the notes specific to tab. 4.

After reviewing the statistical literature (Anghelache, 2004) we have established the following set of hypothesis specific to the ANOVA analysis:

H0: The variation of the dependent variable is independent of the factor, respectively the means are equal – the factor is insignificant.

H1: The variation of the dependent variable is dependent of the factor, respectively the means are not equal – the factor is significant.

Where:

dependent variable – purpose and *r1–r12*, by case;

factor – gender and age, by case.

Tab. 5 highlights the results afferent to the ANOVA analysis implemented for the dependent variables *r1–r12* associated to the reasons for migration and for the factor variable *gender*. H0 is rejected only in three cases (*r5, r10, and r12*). There are statistically significant differences between the different groups of respondents according to gender in what concerns a small share of the reasons they had for migration. For example, in comparison with males, females strongly associate one of the reasons for migrating with the fact that they were exposed to domestic violence. Furthermore, in order to support this statement, we have calculated the nonparametric correlations coefficients Spearman and Kendall tau b for the *gender* and *r5* variables. The obtained results showed that for a significance level of 0.01, the correlation is significant (sig. = 0.000), and the correlation coefficients have a value of – 0.224 (Kendall tau b) and of – 0.235 (Spearman). Furthermore, in case of the *r10* and *r12* variables, even though the differences are not very important – but statistically significant – between males

Tab. 5: The reasons for migration from Romania to Andalusia. Average scores and ANOVA analysis – factor gender

	<i>r1</i>	<i>r2</i>	<i>r3</i>	<i>r4</i>	<i>r5</i>	<i>r6</i>
Females	4.67	3.08	2.27	4.92	1.06	5.39
Males	4.83	2.78	2.57	5.08	0.40	5.51
<i>F</i>	0.466	0.902	1.020	0.528	11.560	0.536
<i>Sig.</i>	0.495	0.343	0.313	0.468	0.001(***)	0.465
	<i>r7</i>	<i>r8</i>	<i>r9</i>	<i>r10</i>	<i>r11</i>	<i>r12</i>
Females	1.53	1.97	0.91	0.26	2.51	1.79
Males	1.90	2.08	0.99	0.59	2.14	2.22
<i>F</i>	2.179	0.161	0.129	5.922	1.368	2.801
<i>Sig.</i>	0.141	0.689	0.720	0.016(**)	0.243	0.095(*)

Source: own computations based on data gathered from the questionnaires

Note: (***) significance level of 0.01. (**)significance level of 0.05. (*)significance level of 0.10.

Tab. 6: The purpose for emigration from Romania to Andalusia. Average scores and ANOVA analysis – factor age

	purpose
Under 16	1.60
16–25 years	0.47
26–35 years	0.07
36–45 years	0.12
46–55 years	0.13
56–65 years	0.50
Over 65	2.00
<i>F</i>	15.277
<i>Sig.</i>	0.000 (***)

Source: own computations based on data gathered from the questionnaires

Note: (***) significance level of 0.01

Tab. 7: Main reasons for migration from Romania to Andalusia. Average scores and ANOVA analysis – factor age

	<i>r1</i>	<i>r2</i>	<i>r3</i>	<i>r4</i>	<i>r5</i>	<i>r6</i>
Under 16	0.00	0.00	0.00	0.00	0.00	4.80
16–25 years	3.59	2.86	2.51	4.20	0.57	4.86
26–35 years	5.04	3.18	2.46	5.42	0.87	5.64
36–45 years	5.28	3.09	2.57	5.46	0.86	5.64
46–55 years	5.47	2.84	2.66	5.41	0.75	5.75
56–65 years	4.63	2.69	1.50	4.19	0.75	5.13
Over 65	2.50	0.00	0.00	1.00	0.00	3.00
<i>F</i>	12.444	1.701	1.675	15.617	0.489	4.088
<i>Sig.</i>	0.000(***)	0.121	0.127	0.000 (***)	0.816	0.001 (***)
	<i>r7</i>	<i>r8</i>	<i>r9</i>	<i>r10</i>	<i>r11</i>	<i>r12</i>
Under 16	1.80	0.00	5.00	0.00	6.00	2.20
16–25 years	1.92	1.51	2.25	0.27	2.49	1.47
26–35 years	1.99	2.29	0.89	0.57	2.12	2.22
36–45 years	1.74	2.23	0.29	0.45	2.03	2.19
46–55 years	1.06	2.16	0.22	0.28	2.34	1.47
56–65 years	0.50	1.63	0.19	0.13	3.06	2.38
Over 65	0.00	0.00	0.00	0.00	6.00	1.00
<i>F</i>	2.171	1.937	12.900	0.847	2.960	1.361
<i>Sig.</i>	0.046 (**)	0.075 (*)	0.000(***)	0.534	0.008 (***)	0.231

Source: own computations based on data gathered from the questionnaires

Note: (***) significance level of 0.01. (**) significance level of 0.05.(*) significance level of 0.10.

and females, the first ones strongly associate one of the reasons for migration with their entrepreneurial intentions or with the fact that they emigrated from Romania in order to follow their friends. In case of the other analyzed variables ($r1-r4$, $r6-r9$, and $r11$) H_0 is accepted. Almost all the respondents, regardless their gender, emigrated to Andalusia as in Romania they did not find a job, money earned in Romania were not enough for their sustenance or the sustenance of their family, they wanted to earn more money, they wanted to work in an environment where they can be appreciated, more precisely, as they wanted a better life.

By assessing the results outlined in tab. 6 specific to the ANOVA analysis implemented for the dependent variable *purpose* and *age* as factor, it can be observed that H_0 is rejected. There are statistically significant differences between different groups of respondents according to age, in what concerns their main purpose for emigrating from Romania to Andalusia. More pronounced differences can be observed between the category of respondents aged under 16 or over 65 and the category of respondents aged between 16 and 65, as, in general, the first ones strongly associate their main purpose for migration in Andalusia with family reunification, while the rest of the respondents mainly emigrated for working purposes.

After studying the results afferent to the ANOVA analysis implemented for the dependent variables $r1-r12$ and the factor *age* outlined in tab. 7, it can be deduced that H_0 is rejected in case of the variables $r1$, $r4$, $r6-r9$, and $r11$. There are statistically significant differences between different groups of respondents according to age, in what concerns a part of their reasons for migration. For example, respondents aged between 26 and 55 strongly associate their reasons for migration with the financial situation, respectively with the fact that in Romania the money they earned was not enough for their sustenance or the sustenance of their family and with the desire of a higher income. Even though the financial situation represents an important reason for emigration, the reason related to the desire for a better life is perceived in almost the same manner by all the respondents, regardless their age. Even if the differences are not very pronounced, they are statistically significant.

Conclusions

The carried out research revealed that Romanians emigrated from almost all the parts of Romania in almost all years after the fall of the communist regime. However, a more pronounced presence is of Romanians from the South-East region and of the ones that emigrated in 2006. The latter aspect may be correlated to some extent with a prosperous period from economic perspective. In Andalusia, most of the Romanian immigrants live in the provinces of Seville and Huelva, mainly because of better job opportunities in agriculture, child or elderly care, or housekeeping. In this sense, most of the Romanian immigrants had their first job in Andalusia in agriculture. However, at the moment the research was carried out, a relative equilibrium between the Romanians hired in a private enterprise – active, mainly in agriculture – and the ones without a job was revealed.

The vast majority of the respondents emigrated from Romania for labor purpose. This mainly happened because most of them did not have a job in Romania. In addition, among the main reasons for emigration from Romania the following can be found: the lack of money for their/their family sustenance, the desire of higher incomes, the desire of a better life. Also, family reunification purposes were envisaged among the investigated immigrants. In general, this is the case of elderly people and/or of children that emigrated to Andalusia in order to follow their children/parents. However, no matter the purposes and reasons for emigration, if at the beginning Romanians left their country with the idea of migration only for a short period of time in order to find a job, to raise money, and to send money back home, after a while, an important part of them did not manifest any coming back intentions. On the contrary, they intended to bring their family – the whole, or a part of it – in Andalusia.

A lot of socio-economic implications – both positive and negative – arise from the migration process of Romanians to Andalusia, for the region of origin and the one of destination. Remittances and the fostering of returnee entrepreneurship represent important positive outcomes for Romania, while for Spain – mainly Andalusia – they may refer to the solving of shortages on the labor market or increase in regional and national incomes. Nevertheless, many negative effects in Romania are

related to social issues – children and/or old parents left behind, school dropouts, children involvement in dangerous entourages and/or in illegal activities, etc. – and also to economic ones, especially specific to the labor market – shortages, brain drain, etc. In Andalusia, labor market implications, such as the lack of job opportunities for the Spaniards may represent a series of negative impacts specific to the Romanians' immigration. However, a proper management of this migration phenomenon may bring an important contribution to the socio-economic development of Spain – especially Andalusia – and Romania.

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THE MIGRATION PROCESS OF ROMANIANS TO ANDALUSIA, SPAIN. FOCUS ON SOCIO-ECONOMIC IMPLICATIONS

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Based on a case study research carried out among Romanian immigrants in Andalusia, Spain, through this paper we aim to outline a wide image of the investigated migratory process. The focus is on the description of its fundamental characteristics and on its socio-economic implications for both the sending and the receiving regions. In this context, we aim to raise awareness among policy makers in relation with the magnitude and complexity of the phenomenon, for its proper management.

Statistical and econometrical analysis were developed in order to process the information gathered through the quantitative research, while the inductive approach was used in order to analyze the information obtained from the qualitative pieces of research.

The scarce financial conditions in Romania determined many people to search for job opportunities – in particular in agriculture, child or elderly care, or housekeeping – in Andalusia, especially in the provinces of Seville and Huelva. However, during the past period, the economic crisis was strongly putting a mark on the Spanish economy and many of the investigated immigrants were unemployed. Even though, in general, their coming back intentions were not very clear. Socio-economic implications – both positive and negative – arise from the migration process of Romanians to Andalusia, for both the sending and the receiving countries. Remittances, solving shortages on the labor market, or increase in regional and national incomes may fit in the first category, while the second category may be composed of examples such as families left behind, school dropouts, children involvement in dangerous entourages and/or in illegal activities, tensions on the labor market etc.

Key Words: *Migration, immigrant, Romanian, Spain, socio-economic aspects.*

JEL Classification: *J15, J60.*

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GROWTH DISPARITIES AMONG REGIONS OF THE VISEGRAD GROUP COUNTRIES: AN EVIDENCE OF THEIR EXTENT AND NATURE

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Introduction

Uneven regional development is generally understood as a problem of growing importance. Leaders of the European Union (EU) aim to actively address this issue, which can be manifested, for example, by the fact that one of the pivotal long-term and ongoing goals of EU regional policy is to combat regional disparities, which is directly based on Article 174 of the consolidated Treaty on the Functioning of the European Union (EU, 2010). In 2004 the EU extended eastwards, which further enhanced the importance of EU regional policy. Regions of the newly integrated and transformed former Eastern bloc countries had been less developed when compared to the existing EU 15 regions (with the exception of the capital city regions of Bratislava, Budapest and Prague). In terms of GDP per capita, as an indicator of economic performance, many of them have been on the same level as the least developed regions across the EU (Applová, 2014; Eurostat, 2015). These regions have not only become eligible recipients for funding from the European structural funds and from the Cohesion fund, but also the de facto platform for reviewing the effectiveness of redistribution mechanisms in terms of fulfilling the objectives of cohesion policy and partly also the efficiency of the entire European integration project. This fact has been documented by numerous recent studies that have focused on the progress of less developed countries and regions, as well as their inclusion in the EU (Dobrinsky & Havlík, 2014; Cuaresma, Oberhofer, & Vincelette, 2014; Forgó & Jevčák, 2015; Zdražil, 2014).

This paper focuses on the Visegrad Group countries (the Czech Republic, Hungary, Poland, and Slovakia) that belong among the transformed economies of the former Eastern Bloc and whose regions can be generally regarded as less developed when compared

with the regions of the traditional EU countries (EU 15). The aim of this paper is to assess the development of disparities in the economic performance among regions of the Visegrad Group countries, to identify the way in which economic growth factors determine these disparities, and partly to assess whether the integration of Visegrad Group countries into the European Union has affected the development of regional disparities in these countries.

1. A Brief Review of Literature

Of course, the economic theory says that the effects of economic integration are very ambiguous (Baldwin & Wyplosz, 2006; Jovanovich, 2005; Krugman & Venables, 1990). However, most authors do agree that the liberalization of the economic environment, in connection with integration, does at least develop the market, and increase pressure to achieve efficiency and higher living standards. Thanks to this it can generally be regarded as a beneficial phenomenon (Balassa, 1961; Fárek & Kraft, 2006; Machlup, 1977). According to some studies the effects resulting from this integration are so unequivocally positive for the participating regions that the fact is indisputable (Olofsdotter & Torstensson, 1998).

On the basis of the standard neoclassical model (Solow, 1956; Solow, 1957) and economic integration theory (Balassa, 1961), relatively less developed countries joining more advanced community should result in the acceleration of the less developed countries' growth and thus their convergence with the more developed countries. The argument in favour of convergence has been derived from neoclassical assumptions, stating that the liberalization of trade and mobility of production factors assumes that the balancing mechanism of price levels and income, or the convergence of (national or regional) economies will be

activated (Martín Velázquez & Funck, 2001), both of in terms of nominal and real convergence. It is therefore essentially a classic convergence hypothesis, on the basis of which notional grouping (convergence clubs) arise among regions, within which there is a significant convergence achieved in terms of productivity, and with that living standards (Baumol, Nelson, & Wolff, 1994). One can therefore expect that the integration of less developed countries into the EU should be beneficial for these countries and their regions as it offers the potential to accelerate growth and to create positive conditions for their development (Capello, 2007), based not only on theoretical principles, but also through interventions in the form of redistribution mechanism within regional policy. On the other hand it must be said that economic integration can be accompanied by some really negative factors, especially when it involves relatively less developed regions. Most notably these include the so-called “brain-drain” in less developed regions (Lucas, 1988), sector concentration that can lead to a proliferation of monopolistic and oligopolistic structures (Perroux, 1969), or arguments arising from the New economic geography – especially spatial concentration, which leads to significant disparities (Krugman, 1991; Ottaviano & Puga, 1998; Fujita & Krugman, 2004).

There is large literature on growth processes and with the heavy focus on disparity issue across the European states. In this paper we follow especially the literature where the Visegrad Group states have been examined. We follow both the classical studies (Gardiner, Martin, & Tyler, 2004; Barro & Sala-i-Martin, 2004; Armstrong, 1995; Ben-David, 1999; Stiglitz, 1999; Fischer, Sahay, & Vegh, 1998) and the recent studies (Monfort, 2008; Dobrinsky & Havlik, 2014; Cuaresma et al, 2014; Tvrdoň, Tuleja, & Verner, 2012; Marzinotto, 2012; Forgó & Jevčák, 2015; Zdražil & Kraftová 2012; Cuaresma, Oberhofer, Smits & Vincelette, 2012; Vintrová & Žďárek, 2007; Geppert, Happich & Stephan, 2008; Tvrdoň, 2010; Barca, 2009). The literature provides mixed results on the study of growth disparities – their extent and nature; based on different approaches and its main objectives. The key points and conclusions of the above-mentioned studies are discussed in the following text.

2. Methodological Definition of the Research

As a reference point for the analysis we chose regions at the NUTS II level, since NUTS II is the default level at which EU regional policy is implemented (European Commission, 2015). Within the Visegrad Group countries we are therefore working with a sample of 35 NUTS II regions, 8 of which are Czech, 7 Hungarian, 16 Polish, and 4 Slovak. The development of disparities is viewed in terms of the conventional concept of tracking coefficient of variation across the monitored sample of regions (1); therefore, it is a standard way of measuring the real disparities through σ -convergence (sigma-convergence) (Barro & Sala-i-Martin, 2004; Quah, 1996).

$$CV = \frac{\sigma}{\mu} \quad (1)$$

where coefficient of variation (CV) is defined as the ratio of standard deviation (σ) to the mean (μ).

As the main indicator of the development of economic disparities we chose gross domestic product per capita (GDP per capita), which is, being a measure of economic activity, a key indicator of changes in economic performance (Organisation for Economic Co-operation and Development [OECD], 2015b). Performance of economy, i.e. the economic growth, belongs to the main issues of economic theory and practice, and it is systematically emphasized by national governments as well as the EU strategies for development (Kraftová, Matěja, & Prášilová, 2011). Drawing on the neo-classical growth model (Solow, 1956; Solow, 1957) we consider that economic growth is, in all its forms, derived from a pair of elementary factors of production – capital and labour – and from the level of technology. In this study we focus mainly on the labour factor and the impact of its changes on the development of regional disparities. We have resorted to this partially restricting step because of a lack of available data that would have allowed us to explore in more detail, at a regional level of the Visegrad Group countries, the effect of changes resulting from the development of capital and its structures as well as changes arising from the advancement of technology.

In this paper, the GDP per capita growth is broken into two parts: “Productivity” and

“Employment”, which can basically be described as the basic attributes of regional competitiveness (Skokan, 2004). When monitoring changes in Productivity we use the approach of OECD (2015b), while monitoring changes in terms of “Labour productivity” (GDP per hour worked) and “Labour utilization” (hours worked). Also in terms of Employment we see the indicators in line with the definition of the OECD (2015a), when monitoring changes in the “Employment rate” (employed persons divided by the total working-age population) and “Labour force participation rate” (total working-age population divided by the total population) indicators. The multiplicative breakdown of the GDP per capita indicator, based on the above described key is shown in the following equation (2).

$$\frac{GDP}{population} = \left(\frac{\text{(Productivity)}}{\frac{GDP}{\text{hours worked}} \cdot \text{hours worked}} \right) \cdot \left(\frac{\text{(Employment)}}{\frac{employment}{ea\ population} \cdot \frac{ea\ population}{population}} \right) \quad (2)$$

Based on the studies of other authors we can prospectively assume that productivity will be the dominant determinant of growth in monitored regions (Cuaresma et al, 2012; Baumol, 1986; Gardiner et al, 2004; Barro & Sala-i-Martin, 2004). For this reason we have chosen a less detailed breakdown of the Employment part; conversely, we have been quite aware of the desirability to classify the Productivity part in detail because, as aptly described by Paul Krugman (1997): “*Productivity isn’t everything, but in the long run it is almost everything*”. However, due to the above indicated unavailability of data on the stock of the regional capital we can proceed to a more detailed breakdown of the Productivity part into productivity resulting from labour, capital, or residual factors, or into multi-factor productivity. For these reasons we will monitor disparities in the economic performance of regions only within the “limited” context of the above outlined breakdown (2).

We have chosen the year 2000 to be the initial year of our analysis as we do not consider it appropriate to distort the analysis by including the very dynamic period of the 1990s, during which the Visegrad Group countries faced

fundamental political, social, and economic changes. The period of transformation of the national economies from a centrally planned system to a market system was, among other things, coupled with high fluctuations in the volume of production and core changes in its structure and in employment, as well as with unstable price levels, fundamental changes in the ownership structure, the development of legislative framework, etc. (Fischer et al, 1998; Stiglitz, 1999). Therefore, the analysis has been prepared for the period 2000–2013, and given the objective of this article, we have paid special attention to the sub-period 2004–2013, i.e. after the entry of the Visegrad Group countries into the EU.

3. Development of Regional Disparities in the Visegrad Group Countries

Before embarking on the analysis of the development of disparities in regional economic performance, and the sources of these disparities, it is appropriate to briefly outline the development of regions within the Visegrad Group countries in relation to the EU average values. Whether in terms of the development of the regions there is a tendency towards fulfilling the objectives of cohesion policy by balancing the economic disparities, or whether in reality the objectives are not met. A simplified illustration of the tendencies in the development of the GDP per capita disparities between regions of the Visegrad Group countries and the current EU average (EU 28) for the period 2000–2013 and also for the shortened period 2004–2013, which represents the integration period of the Visegrad Group countries within the EU, is captured in Tab. 1. The tendencies in the development of disparities are captured through the absolute value of the difference between the ratio of GDP per capita of the region and the GDP per capita of the EU 28 average at the interval borders. It is therefore a very rough and rather tentative illustration that, based on annual comparison, shows by how many percent the regions have converged towards the EU 28 average value during a given period or have diverged from it.

Based on the results captured in Tab. 1 we can say that during the 2004–2013 period only 7 regions did not converge towards the EU 28 average value (CZ01 – Prague, CZ02 – Central Bohemia, CZ03 – Southwest, CZ04 – Northwest,

Tab. 1:

Development of disparities in terms of GDP per capita between Visegrad Group regions and the EU 28 average (2000–2013; 2004–2013)

region	trend	change	trend	change	region	trend	change	trend	change
		(in %)		(in %)			(in %)		(in %)
2000–2013			2004–2013		2000–2013			2004–2013	
CZ01	D	31.1	D	6.1	PL22	C	19.9	C	14.8
CZ02	C	0.9	D	-2.9	PL31	C	13.7	C	12.4
CZ03	C	5.1	D	-0.6	PL32	C	13.6	C	11.9
CZ04	C	2.3	D	-2.1	PL33	C	12.5	C	10.2
CZ05	C	2.9	C	1.3	PL34	C	14.2	C	12.5
CZ06	C	14.2	C	8.4	PL41	C	22.6	C	19.6
CZ07	C	8.4	C	4.7	PL42	C	10.3	C	12.4
CZ08	C	13.6	C	5.5	PL43	C	14.6	C	12.4
HU10	C	25.2	D	8.8	PL51	C	27.1	C	25.8
HU21	C	7.6	C	0.4	PL52	C	15.2	C	12.4
HU22	C	7.6	C	3.2	PL61	C	13.3	C	12.1
HU23	C	4.9	C	1.2	PL62	C	12.3	C	11.3
HU31	C	5.3	D	-0.9	PL63	C	18.6	C	16.6
HU32	C	7.3	C	2.1	SK01	D	77.1	D	56.4
HU33	C	4.9	C	1.2	SK02	C	24.2	C	17.3
PL11	C	20.9	C	17.5	SK03	C	19.0	C	13.6
PL12	C	35.2	C	32.7	SK04	C	14.6	C	10.2
PL21	C	17.1	C	15.9					

Notes: C stands for convergence; D represents divergence; negative values indicate that the region at first converged towards the average value from the “top” and after reaching it, diverged “downwards”.

Source: authors' own work based on Eurostat (2015)

HU10 – Central Hungary, HU31 – Northern Hungary and SK01 – Bratislava Region). The findings confirm prevailing convergence to the EU 28 average and can be described as totally compatible with the findings of many other studies that dealt with the development of disparities in transformed economies (Dobrinsky & Havlik, 2014; Cuaresma et al., 2012; Forgó & Jevčák, 2015). Excluding capital regions (CZ01, HU10 and SK01), where the measured deviation from the average value was positive, the measured negative deviation in CZ02, CZ03, CZ04, and HU31 regions was relatively low – in all cases within 3 percentage points. It is also interesting that disparities – whether in a positive or negative direction – are connected to four Czech regions, or to half of all Czech regions. In contrast, in other countries, the resulting divergence tendencies were very rare

and mostly related to the capital region, where a positive deviation represent divergence due to higher economic performance, which basically corresponds with the reasoning presented by the economists of the New Economic Geography movement, who stated that economic activities are concentrated in the central agglomerations (Krugman, 1991; Fujita & Krugman, 2004; Ottaviano & Puga, 1998). Although in the case of metropolitan regions this phenomenon goes directly against the convergence hypothesis, it certainly cannot be taken as an indication of an undesirable development because these regions are important centres of development with a significant influence on the development of other regions within the country, and at the same time they are some of the most economically powerful regions across the EU (Eurostat, 2015).

The accession of the Czech Republic to the European integration project in the context of general growth trend and the associated convergence of regions of other Visegrad Group countries to the EU 28 average looks the least positive (just because the actual growth does not match the rate of other European regions and therefore, in terms of disparities development, does not contribute to the convergence, it probably would not be appropriate, at this stage, to mark the development of Czech regions as outright negative). The findings that a substantial number of Czech regions did not develop in a very positive way during their integration into the EU takes on a further dimension when we take into account the relatively short period before the country joined the EU (2000–2004). Tab. 1 clearly shows that during the period 2004–2013 the convergence trend was considerably weaker when compared to the period 2000–2013. It is quite logical to measure lower differences for sub-periods when considering a relatively steady development, but the actually recorded changes are for most regions significantly lower and proportionally they do not correspond to the extent of the shortening of the period. Virtually identical conclusions can be drawn for the development of disparities among Hungarian regions, where the measured convergence trend in the period 2004–2013 was also significantly weaker when compared with the period 2000–2013. Conversely, in the case of Polish and Slovak regions the conclusions regarding a significant slowdown in convergence after the countries joining the EU do not apply. Based on measurements we can conclude that for a number of Slovak and Polish regions the convergence trend towards the EU 28 average has been rather even; in the case of some Polish regions it even seems that the pace of the convergence process in the period 2004–2013 slightly accelerated. The detected existence of analogies in the trends of regional disparity development for the two pairs of countries Czech Republic-Hungary and Poland-Slovakia is confirmed by the findings of another study by Zdražil and Kraftová (2012), who moreover believe, based on the analysis of the period 1999–2008, that the NUTS II regions of the mentioned pairs diverged from each other, especially in the period before joining the EU. Although the above view of the development of regional economic disparities

of the Visegrad Group countries is somewhat limited, the conclusions appear to be very problematic in terms of fulfilling the EU cohesion policy objectives. Although there has been quite an obvious convergence of most regions to the EU 28 average, the question is to what extent has this convergence been caused by the integration, and to what extent would this have happened spontaneously.

3.1 Development of Disparities in Terms of σ -convergence

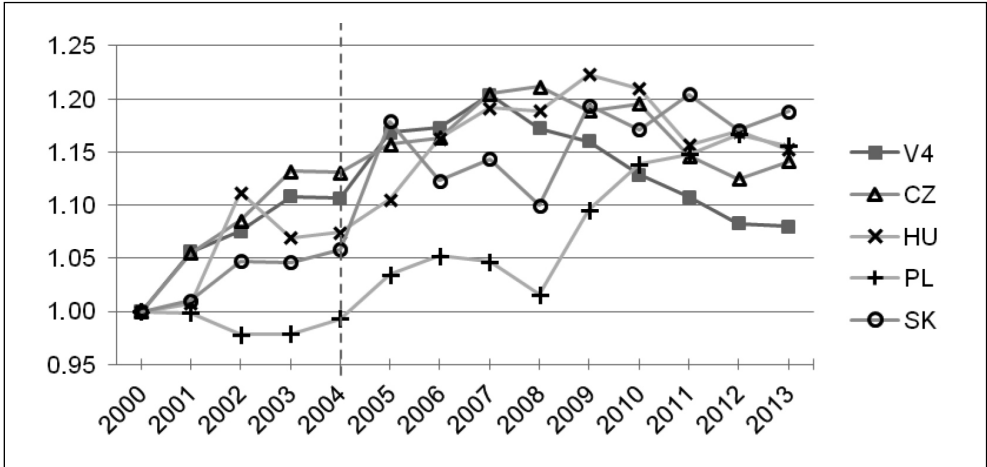
Based on results of the empirical measurements captured in Fig. 1, we can say that the extent of disparities in the economic performance among regions of the Visegrad Group countries after their accession to the EU (2004) grew up to 2007, although the trend had been there since the beginning of the analyzed period (2000). Subsequently, we can say that the trend changed to convergence, and although in 2011 the extent of disparities among Visegrad Group's regions was comparable with 2004, it was reduced in subsequent years. This is somewhat confirmed by the findings of some earlier studies that defend the hypothesis of convergence among European regions (Monfort, 2008; Armstrong, 1995; Geppert et al, 2008), especially among the transformed regions of the Central and Eastern European countries, or the Visegrad Group (Vintrová & Žďárek, 2007; Tvrdoň, 2010). At the same time, the findings showing that the convergence trends only started in the period after the Visegrad Group countries had joined the EU, are largely compatible with the conclusions of the Ben-David (1999) study that showed that liberalization of the economic environment together with integration are the factors that significantly contributes to the convergence. Therefore, the accession to the EU can be seen as an impulse that greatly encouraged the process of convergence in the environment of the former Eastern bloc countries (Dobrný & Havlík, 2014).

The economic crisis and the extent of its influence on the performance of individual economies certainly had a significant effect on the observed convergence of Visegrad Group regions. For example Tvrdoň et al (2012) show in this context that within the Visegrad Group countries the development of the economic performance of Poland was clearly the least affected by the economic crisis. Considering

that Polish regions account for almost half of the sample and are generally considered less developed, the actual contribution of integration to convergence, which has been apparent since the beginning of the economic crisis, is largely disputable.

However, looking at the development of regional disparities in individual Visegrad Group countries, it seems that in the period following the accession of the countries to the EU, from the national point of view, the regional disparities steadily grew. This growing trend

Fig. 1: σ -convergence of GDP per capita, the Visegrad Group and its countries (2000–2013)



Source: authors' own work based on Eurostat (2015)

only started to turn in 2009 for the Czech, Hungarian, and Slovak regions, while the Polish regions remained unchanged with the increase in disparities continuing. Within the monitored sub-period before the accession of the Visegrad Group countries to the EU (2000–2004) it can also be argued that the development of regional disparities in the Czech Republic, Hungary, and Slovakia was pretty similar – i.e. growing; however, among Polish regions there was no increase in disparities. In accordance with the above described situation, in terms of regions across the Visegrad Group, this finding seems somewhat illogical; however, it is fully compatible with the findings of some recent studies on the effectiveness of the European cohesion policy that agree on the fact that although across the EU both countries and regions rather converge, internally for many countries divergence is more common (Barca, 2009; Geppert et al, 2008; Marzinotto, 2012).

4. Natures of Regional Disparities in the Visegrad Group Countries

Whatever the trends regarding the development of regions within the Visegrad Group countries, it is entirely appropriate to ask the question: what is their nature? For only with this knowledge is it then possible to make an effort to actively influence the development of disparities through the application of regional policy instruments. Therefore, in the following subsections we analysed the economic growth in regions of the Visegrad Group countries in order to try and discover the differences in the components of growth in the individual countries, how they determine the economic development, and to what degree they are responsible for the differences in the development of disparities as demonstrated by Fig. 1 above.

The analysis is divided into four parts, one for each country in the sample, followed by a brief summary of the main findings.

Our motivation for presenting the results for individual countries stems from the fact that there are large differences in growth between the regions across the Visegrad Group states while the inner-country differences are much more similar (see Tab. 1 above). We guess it can be due to the differences in regional policy principles applied in individual countries as well as the result of uneven levels of GDP per capita and its growth components in regions of individual countries. Even though we are aware of desirability of revealing the origins of growth disparities within the components that we have examined, we guess this issue is far behind the purpose of this paper which is rather answer the truly crucial question on: How are the disparities caused by its main components? Answering this initial question enables one to start intentionally aimed analysis that should bring relevant findings and recommendations for individual countries and help to shape the most appropriate regional policy objectives.

4.1 Czech Regions

As shown clearly in Tab. 2 the disparities in the development of the GDP per capita indicator among the Czech NUTS II regions can hardly be considered dynamic during 2004–2013. This period can be divided into two halves, in the first half (2004–2008) the extent of the measured disparities grew slowly, while in the second half (2009–2013) it gradually declined. When we take into account the development of disparities before the Czech Republic joined the EU, we can see that a gradual increase in disparities had already occurred in this period, i.e. from the starting point of the analysis – from the year 2000. Therefore, it can be concluded that disparities in the economic performance among the Czech regions had (relatively) grown over the long term, and this trend continued even after the Czech Republic's entry into the EU. However, at present (or in the last reporting period), regional disparities in terms of GDP per capita have reached a comparable level with that of when the Czech Republic joined the EU. Therefore, it can be speculated that the trend in the development of economic disparities has changed and a new phase of a gradual decrease of disparities has started. Dobrinsky and Havlik (2014) consider the relative high level of development of the Czech regions to be the cause of their convergence; this is reflected in a lower rate of GDP growth, especially when

compared to Poland and Slovakia. At the same time it can be argued that, although the extent of disparities among regions of the Czech Republic is lower in comparison with other countries of the Visegrad Group (see Fig. 1 above), the trends of the observed subsample (Czech regions) are very similar to the trends of the whole sample (Visegrad Group regions).

When looking at the breakdown of the GDP per capita, it is clear that the dominant components primarily responsible for the disparities in the economic performance of regions are the disparities in productivity. When breaking down the overall productivity in accordance with the procedure defined above (2), it is obvious that Labour productivity – GDP per hour worked – can without a doubt be considered the central determinant of disparities. The share of Labour productivity disparities within the GDP per capita disparities grew during the monitored period in the Czech regions. In terms of absolute contribution to disparities it can be argued that the development of Labour productivity disparities largely follows the development of the GDP per capita disparities. This similarity is naturally completely logical considering the mentioned deterministic relationship between the two indicators. Although, in absolute terms, the highest disparity in Labour productivity was measured in 2008, the same as with GDP per capita; there was no decrease in the disparities in Labour productivity to the level of 2004 by the end of the reporting period.

In relative terms, an increase in the contribution of Labour productivity to the overall disparities in GDP per capita within the Czech regions can be clearly concluded. To the contrary, other economic performance factors – Labour utilization and Employment rate – displayed convergence trends. The contribution of these two factors to the disparities in economic performance is indeed very low; therefore, the effect of these factors on the convergence of Czech regions, compared with the total extent of disparities in GDP per capita, can be regarded as insignificant but still existing. Regarding the Labour participation rate within the period of 2004–2013 we can speak of a relatively stable development of disparities with a deviation between 2009 and 2010. If we include the sub-period before the Czech Republic joined to the EU, i.e. the total period since 2000, then we could talk from an overall perspective about very

Tab. 2: Czech regions – σ -convergence of GDP per capita and its breakdown (2000–2013)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
GDP per capita	.364	.384	.396	.413	.412	.422	.424	.439	.442	.433	.436	.418	.410	.416
Productivity changes														
Labour productivity	.266	.284	.305	.322	.324	.334	.334	.362	.369	.354	.359	.353	.342	.353
in %	73.0	74.0	77.1	78.0	78.7	79.3	78.7	82.3	83.6	81.8	82.4	84.6	83.5	84.9
Labour utilization	.024	.024	.018	.019	.018	.015	.021	.019	.020	.016	.012	.013	.010	.010
in %	6.6	6.2	4.6	4.7	4.4	3.6	4.8	4.3	4.6	3.8	2.9	3.0	2.4	2.4
Employment changes														
Employment rate	.042	.040	.034	.035	.038	.041	.037	.026	.022	.026	.027	.021	.026	.025
in %	11.5	10.3	8.7	8.5	9.2	9.8	8.7	5.8	4.9	6.1	6.1	5.1	6.4	5.9
Labour parti-cipation rate	.032	.036	.038	.036	.032	.031	.033	.033	.030	.036	.038	.031	.031	.028
in %	8.8	9.5	9.6	8.8	7.7	7.3	7.8	7.5	6.9	8.3	8.7	7.3	7.6	6.8

Source: authors' own work based on Eurostat (2015)

mild convergence trends; however, this trend is not entirely clear. In summary it can probably be said that the high contribution of Labour productivity disparities to the disparities in the economic performance of the Czech regions has not only been due to the development of the Labour productivity disparities, but also partly due to the development tendencies – mainly convergence – of other factors that have been to a greater or lesser extent responsible for the disparities in GDP per capita.

4.2 Hungarian Regions

In terms of the development of disparities in economic performance, the Hungarian regions exhibit partially analogous tendencies with the Czech regions, and considering the above, even with the entire sample of Visegrad Group regions. Thus, at first, there was a gradual increase in disparities from the starting point of the analysis (2000) that lasted even after Hungary joined the EU (2004), then the highest level of disparities was reached in 2009 – i.e. with some delay compared with the Visegrad Group and the Czech Republic – and consequently since then the disparities in the regional economic performance have been decreasing (see Tab. 3). However, besides the fact that the disparities among Hungarian regions have been lower in comparison with the Czech regions, the decrease in disparities at

the end of the monitored period was not such that they dropped to the level at which they were when Hungary joined the EU.

When measuring the sources of disparities in GDP per capita among Hungarian regions, we found that Labour productivity was again a significant determining component and that its significance steadily grew over time. And, although the contribution of Labour productivity to the disparities in GDP per capita is relatively high, it is not that dominant in comparison with the Czech regions. Furthermore, there is higher contribution of Labour participation rate apparent in Tab. 3, which means a convergence of existing disparities among Hungarian regions, and at the same time a reduction in the contribution to the total disparities in economic performance; however, compared with the contribution of this factor to the disparities among Czech regions the level of contribution here was initially almost threefold, and at the end of the 2000–2013 period approximately twice as high. In terms of Labour utilization we can confirm a very low range of regional disparities (the lowest within the Visegrad Group countries), which is associated with convergence, throughout the 2000–2013 period. The contribution of Labour utilization disparities to the disparities in GDP per capita gradually lost its importance. The development of the Employment rate disparities during the 2000–2006 period was characterized by oscillations of a value around

Tab. 3: Hungarian regions – σ -convergence of GDP per capita and its breakdown (2000–2013)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
GDP per capita	.330	.332	.367	.352	.354	.364	.383	.393	.392	.403	.399	.381	.385	.380
Productivity changes														
Labour productivity	.210	.229	.254	.247	.245	.253	.277	.284	.286	.307	.317	.291	.289	.296
<i>in %</i>	63.7	69.1	69.2	70.0	69.2	69.3	72.2	72.3	72.9	76.1	79.4	76.2	75.1	78.0
Labour utilization	.011	.009	.010	.010	.009	.007	.008	.006	.007	.006	.007	.009	.006	.005
<i>in %</i>	3.4	2.6	2.8	2.7	2.6	2.0	2.2	1.5	1.7	1.5	1.8	2.3	1.7	1.3
Employment changes														
Employment rate	.022	.018	.018	.020	.018	.020	.024	.031	.035	.031	.028	.033	.029	.023
<i>in %</i>	6.7	5.6	5.0	5.7	5.0	5.4	6.3	7.9	9.0	7.8	7.0	8.6	7.6	6.2
Labour participation rate	.086	.076	.085	.076	.082	.085	.074	.072	.065	.059	.047	.049	.060	.055
<i>in %</i>	26.2	22.7	23.1	21.6	23.2	23.3	19.3	18.3	16.5	14.6	11.8	12.9	15.7	14.5

Source: authors' own work based on Eurostat (2015)

0.20, then there was a sudden increase coupled with oscillations of around 0.30. The value measured in the last year of the analysis (2013) suggests a reduction in the extent of disparities, but the question is whether this is the beginning of a new trend or merely a temporary deviation. Generally, the development of Employment rate disparities can be described as rather growing and therefore contributing to the increase in the disparities in GDP per capita among Hungarian regions, which is also evident when looking at the development in terms of absolute and relative contributions (see Tab. 3).

4.3 Polish Regions

The development of disparities that are reflected in Tab. 4 clearly shows that the extent of disparities in GDP per capita among the Polish regions is definitely the lowest within the Visegrad Group. At the same time the development of these disparities stands out the most in comparison with the other Visegrad Group countries (this fact is well demonstrated by Fig. 1 above). In other words, regional disparities within Czech, Hungarian, and Slovak regions had grown steadily before and after 2004 (and with greater intensity than was the case in Polish regions) and only since 2009 can we talk about their stabilization, or perhaps even a change of trend and a gradual reduction of disparities among regions. In contrast, in the case of the Polish regions we can talk about

a relatively stable development of disparities until 2004, followed by a period of increased divergence. We also cannot claim, based on the measurements captured in Tab. 4 that in the case of Polish regions there was a peak and a subsequent stabilization, or even a reversal in the trend, or a starting convergence.

Regarding the causes of the disparities, it is evident looking at Tab. 4 that even in the case of Polish regions the disparities in Labour productivity per unit of time, i.e. in GDP per hour worked, are primarily responsible for the extent of disparities in GDP per capita. However, both in absolute terms and in relative terms, the contribution of this component to the disparities in GDP per capita is clearly the lowest within the Visegrad Group countries – about two-thirds in relation to the Hungarian disparities, about a half in relation to the Czech, and a third in relation to the Slovak regional disparities. From this perspective Polish regions can be marked as the least varied within the Visegrad Group. In terms of an absolute contribution to the disparities in economic performance of Polish regions the development of Labour productivity disparities largely correlates with the development of disparities in GDP per capita – a relatively stable development during the period preceding the country joining the EU is followed by a change in the trend and growing disparities in the following years. However, in relative terms the development of

Tab. 4: Polish regions – σ -convergence of GDP per capita and its breakdown (2000–2013)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
GDP per capita	.209	.209	.204	.205	.208	.216	.220	.219	.212	.229	.238	.240	.244	.242
Productivity changes														
Labour productivity	.123	.123	.123	.122	.114	.130	.131	.127	.121	.138	.148	.142	.145	.144
in %	58.7	58.8	60.0	59.5	54.8	60.1	59.5	58.0	56.9	60.4	62.3	59.2	59.6	59.7
Labour utilization	.016	.019	.015	.016	.018	.019	.016	.016	.014	.016	.013	.013	.015	.015
in %	7.6	9.1	7.3	7.6	8.7	8.7	7.4	7.3	6.7	6.8	5.4	5.6	6.2	6.0
Employment changes														
Employment rate	.019	.021	.027	.023	.025	.020	.013	.009	.008	.011	.009	.010	.011	.012
in %	9.1	10.3	13.1	11.4	12.0	9.0	5.8	4.1	4.0	4.8	3.9	4.2	4.7	4.9
Labour parti-cipation rate	.051	.046	.040	.044	.051	.048	.060	.067	.069	.064	.068	.074	.072	.071
in %	24.6	21.8	19.6	21.4	24.4	22.2	27.4	30.6	32.4	27.9	28.4	31.0	29.5	29.4

Source: authors' own work based on Eurostat (2015)

disparities among Polish regions in comparison with the development of disparities among regions of other Visegrad Group countries is totally unique – there is in fact no increase in the proportion of Labour productivity disparities within the GDP per capita disparities, but the amount of this proportion oscillated (with rare exceptions) within the range of 2.5 percentage points throughout the period 2000–2013. In practical terms this means that the growth of disparities in the economic performance of Polish regions must be attributed to at least one other significant factor in addition to the growth of disparities in Labour productivity. At the same time it is also clear that in terms of growth of disparities in GDP per capita the Labour productivity factor is not the most important determinant; based on the values recorded in Tab. 4 that position has been taken by the Labour participation rate.

The development of disparities in the Labour participation rate to some extent also correlates with the development of disparities in GDP per capita (as well as with Labour productivity) – i.e. they only started to increase after Poland's accession to the EU. It is therefore quite the opposite development to the development of regional disparities in other Visegrad Group countries. This fact is clearly demonstrated by the increasing contribution of Labour participation rate disparities to the disparities in economic productivity among Polish regions.

In terms of Employment rate in Polish regions one can undoubtedly talk about convergence, especially in the post-entry period; in terms of Labour utilization there is no clear trend of either convergence or divergence. However, in general, both these factors (Employment rate and Labour utilization) have very low and continuously decreasing impact on the extent of disparities in economic productivity among Polish regions.

4.4 Slovak Regions

As already partially implied above, the development of disparities in economic productivity among Slovak regions is in terms of σ -convergence measurement rather similar to Czech and Hungarian regions than to Polish regions. This statement is not only illustrated by Fig. 1 (see above) but it is also backed up by the results presented in Tab. 5. Since the beginning of the monitored period (2000) there has been an increase in disparities in GDP per capita among the Slovak regions. The extent of disparities among the Slovak regions is the highest within the Visegrad Group, and at the same time the development of these disparities is generally the most dynamic. However, the outlined situation could to some extent be caused by the lowest count of Slovak regions; therefore, it is necessary to consider this part of the analysis to be the most limited. Given the above dynamics of disparities in

Tab. 5: Slovak regions – σ -convergence of GDP per capita and its breakdown (2000–2013)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
GDP per capita	.495	.500	.518	.518	.524	.583	.556	.566	.544	.591	.579	.596	.579	.588
Productivity changes														
Labour productivity	.308	.322	.357	.351	.363	.422	.411	.424	.404	.450	.447	.452	.434	.458
<i>in %</i>	62.3	64.4	68.8	67.8	69.3	72.4	74.0	74.9	74.2	76.2	77.2	75.8	74.9	77.8
Labour utilization	.029	.016	.020	.021	.018	.014	.015	.016	.019	.019	.019	.024	.026	.025
<i>in %</i>	5.9	3.3	3.8	4.1	3.4	2.4	2.8	2.8	3.6	3.1	3.3	4.1	4.6	4.2
Employment changes														
Employment rate	.083	.081	.070	.071	.079	.082	.066	.053	.047	.051	.055	.057	.059	.055
<i>in %</i>	16.8	16.3	13.5	13.7	15.1	14.1	11.9	9.3	8.6	8.7	9.5	9.6	10.1	9.4
Labour participation rate	.075	.080	.072	.075	.064	.065	.063	.073	.074	.071	.058	.063	.060	.051
<i>in %</i>	15.1	16.1	13.9	14.4	12.2	11.1	11.3	12.9	13.5	12.0	10.0	10.5	10.4	8.7

Source: authors' own work based on Eurostat (2015)

GDP per capita it is not clear whether at the end of the 2000–2013 period the disparities had a tendency to stabilize (as in the case of Hungarian regions), or whether we could rather talk about their ongoing accretion (as in the case of Polish regions). In any case, based on our measurements there is no evidence speaking in favour of the beginning of convergence (as is the case in Czech regions).

Based on the breakdown we can repeat the general assertion, which is valid for all the Visegrad Group countries and that proclaims the Labour productivity factor to be clearly the dominant component of disparities in the economic productivity among their regions. The disparities in Labour productivity among Slovak regions grew both before and after Slovakia joined the EU, i.e. throughout the 2000–2013 period, and at the same time the proportion of these disparities contributing to the disparities in GDP per capita were also increasing. In the case of the Labour utilization factor the development of disparities among Slovak regions seems to be the most different in comparison with other countries of the Visegrad Group. It is, in terms of its extent, the least determining factor within the GDP per capita; however, although in the case of Czech, Hungarian, and Polish regions we can speak about convergence or at least a stable development of the Labour utilization factor, the extent of disparities among Slovak regions seems to rather increase in the post-

entry period, which is reflected in the increasing contribution to the GDP per capita disparities and therefore, to a certain extent, their growth.

The demographic and economic factors of disparities among Slovak regions, i.e. Employment rate and Labour participation rate, are characterized by a very similar development – both went through a decline in regional disparities, and thus to a decline in the economic performance disparities. Both the absolute and the percentage contributions of the Employment rate factor to the GDP per capita disparities are the highest among the Visegrad Group countries. The development of the Labour participation rate disparities among Slovak regions can be, to some extent, compared to Hungarian regions in terms of their absolute contribution to the GDP per capita disparities. However, in terms of percentage the impact of the Labour participation rate factor is lower due to higher disparities in GDP per capita among Slovak regions.

4.5 A Cross Country Comparison

With all the above mentioned results in mind, we can state that Labour productivity is unambiguously the most important factor of regional disparities in economic performance across the Visegrad Group countries, since its contribution dominates over the other components in all the countries. This result is

in one line with some other studies (Cuaresma et al, 2012; Barro & Sala-i-Martin, 2004; Gardiner et al, 2004; etc.). Moreover, we have found its increasing figures both in absolute terms as well as relative to disparities. Those simple facts suggest the impact of disparities in Labour productivity is becoming more important over time; meanwhile it is increasing the gap between regions. The situation in the Labour utilization component is completely opposite to the previous case. The contribution of Labour utilization factor to regional disparities in growth is very low and mostly tends to convergence. Nevertheless, its low importance within the disparity process is not strong enough to compensate for the increase due to the divergence in Labour productivity. See Appendix 1 for visual comparison of disparities in the GDP growth by components.

The contribution of Employment indicators – Employment rate and Labour participation rate – to disparities between Visegrad Group states is rather minor. The results are much more variegated in both its contributions as well as trends in disparity process between the countries of Visegrad Group. Even though the general patterns are not so obvious in the Employment components, another important finding has been revealed. The EU accession seems to have catalysed some changes in the previous trends (this is not so obvious from Tabs. 2–5; see Appendix 1 for better recognition of those changes). However, these changes had only little impact on the development of regional disparities in economic performance of Visegrad Group countries.

Conclusion

The aim of this paper was to assess the development of disparities in the economic performance of regions of the Visegrad Group countries, to identify how the individual factors of economic growth determine these disparities, and also to assess whether the integration of the Visegrad Group countries into the European Union affected the development of regional disparities in these countries.

Based on the analysis of the development of regional disparities in the Visegrad Group countries it can be argued that during the period 2000–2013 the regions converged, in general, to the EU 28 average, with the exception of only two metropolitan regions (Bratislava, Prague). However, when comparing a shorter period

(2004–2013), which reflects the integration of the Visegrad Group countries into the EU, we can say that after joining the EU, the measured trends varied considerably among individual countries. While in the Czech and Hungarian regions there were rather deceleration trends measured (in the case of a large number of Czech regions and a few Hungarian regions they even moved towards a divergence with values below the EU 28 average), in Slovak and Polish regions the convergence trend toward EU 28 was rather steady (in the case of several Polish regions they even slightly accelerated). Therefore, the effect of the Visegrad Group countries joining the EU seems generally contradictory from this point of view; the effect on the convergence of Czech and Hungarian regions seems to be rather negative, while in the case of the Polish and Slovak regions rather positive.

In terms of using σ -convergence to measure disparities between regions of the Visegrad Group countries it can be stated that from the transnational perspective across the whole Visegrad Group there was an increase in disparities culminating in 2007, followed by a turn towards convergence, and in 2011 the extent of disparities reached the values of 2004, thus, in the subsequent period the extent of regional disparities in the Visegrad Group countries was lower than before their accession to the EU. However, the question is to what extent can the convergence be attributed to the countries joining the EU, and to what extent did the economic crisis have different effects on the economies of individual countries. In terms of intranational disparities we can only come to conclusions about convergence in the case of the Czech regions. Regarding Hungarian and Slovak regions we can possibly talk about a stabilization of the extent of disparities, or their oscillation in the range of percentage units with no further increase, but at the same time we cannot unambiguously say that a downward trend has started. Polish regions show a completely different development; the growth of disparities only started after Poland's entry into the EU, but based on the measurements it is obvious that the stabilization of disparities, let alone convergence, has not yet taken place there. Generally it can be said that the Visegrad Group regions have converged, but internally the disparities within the Visegrad Group countries have rather grown or stagnated.

Only in the case of the Czech Republic regions we can think about an initiation phase of convergence. These conclusions are quite significant regarding the application and configuration of regional policy tools, especially as they are somewhat surprising; on the other hand, they are consistent with several other studies that also record similar anomalies in terms of regional convergence within the EU.

In the context of the analysis of natures of disparities within the Visegrad Group it is possible to discern disparities in productivity expressed as GDP per hour worked as the main determinant of regional disparities in economic performance. This fact surely cannot be surprising as other authors have previously come to the same conclusion after analyzing the sources of economic growth. However, what is rather surprising is the large diversity among regions in different countries of the Visegrad Group, both in terms of the extent of variability of individual natures of economic performance determinants and in terms of their trends. In the Czech Republic, Hungary, and Slovakia, the proportion attributable to Labour productivity in terms of regional disparities clearly rose throughout the monitored period (2000–2013) – in 2013 it accounted for more than 75% of the disparities in GDP per capita among Hungarian and Slovak regions, and almost 85% among Czech regions. Conversely, in the Polish regions a lower and relatively stable proportion of disparities in Labour productivity among the GDP per capita disparities was measured, which oscillated around 60%. In terms of regional disparities in Labour utilization it is true for all the countries that this factor has been contributing to the GDP per capita disparities by only a very small proportion. At the same time it can be argued that in terms of the development of Labour utilization all regions of the Visegrad Group countries, with the exception of Slovakia, displayed convergence.

It can generally be said that the development of growth disparities in the context of the Employment indicators contributes to the existence of disparities in the economic performance of regions in a rather minor way; however, due to the substantial influence of Productivity this is quite logical. In terms of disparities in Employment rate it can be stated that among regions of all countries, except Hungary, there was a convergence as well as a contribution to the GDP per capita disparities.

In the context of the Labour participation rate the convergence tendencies and declining contribution to the economic disparities are evident among Czech, Hungarian, and Slovak regions, while in the case of Hungarian and Slovak regions the initial extent of disparities and the following intensity of the convergence process were larger. In contrast, the Polish regions displayed regional divergence in terms of Labour participation rate and at the same time a growth in the contribution of this indicator to the development of GDP per capita disparities. Based on this fairly definite conclusion it can be argued that the causes of disparities growth among Polish regions do not originate in Productivity changes, as is the case in other Visegrad Group countries, but are the result of divergence in the Labour participation rate.

In terms of the accession of the Visegrad Group countries into the EU there have been certain changes in the sources of regional disparities measured, but these changes are rather minor and had only little impact on the development of disparities in economic performance. In terms of the development of Labour productivity and other, at least initially, significant determinants of regional disparities, among which for all countries, except the Czech Republic, Labour participation rate belongs, it seems that, with the exception of Poland, the existing trend started in the period before the accession of the Visegrad Group countries to the EU. Data on Polish regions indicate that a significant change in the development of Labour participation rate only occurred around the 2004 period.

In the end we can, with respect to the above findings, perhaps briefly summarize that there are some similarities but also some quite fundamental differences in the development of disparities in the economic performance of regions within the Visegrad Group countries. Generally, the most important determinant of economic disparities are the disparities stemming from the Labour productivity factor, where regions, with the exception of Poland, diverge, while in terms of other examined natures of disparities they rather converge. The impact of Labour productivity on the extent of regional disparities in economic performance has grown for the majority, while other factors have been contributing to disparities at a declining rate. At the same time we can

say that the country, whose development of regional disparities is most deflected from others, is Poland. In terms of the impact on regional convergence of the Visegrad Group countries entering the EU it is not possible to come to a definite conclusion. Although, in terms of economic performance almost all regions of the Visegrad Group countries clearly converged to the EU 28 average value and in terms of the Visegrad Group as a whole, the question is how much of this convergence is due to the EU integration and how much is due to other factors that indisputably had an influence on economic performance. It should also be noted that in the absence of data we conducted research based on the basic breakdown of growth, which does not reflect changes in technological development nor quantitative and qualitative changes in the structure of regional capital. Nonetheless, due to the confirmation of the assumption that changes in the population characteristics affect the development of disparities in a rather minor way, and at the same time the development within these demographic factors rather speak in favour of convergence trends, it is clear that detailed research into the breakdown of the equity component of growth would undoubtedly be very desirable.

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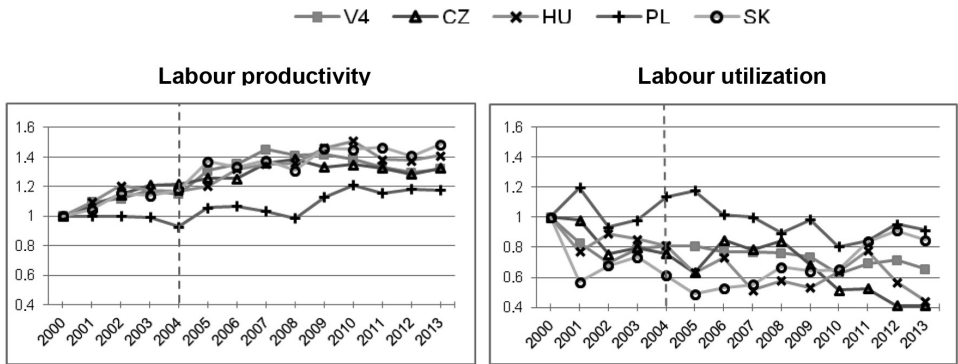
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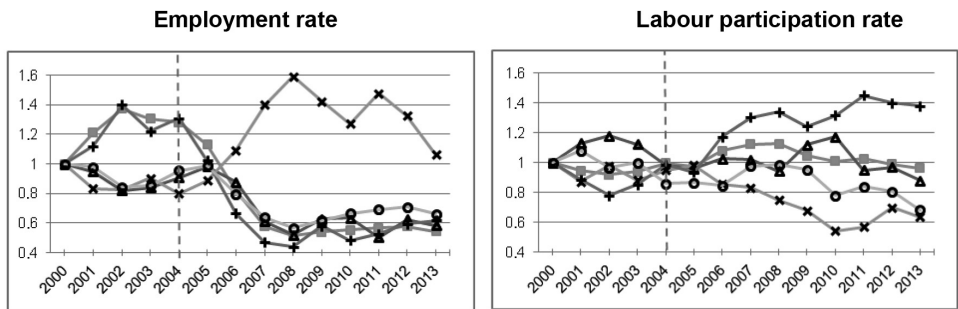
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Appendix 1: σ -convergence of growth components, the Visegrad Group and its countries (2000–2013)



Source: authors' own work based on Eurostat (2015)



Source: authors' own work based on Eurostat (2015)

GROWTH DISPARITIES AMONG REGIONS OF THE VISEGRAD GROUP COUNTRIES: AN EVIDENCE OF THEIR EXTENT AND NATURE

Pavel Zdražil, Petra Applová

The deepening of regional disparities is an issue of increasing importance that has been systematically emphasized in the EU policy, especially since the process of “Eastern Integration” has started. The paper focuses on the Visegrad Group countries whose regions are less developed in the EU context. The aim of the research is to assess the development of disparities in regional economic performance of the Visegrad Group countries, to identify how the factors of economic growth determine these disparities, and partly to assess whether the integration of the Visegrad Group countries into the EU influenced the development of regional disparities in these countries. For the analysis of disparities during 2000–2013 we selected an approach of measuring real convergence (sigma-convergence). Disparities were measured in the context of a breakdown of the GDP per capita into sub-components, reflecting on the development of disparities in productivity and employment.

The results show that, although regions of the Visegrad Group countries converged towards the EU average and also in terms of the Visegrad Group as a whole, regional disparities within countries rather increased. This led to a paradox where, although the objective of reducing regional disparities across the EU was satisfied, from a national perspective disparities increased. The Labour productivity factor, with its dominant yet steadily growing contribution, is the main determinant of disparities in the performance of the Visegrad Group regions. Other sources of disparities are characterized by a stable development or convergence. Only Polish regions deviated from the general conclusions, since the extent of disparities among them grew constantly, and the nature of disparities was the Labour participation rate. In terms of the impact caused by accession into the EU, the measured changes were rather minor and the identified trends had mostly been in place before the Visegrad Group countries entered the EU.

Key Words: *Visegrad Group, Central Europe, regional disparities, productivity, growth, EU enlargement.*

JEL Classification: *R11, O47.*

DOI: *10.15240/tul/001/2016-2-003*

GREEN GROWTH AND USE OF EU STRUCTURAL FUNDS IN BALTIC STATES, CZECH REPUBLIC AND SLOVAKIA

Dalia Štreimikienė, Asta Mikalauskienė

Introduction

Green growth is resource-efficient, cleaner economic growth and more resilient without slowing it. Green growth policies pursue a variety of goals, they are best served by a combination of instruments. There are many questionable assumptions in the discussion of economic growth. One of them is the idea that governments are able to achieve sustained high growth. Another one is the believe that the solution to pressing financial and social problems centers on higher growth. The solving of such problems is about radical growth in environmental and resource-saving technologies. It is also about radical “de-growth” in products and processes that undermine long-term living and production conditions (Janicle, 2012). Green growth not only affects the quality of growth, but overall production. In this case, growth results from the investment in the upgrading of the entire production system to environmental and resource-saving processes and products. A prototype of this phenomenon is the climate-friendly “low-carbon economy.” In this broader sense, there is also discussion of sustainable “green economy,” referring to a comprehensive business innovation process. Green growth is EU policy priority. Green growth of EU member states can provide for cohesion and harmonious development of EU member states.

More than one third of the EU’s total budget is spent on so-called Cohesion Policy via the structural funds. Its main purpose is to promote the overall harmonious development of the EU, to reduce disparities between the levels of development, and to strengthen its economic and social cohesion. However the results of studies completed for assessment of use of EU structural Funds to ensure cohesion are contradictory (Mohl & Hagen, 2009). Generally, the literature review does not lead to clear-cut

results. Some authors do empirical evidence for a positive impact of European structural funds. The conclusions are based on different sample sizes and different EU member states. Bussoletti and Esposti (2004) use an EU-15 sample, whereas smaller samples are used by Cappelen, Castellacci, Fagerberg and Verspagen (2003) (EU-9) or Bouvet (2005) (EU-8). Some studies even concentrate on single country studies such as Eggert, von Ehrlich, Fenge and Konig (2007) (Germany) or Antunes and Soukiazis (2005) (Portugal). Furthermore, some authors do not find any statistically significant impact of structural funds on the regional growth rates (Garcia-Mila, & McGuire, 2001; Dall’erba, & Le Gallo, 2008). Moreover, in some cases the findings are conditioned on certain aspects. Rodriguez-Pose and Fratesi (2004) conclude that only structural fund expenditures for education and investment have a positive impact in the medium run, whereas expenditures for agriculture do not. Ederveen, Gorter, de Mooij and Nahuis (2002) condition the key results on the assumptions of the convergence model. Assuming that all regions finally catch up to the same level, they find positive evidence. By contrast, assuming that the convergence process is limited to convergence within countries, they do not find a positive impact. Finally, Puigcerver-Penalver (2004) finds that structural funds to have a positive impact on economic growth.

The aim of this paper is to review and compare achievements of Baltic States, Czech Republic and Slovakia in green growth and use of EU Structural Funds for green growth.

Seeking to achieve this aim the main tasks are:

- to review literature and policy documents on green growth and its benefits;
- to analyse and compare green growth achievements of Baltic States and Czech Republic and Slovakia in green growth;

- to analyse and compare use of EU structural Funds for green growth priorities in Baltic States and Czech Republic and Slovakia;
 - to develop policy recommendations based on the main findings of analysis conducted.
- The methods applied: comparative analysis, graphical analysis, systematization and generalization.

1. Green Growth

Over recent years the concept of green growth has burst onto the international policy scene. A term rarely heard before 2008, it now occupies a prominent position in the policy discourse of international economic and development institutions (Jacobs, 2012). The World Bank, along with five other multilateral development banks, has committed itself to this goal (World Bank, 2012a; 2012b). The OECD has adopted a 'green growth strategy' of research and publications (OECD, 2012). A new international body, the Global Green Growth Institute, supported by a number of governments, has been created to advise countries on its implementation (GGGI, 2012). Using its own preferred label of 'the green economy', the United Nations Environment Programme has published a 600-page report (UNEP, 2011). These four institutions have jointly established a 'Green Growth Knowledge Platform' to provide a locus for research and knowledge about the field (World Bank, 2012c). A number of high level meetings and networks have been established (Global Green Growth Forum, 2012; Green Growth Leaders, 2012). Several countries have adopted green growth as an explicit policy objective (OECD, 2012a), while at the G20 Summits in France and Mexico in 2011 and 2012, the largest economies in the world committed themselves to its promotion (Government of France, 2011; Government of Mexico, 2012). The 'green economy' was a major focus of the 'Rio+20' United Nations Summit in June 2012 (UNCSD, 2012).

The concept of economic growth which also meets environmental objectives is not new. Indeed it lay at the heart of the discourse of 'sustainable development', first popularised by the Brundtland Report (World Commission on Environment and Development, 1987) and subsequently institutionalised by the Rio 'Earth Summit' in 1992 (Dresner, 2008). Sustainable development remains the core principle of international environmental policymaking, and

of national environmental planning in many countries. Indeed, the official institutions now promoting green growth insist that it is not a substitute for sustainable development but a way of achieving it (OECD, 2011; UNEP, 2011; World Bank, 2012b). Inherent in the "growth" part of "green growth" is a focus on the relatively long term. And the usual starting point for discussions of long-term development policies is the notion of sustainability (Heal, 2012). In what has deservedly become canonical text, the Brundtland Report (World Commission on Environment and Development, 1987) defined sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." Many subsequent discussions of sustainability refer to its economic, social, and environmental pillars.

For economists, a natural way to sharpen the notion of sustainability is to consider the various stocks a nation or group of nations holds at any particular time. These would include various types of renewable and non-renewable natural resources, fixed capital, knowledge, human health, human capital, and environmental quality. What Heal (2012) calls weak sustainability would then be defined as the requirement that the stocks we pass to future generations be at least as capable of providing them with good living standards as the stocks we inherited. This doesn't mean that none of our stocks can ever be reduced, just that the overall value of the whole portfolio cannot be decreased (Schmalensee, 2012). Heal (2012) notes, for instance, that both Botswana and Namibia are depleting their stocks of natural capital, but Botswana may be on a sustainable development path because it is building up stocks of human and fixed capital, while Namibia is not doing so. He argues that Saudi Arabia, which is mainly using non-renewable oil resources to support consumption rather than any sort of investment, is "the ultimate country example of unsustainability." Similarly, it is hard to see what assets are being built up to offset the global declines in fish stocks and underground aquifers or the increases in greenhouse gas concentrations.

While these examples are fairly clear, Heal (2012) and Reilly (2012) show that assessing the sustainability of a nation's development path encounters some difficult, longstanding conceptual and measurement issues. All

economists would agree that GDP growth is not an adequate measure of progress: a nation that sells more of its oil every year to finance increasing consumption is getting poorer, not richer. Selling the family silver to pay the rent does not increase properly measured income, even if it permits a move to a better apartment. Similarly, the uncertain future costs of climate change must be offset against the current benefits of fossil fuel use.

The U.S. Bureau of Economic Analysis has developed a system of Integrated Environmental and Economic Satellite Accounts to address these issues, and the World Bank has developed a conceptual frame-work and data to measure Adjusted Net Savings (Heal, 2012). But serious problems remain. The valuation of such assets as air quality and forested public lands is difficult conceptually.

Hallegette et al. (2011) assert that Green growth is about making growth processes resource-efficient, cleaner and more resilient without necessarily slowing them. This phrase has no obvious content, since few would intentionally slow growth processes unless doing so had other benefits. Whatever it is intended to mean, the discussion they subsequently present makes clear these authors' view that taking the steps they propose will more likely speed up growth than slow it down. In both these definitions, the "social pillar" of sustainable development is completely absent. In contrast, it plays the central role in the World Bank's push for "inclusive growth," growth that is "broad-based across sectors and inclusive of the large part of the country's labor force" (Ianchovichina & Lundstrom, 2009). Green growth would thus appear to be a "subset" of sustainable development in the sense that only a subset of the capital stocks relevant to meeting the needs of future generations is explicitly considered.

Hallegette et al. (2011) defend this approach by arguing that social improvements follow more or less automatically from economic growth.

Green growth (GG) and green economy (GE) have been subject to various definitions but those currently being used by international organisations have a lot in common. Green growth seeks to fuse sustainable development's economic and environmental pillars into a single intellectual and policy planning process, thereby recasting the very essence of the development model so that it

is capable of producing strong and sustainable growth simultaneously (Samans, 2013). It aims to foster economic growth and development, while ensuring that natural assets are used sustainably, and continue to provide the resources and environmental services on which the growth and well-being rely (OECD, 2011). It is growth that is efficient in its use of natural resources, clean in that it minimises pollution and environmental impacts and resilient in that it accounts for natural hazards (World Bank, 2012). Green economy aims for improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities (UNEP, 2011). The concept of green economy rests on the economy, the environment and the social pillars of sustainable development. A broader concept of 'inclusive' green growth or sustainable development incorporates fully the social sustainability aspects, in particular enhancing human development and the conditions for the poor and vulnerable (Green Growth Knowledge Platform, 2013).

Greening growth and moving towards a greener economy is complex and multi-dimensional. It entails (i) pricing externalities and valuing natural assets for the long-run services they provide and pricing externalities; (ii) innovation as a means of breaking with unsustainable growth paths; (iii) the creation and dissemination of new, more environmentally sustainable technologies, goods, and services; and (iv) sectoral shifts and changes in comparative advantage that inevitably imply winners and losers. If GG/GE is to help move countries towards more sustainable development, the social consequences and local contexts of the transition to a greener economy must be central to managing change (Green Growth Knowledge Platform, 2013). GG/GE policies need solid, evidence-based foundations. Assessing and communicating the need for policies and whether they achieve their stated goals requires proper monitoring of the underlying developments, progress, and potential opportunities and risks. GG/GE indicators can serve to improve the level of debate on GG/GE and inform the wider public.

At the 2012 UN Conference on Sustainable Development ("Rio+20"), the Heads of State and Government and high-level representatives recognized the indicators as a necessary means to assess progress towards the achievement of

the sustainable development goals, while taking into account different national circumstances, capacities, and levels of development (Green Growth Knowledge Platform, 2013). Green economy has been proposed as a means for catalysing renewed national policy development and international cooperation and support for sustainable development. And the relevant bodies of the UN system were requested to support collecting and compiling integrated and scientifically based information from national sources (UN, 2012).

Measuring progress on a complex and multi-dimensional change and identifying relevant indicators are challenging tasks. No agreement exists yet on an analytical framework or a set of indicators to monitor GG/GE. Data for natural capital is notoriously poor and efforts are needed to both collect and harmonise it. Different institutions are relying on different indicators. Different national circumstances, capacities and levels of development add to the complexity of a common approach on indicators. And no single indicator will suffice to capture

Tab. 1: Green growth indicators

Green growth performance indicators	Units of measurement
<i>Macroeconomic indicators</i>	
Energy intensity	kgoe/€
Carbon intensity	kg / €
Resource intensity (reciprocal of resource productivity)	kg / €
Waste intensity	kg / €
Energy balance of trade	% GDP
Energy weight in HICP	%
Difference between energy price change and inflation	%
Ratio of environmental taxes to labour taxes	ratio
Ratio of environmental taxes to total taxes	ratio
<i>Sectoral indicators</i>	
Industry energy intensity	kgoe / €
Share of energy-intensive industries in the economy	% GDP
Electricity prices for medium-sized industrial users**	€ / kWh
Gas prices for medium-sized industrial users***	€ / kWh
Public R&D for energy	% GDP
Public R&D for the environment	% GDP
Recycling rate of municipal waste	ratio
Share of GHG emissions covered by ETS*	%
Transport energy intensity	kgoe / €
Transport carbon intensity	kg / €
<i>Security of energy supply</i>	
Energy import dependency	%
Diversification of oil import sources	HHI
Diversification of energy mix	HHI
Renewable energy share of energy mix	%

Source: own

the many dimensions on which progress is needed. Yet, from a communication and policy action viewpoint, too many indicators can be confusing. Thus, further efforts to converge on an internationally agreed set of indicators are necessary.

Europe 2020 is the EU's growth strategy for the coming decade. In a changing world, we want the EU to become a smart, sustainable and inclusive economy. These three mutually reinforcing priorities should help the EU and the Member States deliver high levels of employment, productivity and social cohesion. Concretely, the Union has set five ambitious objectives – on employment, innovation, education, social inclusion and climate/energy – to be reached by 2020. Each Member State has adopted its own national targets in each of these areas. Concrete actions at EU and national levels underpin the strategy. The 2015 European Semester kicked off in 2014 November with the Annual Growth Survey, which outlined the new Commission's three-pillar jobs and growth strategy: boosting investment, accelerating structural reforms and pursuing responsible, growth-friendly fiscal consolidation. In February, the European Commission published a series of country reports in February, analyzing Member States' economic policies. In May 2015, the Commission has published the country-specific recommendations for each Member State, along with an overarching Communication on how to strengthen and sustain the recovery, and how the streamlined European Semester is implemented. There several important indicators of green growth indicated European Commission Reports (Tab. 1).

As one can see from table 1 the green growth performance indicators consists from macroeconomic indicators, sectoral indicators and security of energy supply. All Member States have committed to the Europe 2020 strategy. However, each country has different economic circumstances and translates the overall EU objectives into national targets in its National Reform Programme – a document which presents the country's policies and measures to sustain growth and jobs and to reach the Europe 2020 targets. The National Reform Programme were presented by EU member states in parallel with its Stability/Convergence Programme, which sets out the country's budgetary plans for the coming

three or four years All indicators presented in table 1 were assessed by EU member States in their National Reform programmes. In the next section of paper the dynamics of the main indicators of green growth in Baltic States and Czech Republic and Slovakia will be analysed by applying graphical analysis in order to define the best performing country.

2. Green Growth Achievements in Baltic States, Czech Republic and Slovakia

Green growth is the priority of EU cohesion policy and can serve for harmonious development of EU member states. The European Commission encourages more intensive use of the Structural and Cohesion funds EU Structural Funds for green growth. Achievements of Baltic States and Czech Republic and Lithuania in green growth at 2012 in indicators presented in table 1 are summarized in table 2.

As one can see from information provided in table 2 according macroeconomic indicators related to energy intensity and carbon intensity Latvia and Lithuania are best performing countries however according to industry energy intensity Latvia is the worst performing country having highest energy intensity of industry. Lithuania and Latvia have very low rates of recycling of municipal waste comparing with Czech Republic and Slovakia. Lithuania has lowest energy and carbon intensity of transport and comparable low share of GHG emissions covered by Emission Trading Scheme (ETS). This indicates that country does not put tax burden on many GHG emitting sectors. Regarding security of energy supply Lithuania has the highest energy important dependency. The lowest energy import dependency is in Estonia following by Czech Republic because these countries have abundant local energy resources such as oil shale (Estonia) and coal (Czech Republic). Lithuania has the highest oil import diversification rate and quite low diversification of energy mix. Public R&D expenditures for energy and environment as the share of GDP are very low in all analysed countries. Estonia has the highest share of public R&D expenditures for energy and environment but also the highest energy and carbon intensity. Also Estonia distinguishes from other analysed countries with high diversification of energy mix and very high waste intensity as local energy source oil

Tab. 2: Achievements in green growth in Baltic States, Czech Republic and Slovakia, 2012

Green growth performance indicators	Units of measurement	Lithuania	Latvia	Estonia	Czech Republic	Slovakia
<i>Macroeconomic indicators</i>						
Energy intensity	kgoe/€	0.29	0.33	0.48	0.36	0.33
Carbon intensity	kg / €	0.89	0.79	1.50	1.09	0.84
Resource intensity (reciprocal of resource productivity)	kg / €	n.a.	n.a.	n.a.	n.a.	n.a.
Waste intensity	kg / €	0.23	0.17	1.72	0.19	0.17
Energy balance of trade	% GDP	-7.6	-6.0	-1.4	-4.3	-6.0
Energy weight in HICP	%	16.4	15.7	14.7	14.2	18.9
Difference between energy price change and inflation	%	3.8	7.3	7.2	5.0	1.8
Ratio of environmental taxes to labour taxes	Ratio	13.2%	17.7%	16.7%	13.0%	13.7%
Ratio of environmental taxes to total taxes	Ratio	6.1%	8.7%	8.6%	6.7%	6.2%
<i>Sectoral indicators</i>						
Industry energy intensity	kgoe / €	0.18	0.39	0.23	0.21	0.30
Share of energy-intensive industries in the economy	% GDP	n.a.	n.a.	12.6	14.6	15.0
Electricity prices for medium-sized industrial users	€ / kWh	0.11	0.11	0.08	0.10	0.13
Gas prices for medium-sized industrial users	€ / kWh	0.05	0.04	0.04	0.03	0.04
Public R&D for energy	% GDP	0.01	0.01	0.02	0.02	0.00
Public R&D for the environment	% GDP	0.00	0.01	0.03	0.01	0.01
Recycling rate of municipal waste	Ratio	20.4%	15.8%	44.2%	43.4%	22.3%
Share of GHG emissions covered by ETS	%	26.4	24.9	70.6	52.7	49.0
Transport energy intensity	kgoe / €	0.57	0.95	0.96	0.86	0.93
Transport carbon intensity	kg / €	1.63	2.53	2.76	2.40	2.62
<i>Security of energy supply</i>						
Energy import dependency	%	80.3	56.4	17.1	25.2	60.0
Diversification of oil import sources	HHI	0.75	0.28	0.20	0.27	0.67
Diversification of energy mix	HHI	0.29	0.30	0.45	0.27	0.22
Renewable energy share of energy mix	%	16.4	36.4	14.1	7.5	8.1

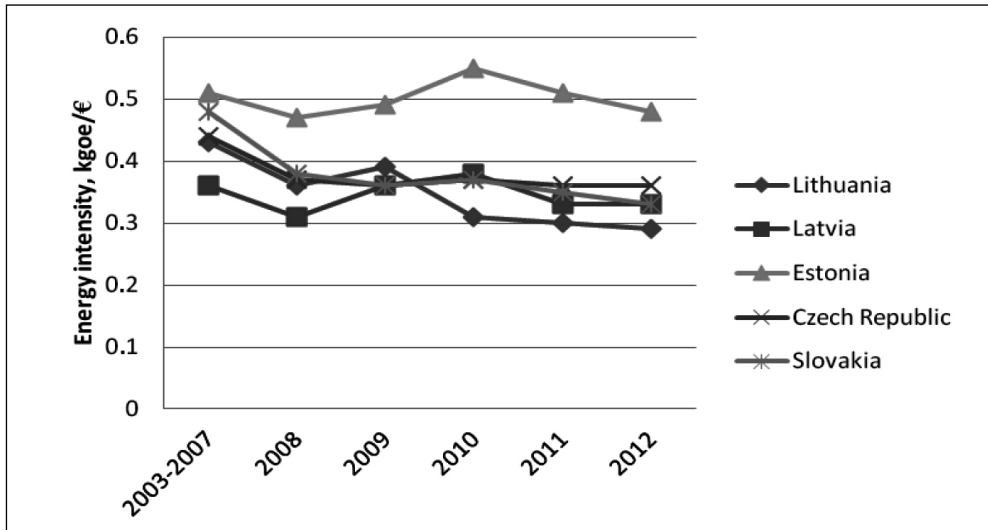
Source: (European Commission, 2015a,b,c,d,e,f)

shale has very high ash content. All countries have negative energy balance of trade. The (net) energy trade balance is expressed as a percentage of GDP. All other things being equal, the more negative this balance, the higher the likelihood that the current account is vulnerable to energy price shocks, and hence the bigger the contribution of trade in energy products to an external imbalance.

It is important to analyse the trends of the main green growth indicators in Baltic States, Czech Republic and Slovakia in order to assess the impact of use of EU Structural Funds to enhance green growth in these EU member states during 2007–2013.

In figures 1–8 the development of the main indicators of green growth in Baltic States, Czech Republic and Slovakia are presented.

Fig. 1: Energy intensity in Baltic States, Czech Republic and Slovakia



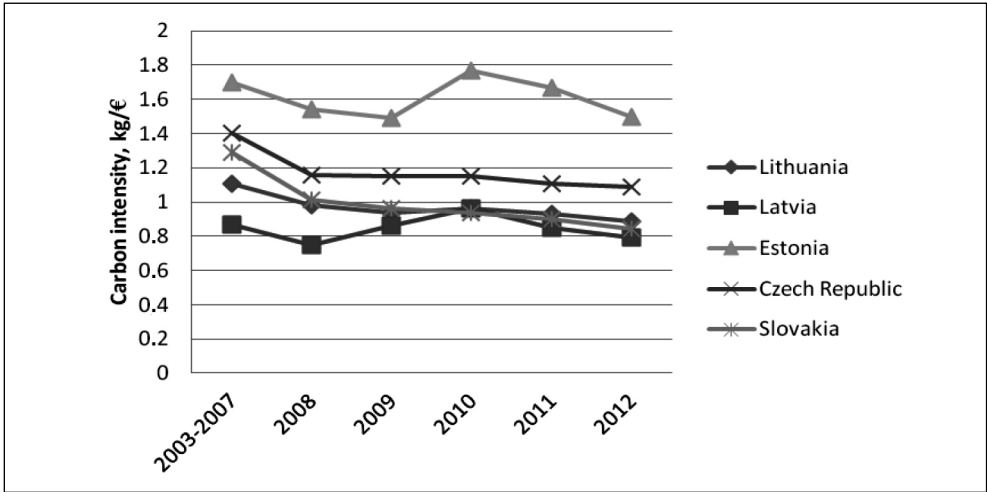
Source: EUROSTAT

The most important indicator of green growth is energy intensity of GDP as this indicator represents also competitiveness, environmental sustainability and energy security issues. Reduce of energy intensity in member states has direct impact on environmental and pollution reduction, climate change mitigation and on increase of competitiveness of economy and security of energy supply. In figure 1 the trends of energy intensity of GDP is compared in Baltic States, Czech Republic and Slovakia. As one can see from figure 1 though all Baltic States and Czech Republic and Slovakia have energy intensity well above EU-28 level the highest energy intensity is in Estonia and the lowest one in Lithuania. Comparing data of year 2004 with energy intensity in 2012 one can notice

that energy intensity was decreasing since entering EU in all analysed countries however economic crisis had negative impact and energy intensity started to increase however in Estonia energy intensity increase can be noticed since 2007 but in 2010 this trend has dramatically changed and energy intensity began to decrease. In other analysed countries the trend of energy intensity decrease can be noticed following the recovery from economic crisis in 2010. In Czech Republic the trends of energy intensity decrease were almost stable during all investigated period.

The CO₂ intensity of the economy for the whole EU decreased substantially since 2001 by about 23%. It declined for all Member States. However, similarly to the energy intensity, a trend break occurred around 2008 for a group

Fig. 2: Carbon intensity in Baltic States, Czech Republic and Slovakia



Source: EUROSTAT

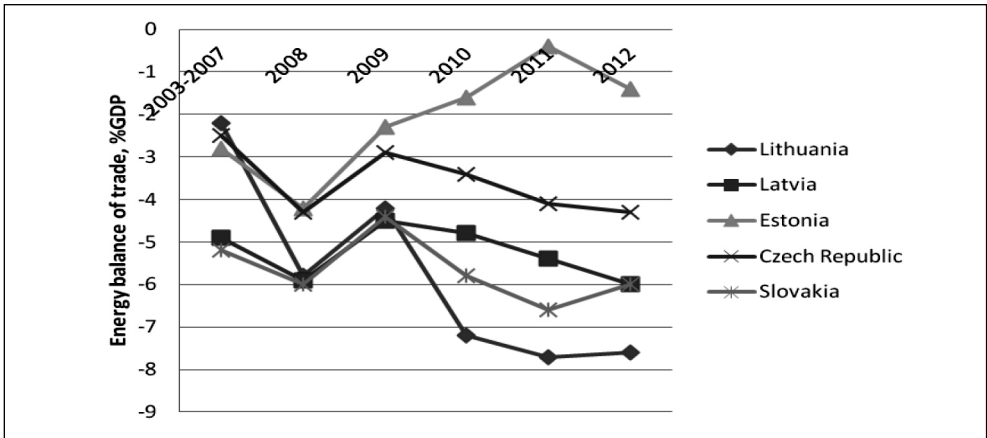
of countries when the carbon intensity of these economies started increasing. This is the case for Estonia and Latvia. In Czech Republic carbon intensity was decreasing during all investigated period.

As one can see from the figure 3 the persistently negative energy trade balance can be noticed in all analysed countries. In EU in 2013

negative energy balance in trade amounted to 3.1% of EU GDP up from 2.1% of 2009 therefore the negative trends can be noticed in all analysed countries. Especially in Lithuania this trend is very negative since the closure of the second unit at Ignalina NPP in 2009.

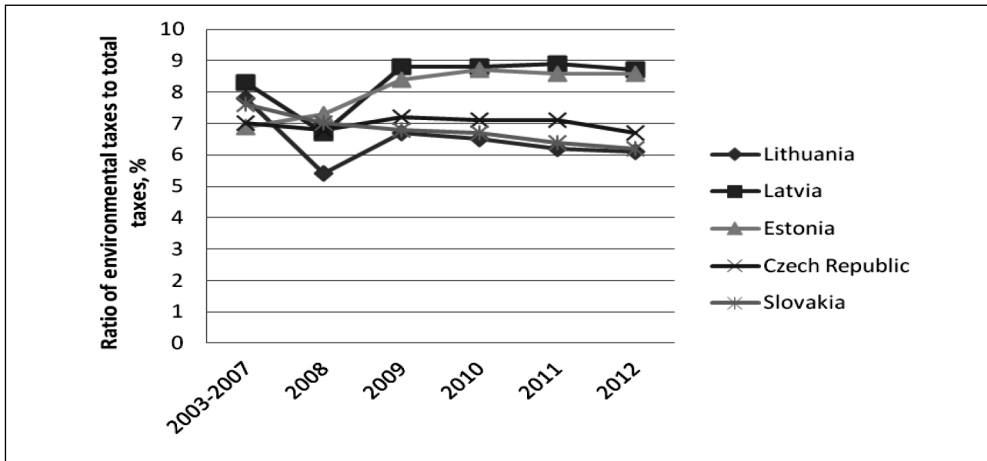
As one can see from fig. 4 the ratio of environmental taxes to total taxes was

Fig. 3: Energy balance of trade in Baltic States, Czech Republic and Slovakia



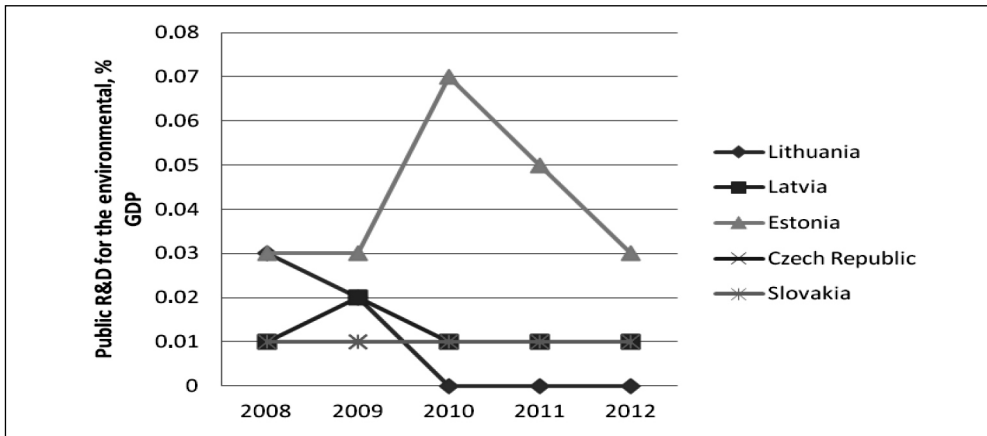
Source: EUROSTAT

Fig. 4: Ratio of environmental taxes to total taxes in Baltic States, Czech Republic and Slovakia



Source: EUROSTAT

Fig. 5: Public R&D expenditures for the environment in Baltic States, Czech Republic and Slovakia



Source: EUROSTAT

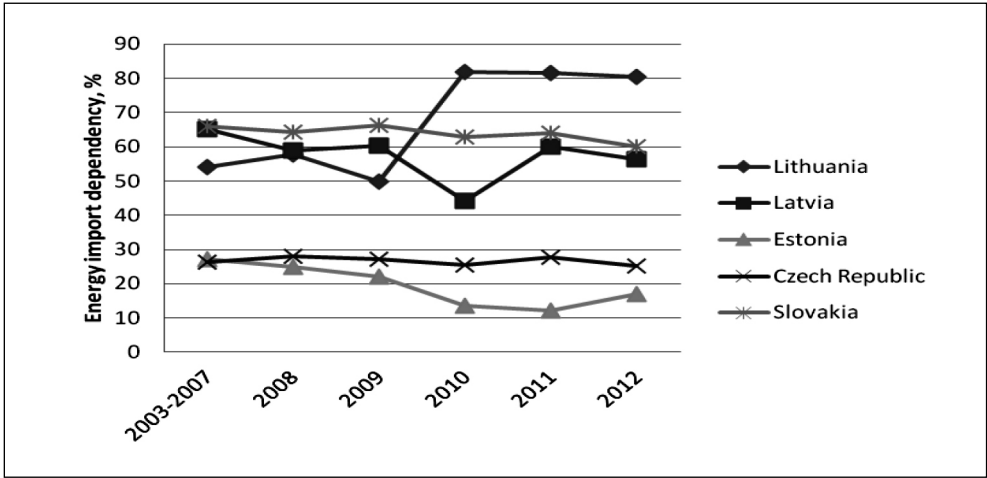
increasing since 2009 in all analysed countries however Lithuania and Slovakia remains with the lowest ratio of environmental taxes to total taxes between Baltic States, Czech Republic and Slovakia.

As one can see from fig. 5 though Estonia had the highest public R&D expenditures to environment in 2009 and especially 2010 their began to decline steeply since 2011 and almost

reached level of other analysed countries. In Czech Republic public R&R expenditures remained stable during investigated period.

As one can see from the figure 6 the highest energy dependency rate in 2012 was in Lithuania. This is related with the closure of Ignalina NPP in 2009 and increase of energy import. Before closure of Ignalina NPP Lithuania was net energy exporter. The lowest

Fig. 6: Energy import dependency in Baltic States, Czech Republic and Slovakia

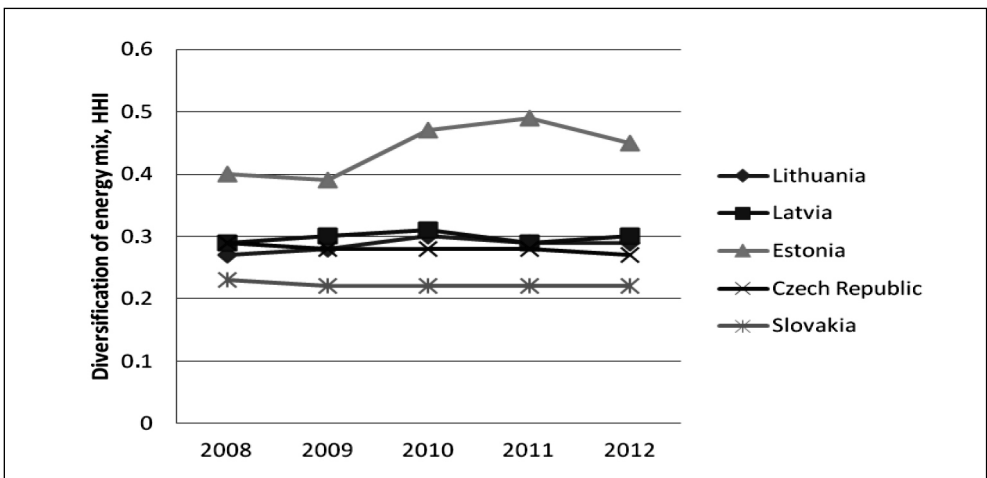


Source: EUROSTAT

energy import dependency is in Estonia though it has slightly decreased in 2012 comparing with year 2011. Estonia has abundant oil shale resources and has been utilising these resources in energy sector quite intensively however with entrance in force of stringent EU environmental regulations the use of oil shale

having high sulphur content is diminishing. Czech Republic also has quite low energy import dependency because of availability local coal resources. Slovakia and Latvia have high energy dependency rate well above EU-28 level however the trends in Latvia and Slovakia are very positive and energy dependency rates

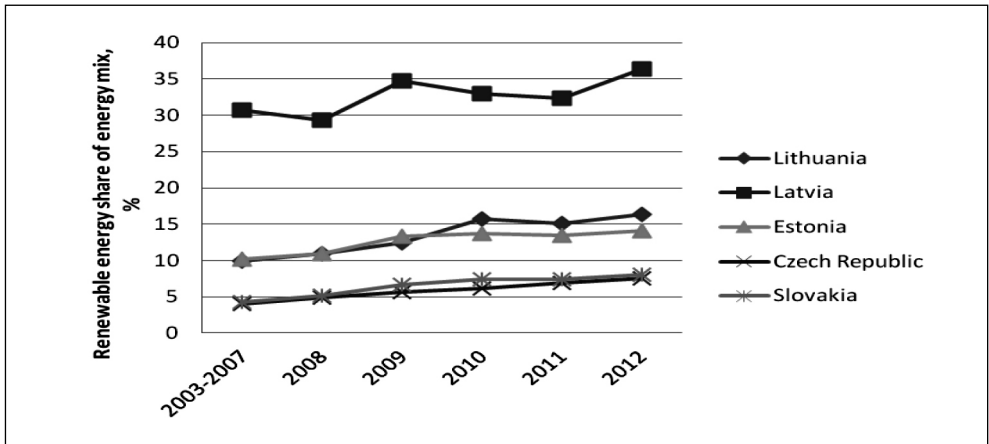
Fig. 7: Diversification of energy mix in Baltic States, Czech Republic and Slovakia



Source: EUROSTAT

Fig. 8:

Renewable energy share of energy mix in Baltic States, Czech Republic and Slovakia



Source: EUROSTAT

have decreased in these countries from almost 70% in 2004 to 55–60% in 2012.

As one can see from the figure 7 Estonia has the highest diversification of energy and since 2009 the trends of energy mix diversification were favourable in Estonia in other analysed countries the situation remained stable during investigated period.

As one can see from the figure 8 Latvia distinguishes with very high share of renewables in final energy which is well above EU-28 level. In Estonia and Lithuania the share of renewables in final energy is also above EU-28 level and has increased significantly since 2004 (by almost 70%). The high share of renewables in Latvia is related with the natural conditions and high share of hydro in electricity generation. The lowest share of renewables is in Slovakia and Czech Republic and though since 2004 use of renewables in final energy was increasing in all analysed countries the highest increase was achieved in Estonia. Comparing results achieved by new EU member states with target one can notice that Estonia achieved level above target set for 2020 in 2011.

It is necessary to stress that there is close relationship between green growth indicators as increase in the share of renewables and energy efficiency improvements have direct impact on reduction of energy and carbon intensity of economy and all sectors as well as on decrease

of energy import dependency, energy balance of trade and diversification of energy mix. Therefore the priorities of energy policy targeting increase use of renewable energy sources and energy efficiency improvements are important drivers of green growth. In the next section the analysis of use of EU structural funds will be performed seeking to compare countries in terms of means allocated to renewable energy and energy efficiency projects as well according other indicators related with allocations of means from structural funds.

3. Use of EU Structural Funds in 2007–2013 for Green Growth Priorities in Baltic States, Czech Republic and Slovakia

European Commission in 2013 developed data on the use of EU structural funds and the implementation of joint projects in the context of the EU countries for 2007–2013. Structural and Cohesion Funds – the EU's main common financial measure to promote its goals and play a central role to play in realising the EU climate change mitigation strategy. The strategy will only succeed if it is implemented through joint and consistent effort at all levels, from the local through regional and national to European, and if it is backed up by adequate financial resources. The funds should be used to help

the beneficiary member states move towards a sustainable and climate-friendly pattern of development. For this, however, EU cohesion policy aims to be “decarbonised” (Streimikiene & Balezentiene, 2012). The European Commission encourage more intensive use of the Structural and Cohesion funds to improve energy efficiency in the new Member States, including in the multi-family and social housing sectors. In the table 3 allocation of EU structural funds including the share of structural funds allocated for renewable energy and energy efficiency is presented in Baltic States.

As one can see from information provided in the table 3 the highest amount of EU structural funds per capita was allocated in Estonia and Czech Republic however the highest intensity of financing as the share of GDP was obtained in Lithuania. Comparing with Central and Easter Europe average this financing intensity was high in all Baltic States. The highest payment ratio was obtained in Estonia significantly exceeding CEE average rate. The highest

share of allocations for energy efficiency from EU structural funds in 2007–2013 was in Lithuania following Czech Republic however the highest share of allocations for RES in the same period was in Czech Republic and the lowest in Estonia following Lithuania.

Promotion of renewable energy sources (RES) and increase of energy efficiency are priorities of EU energy policy and among green growth indicators the major roles plays energy sector related indicators. In general, the energy sector has received funds and the Cohesion Fund and the ERDF. Some of analyzed countries have supported by RES from both structural funds, but Baltic States for promotion of use of renewable energy sources allocated just means from Cohesion fund. Lithuania and Latvia for financing of RES projects from Cohesion Fund allocated means just for biomass projects and Estonia allocated means for biomass and wind energy products in the 2007–2013 programming period. Estonia has allocated significant amounts of EU structural funds to wind energy projects

Tab. 3: Allocation of EU structural funds in Baltic States in 2007–2013

	Lithuania	Latvia	Estonia	Czech Republic	Slovakia	CEE total	CEE average
Population (million)	2.97	2.02	1.32	10.52	5.41	104.33	9.49
Annual GDP (EUR billion)	34.60	23.37	18.43	149.39	72.13	1,047.05	95.19
GDP per capita (EUR)	11,650	11,548	13,800	14,206	13,333	124,710.07	11,314
EU funds 2007–2013 (EUR billion)	6.77	4.54	3.40	26.3	11.65	175.72	
EU funds per capita (EUR)	2,280	2,243	2,595	2,501	2,154		1,830
EU funds per GDP (%)	19.6	19.4	18.5	17.6	16.2		16.2
Available budget 2007–2013 (EUR billion)	6.8	4.5	3.4	26.3	11.7	174.7	
Available budget 2007–2013 per capita (EUR)	2,278.8	2,242.7	2,595.4	2,501.7	2,151.4		2,102.3
Contracted grants 2007–2013 (EUR billion)	6.7	4.4	3.3	24.2	11.4	169.4	
Contracting ratio (%)	99	96	96	92	98		97
Paid grants 2007–2013 (EUR billion)	5.0	3.2	2.6	16.8	6.1	105.5	
Payment ratio (%)	70	70	77	64	53		63
The share of allocations for renewables	0.5%	0.6%	0.3%	2.1%	0.7%		
The share of allocations for energy efficiency	4.9%	2.0%	1.9%	2.4%	1.1%		

Source: CEE Bankwatch Network, 2012; KMP, 2014

and it would be possible to expect that Estonia has achieved good results in increasing use of renewables especially in electricity generation. Czech Republic was the only country applying the EU Structural Funds for all renewable energy technologies in 2007–2013. Also it was the only country applying more than 2% of means from Structural Funds to renewable energy projects.

“National general strategy: the Lithuanian Strategy for the use of European Union Structural Assistance for 2007–2013” is one of the main documents for this programming period in Lithuania. The National General Strategy was supposed to be implemented through four operational programmes (OP): Development of human resources, Economic growth, Cohesion promotion, and Technical assistance. These OP were established on the basis of three main Structural Funds that exist at the EU level: the European Regional Development Funds, the Cohesion Fund and the European Social Funds. The EU funds available for the framework programme are the equivalent of EUR 6.77 billion, with nearly all of these funds being contracted. EU funding played an important role in the Lithuanian economy as it was nearly equal to the annual state budget. In the 2007–2013 financial budgeting period, the majority of the EU funds in Lithuania were spent on economic growth and cohesion promotion OPs. So far the EU funds have been a tool for prosperity which has contributed to achieving faster economic growth, increasing knowledge and competence levels and improving living standards. Additionally, many new workplaces have been created. However there were two major problems related to the 2007–2013 financial budgeting period in Lithuania. First of all, even though there is plenty of data on how the EU funds are structured and implemented there is a lack of summarised data which would indicate how effective these funds were and what additional value was created. For example, recent programmes on energy efficiency improvements in public buildings on average reached only 25% savings, while the potential to reduce energy consumption by up to 50% is great. However the analysis of green growth indicators revealed that use of EU Structural Funds especially means from Cohesion fund contributed effectively to increase of energy efficiency and the share of renewables in final energy consumption.

Latvia used financial assistance provided by the EU for economic and social development. In

the programming period 2007–2013 the largest financial instruments from which Latvia receives financial assistance were European Regional Development Fund (ERDF), European Social Fund (ESF) and Cohesion Fund (CF) covering three operational programmes (OP) within the National Strategic Reference Framework (NSRF): ESF OP “Human Resources and Employment”; ERDF OP “Entrepreneurship and Innovations” and ERDF and CF joint OP “Infrastructure and Services”. The structural assistance available in the programming period 2007–2013 was equivalent to EUR 4.54 billion in Latvia. In the programming period 2007–2013, the largest proportion of EU funds was mainly directed to public education, technological distinction and flexibility of enterprises, as well as development of science and research to facilitate a knowledge-based national economy and strengthen other pre-conditions for sustainable economic development and living conditions in Latvia in general. Although no formal overall evaluation of EU funds implementation in the programming period 2007–2013 is available yet, initial indications show that in Latvia EU funded investments and implementation of activities have had a positive impact on GDP growth. The increase in energy efficiency and increase in the share of renewables in final energy consumption was achieved because of generous contribution from Cohesion fund.

In Estonia the priorities and goals for structural assistance are set out in the National Strategic Reference Framework 2007–2013. The framework is carried out through three operational programmes (OP): OP for Human Resource Development; OP for the Development of the Living Environment; OP for the Development of Economic Environment. The structural assistance available for the framework programme is equivalent to EUR 3.4 billion. During the financial period 2007–2013 large investments were made in infrastructure, including roads, water and waste management, schools, hospitals, community centres, R&D infrastructure, etc. Additionally, EU structural assistance was invested in advancing technology development centres and centres of excellence, and increasing the supply of skilled workers. Structural assistance has been successfully used to reorganise and modernise vocational education to raise its competitiveness. Another achievement is using structural assistance for building innovation systems and for investing

in R&D. EU funding was used to finalise the merging of some universities and academies of science and thereby raise the quality of education. Structural assistance has helped to increase the competitiveness of Estonian companies through increased investments in R&D and exports. Estonia distinguishes with positive trends in many green growth indicators development during 2007–2013 financing period. Especially good achievements can be noticed in increase use of renewables and energy efficiency improvements.

In the Czech Republic the total available budget of Structural Funds and the Cohesion Fund for the period 2007–2013 comprises EUR 26.3 billion, distributed as follows: ERDF – EUR 12.96 billion; CF – EUR 8.82 billion; ESF – EUR 4.52 billion. In the period 2007–2013 the defined priorities and goals of the Czech Republic are set out in the National Strategic Reference Framework 2007–2013. The Convergence Objective is implemented through eight thematic operational programmes with a total allocation of EUR 21.23 billion and seven regional operational programmes with a total allocated amount of EUR 4.66 billion. The Regional Competitiveness and Employment Objective support regions that do not utilise funds from Convergence objective. In the Czech Republic, the capital city of Prague falls under its scope with two operational programmes and an allocation of EUR 0.42 billion. Individual Operational Programmes show significant differences regarding the amounts of financial support already paid to the beneficiaries. By the end of 2013 the Transport Operational Programme had reached an outstanding payment ratio of 80.6%. Also, the regional Operational Programmes have retained a high payment ratio ranging 66–80.4% for the entire programme period. The worst payment ratio was shown by the OP Environment at 44% followed by OP Technical Assistance (45.4%) and Integrated Operational Programme (47.4%). The current trend in the Czech Republic is the improvement of effectiveness and transparency of the implementation and audit systems.

Slovakia is implementing EU funds through various programmes. Priorities of the National Strategic Reference Framework (NSRF) are implemented through 11 operational programmes (OP) where there are seven operational programmes under the Convergence objective, three multi-

objective operational programmes (for the Convergence objective and the Regional Competitiveness and Employment objective) and one operational programme under the Regional Competitiveness and Employment objective. The beginning of the programming period 2007–2013 was marked by delayed management and control mechanism settings for each operational programme. The low rate of contracting and withdrawal in the initial years for some operational programmes became an urgent issue. Slovak implementing bodies took crucial measures to improve the state of implementation. Several revisions of operational programmes as well as transfer of funds to areas more attractive for the beneficiaries assisted in this improvement.

The conducted analysis revealed that EU funds have been a useful instrument in Baltic States, Czech Republic and Slovakia to reduce the impact of the economic crisis, to slow growth of unemployment and to secure contracts, especially for domestic suppliers. One of the major successes was the partial modernisation of infrastructure in the area of energy sector, education, social services, culture, non-commercial rescue services and other civil infrastructure in towns and municipalities, creating the necessary precondition for increasing benefits to citizens and entrepreneurs from services linked to support.

Conclusions

Green growth is expected in implementation of Europe 2020 strategy and can provide to harmonized development and cohesion of old and new EU member states. Europe 2020 is the EU's growth based on the growth of smart, sustainable and inclusive economy. These three mutually reinforcing priorities should help the EU and the Member States deliver high levels of employment, productivity and social cohesion. Concretely, the Union has set five ambitious objectives – on employment, innovation, education, social inclusion and climate/energy – to be reached by 2020. These all objectives can be reached by promoting sustainable growth.

There is close relationship between green growth indicators as increase in the share of renewables and energy efficiency improvements have direct impact on reduction of energy a carbon intensity of economy and all sectors as well as on decrease of energy import dependency, energy balance of trade

and diversification of energy mix. Therefore the priorities of energy policy targeting increase use of renewable energy sources and energy efficiency improvements are important drivers of green growth. In the next section the analysis of use of EU structural funds will be performed seeking to compare countries in terms of means allocated to renewable energy and energy efficiency projects as well according other indicators related with allocations of means from structural funds.

The EU's energy policy key objectives developed since 2007 are energy efficiency and promotion of renewable energy sources. They are directly related with priorities set by Europe 2020 strategy and the Directive 2009/28/ EC providing the legal obligations of the parties, with ambitious goals for the share of RES in final energy consumption. To this end, members of the EU focus great efforts to increase the development of RES and energy efficiency improvements. EU Structural Funds could be used to unlock the large but unused renewable energy potential of the CEE countries. The costs of wind, solar, biomass and geothermal energy have been steadily falling rapidly in recent years, mainly due to the learning effect and economies of scale.

Comparing Baltic States and Czech Republic and Slovakia in terms of progress achieved in green growth several indicators were selected. The trends of security of energy supply, energy efficiency, penetration of renewable energy sources and GHG emissions were compared among five new EU member states.

Estonia distinguishes from analysed countries with good results achieved in achieving several green growth targets, such as high share of renewables in final energy consumption, high security of energy supply (low rate of energy independency), significant decrease in energy intensity and carbon intensity of energy. Czech Republic has achieved good results in increase of security of energy supply and decrease of energy intensity of GDP and carbon intensity of energy. Latvia distinguishes with very high shares of renewables in electricity generation and in final energy consumption however it is more related with favourable climate conditions and well developed hydro power plants.

Estonia is making considerable progress in use of RES and use of EU Structural Funds and local support measures allowed country to achieve the highest increase in the share

of renewables in final energy and electricity consumption in 2013. In 2004 the share of renewable in final energy consumption and in electricity consumption in Estonia was lower than in Lithuania but in 2012 Estonia overcame Lithuania almost by 5%.

The EU Structural Funds absorption for promotion of RES promotion in 2007–2013 showed that Estonia was the only country from Baltic States allocating 0.2% of means from EU Structural Funds for wind energy projects. Lithuania has allocated 0.5% of means from EU Structural Funds for promotion of biomass projects and together with Latvia which has allocated even 0.6% of means from EU Structural for biomass projects achieved the best results in utilization of RES in heating and cooling. Czech Republic allocated the highest share of means from EU Structural Funds to enhance green growth. In terms of development of green growth indicators Czech Republic is also among the best performing countries following Estonia.

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GREEN GROWTH AND USE OF EU STRUCTURAL FUNDS IN BALTIC STATES, CZECH REPUBLIC AND SLOVAKIA**Dalia Štreimikienė, Asta Mikalauskienė**

Green growth is resource-efficient, cleaner economic growth and more resilient growth without slowing it. "Green growth" not only affects the quality of growth, but overall production. In this case, growth results from the investment in the upgrading of the entire production system to environmental and resource-saving processes and products. A prototype of this phenomenon is the climate-friendly "low-carbon economy." Green growth is expected in implementation of Europe 2020 strategy and can provide to harmonized development and cohesion of old and new EU member states. Europe 2020 is the EU's growth strategy based on the growth of smart, sustainable and inclusive economy.

The comparative study of green growth indicators and use of EU Structural Funds in 2007–2013 period in Baltics and Czech Republic and Slovakia was performed with the aim to define the role of financing from EU Structural Funds for enhancement of green growth in Baltic States, Czech Republic and Slovakia. The performed comparative assessment revealed that Czech Republic allocated the highest share of means from EU Structural Funds to enhance green growth. In terms of development of green growth indicators Czech Republic is also among the best performing countries following Estonia. The analysis of the use of EU Structural Funds in 2007–2013 in five new EU member states indicated that the EU Structural Funds has positively influenced the development of RES in Baltic States, Czech Republic and Slovakia. The increase of renewable energy capacities in Baltic States, Czech Republic and Slovakia also contributed to the reduction of carbon intensity of economy, reduction of environmental pollution, climate change mitigation and energy import dependency.

Key Words: *Green growth, EU structural funds, Baltic States, Czech Republic, Slovakia.*

JEL Classification: *M12, M53.*

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KNOWLEDGE TRANSFER IN A KNOWLEDGE-BASED ECONOMY

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Introduction

The OECD member states passed through three fundamental development stages during the last century: from an industrial society in the first half of the 20th century to a post-industrial society and on to the developmental stage of the so-called new economy, which can be considered to involve the relatively long historical period of economic growth in the 1990s. The effects of the knowledge economy manifested themselves positively in the last decade of the 20th century and the significance of human capital as an essential factor for long-term economic growth was unequivocally confirmed (Kruss et al., 2015). The knowledge economy corresponds both to the theories of endogenic growth and especially to the alternative directions for contemporary socio-economic approaches to the theory of growth. Theories incorporating the knowledge economy place an emphasis on the importance of knowledge, information and technical skills, i.e. know-how, as the basic resource for the development of the economy (Lilles & Rõigas, 2015). This is the precondition for a so-called resource approach to the creation of a competitive advantage where know-how is considered to be the most significant of the production factors (Kislingerová, 2011). Talented young people, high quality institutions within the framework of the entire system, the appropriate funding of organizations, a strong infrastructure, including the e-Science infrastructure and the existence of scientific leaders are considered to be important components in the knowledge economy, while the key abilities are considered to be an appetite for risk and the ability to utilize international cooperation with the aim of strengthening the original initiative (Chidambaran, 2014).

It is possible to view the knowledge economy as a collective term for the current distinctly positive supply shock, at the core of which

lies the rapid development of information and communication technology (Kruss et al., 2015; Nečadová, Soukup, & Breňová, 2007). Its wide use brings with it ever increasing requirements when searching for and processing information and an emphasis on knowledge and its application in practice (Kloudová, 2012). The key source of success is no longer information as such, but the right knowledge which is associated with a specific bearer – employee who must constantly develop this in a currently highly competitive environment.

The active use of knowledge is therefore unquestionably a competitive tool for individual organizations. An organization is part of the system from which it draws its resources. The conditions set up in it and the way they are influenced by the state have a substantial influence on the options of using knowledge as a communication tool in a given branch and in a given organization. Macroeconomic, but also microeconomic, policies therefore have a substantial impact on innovative development.

The correctly adjusted knowledge economy must endeavor to achieve a cutting edge level of basic research and applied research. According to Chidambaram (2014), it is currently necessary to emphasize not only the strengthening of academic and practical interaction, but also excellent results in the area of research and development based on innovation. However, this must also be supported with first rate knowledge, skills and experience (Arvanitis et al., 2015; Levy, 2011). The results of the Hansen, Winther and Hansen (2014) research have showed that human capital has a positive impact on economic growth in the branch in which the organization is located. It is the private sector which designates the innovative capacity of the economy to a critical extent. Suitable economic policies applied for the purpose of the internalization

of existing externalities and the setting of suitable framework conditions for the creation of innovation may support important innovation for this sector, the individual branches and the organization itself (Hobza, 2009). The research undertaken by Chidambaram (2014), Levy (2011) or Hansen, Winther and Hansen (2014) has looked into the standing of organizations in the knowledge economy, primarily in the tertiary sector. However, knowledge stands at the forefront of the interests of all the types of organizations in all the branches. Its effective use leads to the prosperity of the organization, the branch and the entire economy and this will unquestionably continue to be the case for a long time to come (Tosici, 2014). The knowledge economy currently presupposes that each organization manages its knowledge and in doing so intentionally endeavors to achieve a long-term competitive advantage.

The goal of this article is to identify and evaluate the conditions for the use of the resource approach focused on the management of knowledge in the current knowledge economy across all economic branches. The article's secondary goals are:

- to provide a summary of the viewpoints (standpoints) of individual authors who have concerned themselves with the area of the knowledge economy, knowledge management, competitive advantage and the influence of the state on the creation of market conditions,
- to present the results of primary research into the area of knowledge transfer within organizations in the Czech Republic,
- to propose measures in the area of improving the effectiveness of the knowledge management process in organizations.

The structure of the paper is as follows: the theoretical background of the work is presented first; this is followed by the paper's methodology which describes the paper's preparation. Furthermore, the results have been evaluated and we have proposed recommendations for the use of knowledge transfer in knowledge-based organizations. Finally, the paper also presents the theoretical and practical benefits and limitations which apply to it.

1. Theoretical Background

According to Matula (2011), the concept of the knowledge economy is becoming a daily part of the routine life of all the citizens of advanced

economies throughout the world. For this to be so, however, it is necessary for each individual organization in each member state to concern itself with effective knowledge transfer, to support the personal development of their employees and in doing so to increase the organization's knowledge base. Based on Levy (2011), it is possible to support a knowledge approach to the creation of the competitive advantage using effective knowledge transfer and thus to create a relatively permanent competitive advantage for the organization and the economy as a whole. An economy based on knowledge should be the current and future goal for everybody. The first step in support of the knowledge economy is a focus on effective knowledge transfer within an individual organization and how this knowledge transfer system is set up inside the organization.

Learning is individually driven and once individuals have learned some skills the next question is how the organization should incorporate its procedures and assets. In other words, individual learning needs to be transformed into organizational learning (Kumaraswamy & Chitale, 2012). Organizational learning takes place when the organization concerned addresses a particular problem which the organization needs to solve. As such, the problems are confronted during the learning of lessons and the assimilation of competences which represent the collective learning of the present, past and future employees. Organizational learning is described as the way organizations build, supplement and organize their knowledge and routines around their business activities and business cultures, as well as the way they adopt and develop organizational efficiency by improving the use of the broad skills of their workforces (Fiol & Lyles, 1985).

Organizational learning theories provide rich perspectives on the processes that generate and change organizational knowledge. Learning provides the skills, insights and competence to perform well at work. It enables people to adapt and grow in their workplaces and to become better problem solvers, more creative and innovative thinkers and more confident and proficient workers. Organizational learning can be considered to constitute the systematic behavior required to acquire the capacities for dealing with the needs and challenges of organizations in competitive environments.

The essential key elements of knowledge sharing are a climate of trust and openness in the working environment where continuous learning and experimentation are well supported (Kumaraswamy & Chitale, 2012). The overall benefits of learning in an organization focused on its employees fall into two main categories; career advancement and psychosocial support (Beech & Brockbank, 1999; Gannon & Maher, 2012). These professional and personal advantages are evident via more promotions, higher salaries, more job satisfaction and reduced levels of worker turnover (Allen et al., 2004). Learning and education also have an impact on social capital and social networks (Bozionelos, 2006; Hezlett & Gibson, 2007; Singh et al., 2009). The recognition of social capital as offering valuable insights into organizational learning is built upon the premise that access to intellectual and economic capital is now more available than ever before (Hezlett & Gibson, 2007). Therefore the social capital perspective of employees and their organizations can be seen in the understanding, developing and leveraging of relations with others which can further develop their careers and competitive success (Singh et al., 2009).

Employees who are being educated and developed are usually highly interested in working towards organizational goals and following the organizational strategy; they are communicative, cooperative, proactive, respectful, customer-friendly, willing and able to constantly learn (Li et al., 2009; Vnoučková, 2013). As Mazouch and Fischer (2011) and Gururajan and Fink (2010) have stated, measuring the level of education in organizations is necessary for predicting future developments.

De Luis Carnicer et al. (2004), Pearce and Randel (2004), Branham (2009), Vnoučková (2013) and Zeman (2009) state that it is necessary to cater for employees' needs in terms of their education and development; otherwise, there is a possibility that the organization in question will lose those employees. The necessity of retaining educated, trained and skilled employees has also been noted by the European Union. The key indicators of the Europe 2020 Strategy focuses primarily on the sustainability of employees and employment. Focusing on people and knowledge is the priority of all of Europe. The main priorities of the knowledge society up to 2020 are above

all productivity, education and employment and their impact on the development of Europe.

Covey (2011) and Peters (2011) state that the use of sustainable values which lead to sustainable development is crucial for the future development of employees; these values specifically include: cooperation, ethics, integrity (relationships), quality and values for the next generation. The authors argue that the main decisions which have proved to be right and persistent (and the authors have supported this with many examples) do not often result from economic, financial or other analyses (which according to Peters (2011) have caused the current crisis); on the contrary, they are based on the employees' abilities, their character, relationships and common values (cooperation, sacrifice, adherence to and orientation towards goals, results and needs and a focus on the customer as a person and a citizen).

Based on Svatoš's research (2005), it can be said that it is important to invest in the constant development of employees, because the growth in investments in human capital positively influences the growth in work productivity. This is based on the fact that the higher education (growth in the qualification level) of the employees is a significant factor (source) of economic growth on the one hand, but it also has a supportive effect on the efficiency of other crucial factors affecting this growth, i.e. on the use of the effects of technological progress and production management and organization or the effects of the scope and specialization of production. All of these factors are essential to support the economy as a whole. Bureš & Hájek (2007) added that it is necessary to realize that the creation and realization of each knowledge economy (i.e. innovations and the application thereof) require an active approach, both at the level of the individual organizations and at the level of the individuals themselves. Without the personal development of individuals, it is not possible to achieve positive results at either the level of the organization or the entire economy, which has also been confirmed by the research undertaken by Arvanitis et al. (2015).

With regard to the aforementioned information, this paper focuses on the current situation with regard to knowledge transfer in organizations in the Czech Republic which has been evaluated on the basis of long-term research undertaken within organizations in all sectors of the economy. The acquired data and

the evaluation thereof has been compared with the results of similar research realized abroad.

2. Data and Methods

Analysis and the comparative method have been used to analyze the theoretical basis and terms. The analytical section of the paper has been based on deductions and the synthesis of the acquired knowledge. The recommendations are based on quantitative research realized using questionnaire data collection techniques across the economic branches (CZ-NACE). The research is descriptive and empirical by nature, because the primary data has been collected using the survey method, including fact-finding techniques such as questionnaires and interviews. The data for the evaluation of the current level of education and learning in Czech organizations has been collected in a primary quantitative survey by means of a questionnaire. Only one respondent per business was contacted. The questionnaire was completed on behalf of the organization by a respondent who held a managerial position (had at least one direct subordinate). The data collection respected the ethical aspects of research (Personal Data Protection Act no. 101/2000 Coll.).

2.1 Research Sample

Randomly selected organizations were contacted by e-mail, the electronic questionnaire was automatically recorded and the respondents' answers were pre-categorized (the CAWI method). The selected sample was chosen from the database of Czech organizations based on distribution of organizations in economy presented by Czech Statistical Office; therefore the group was representative. The results were generalized on selected sample. In order to ensure the findings are evaluable and generalizable with respect to the sample group the selection criteria for the survey have been set in a way to roughly reflect the proportional representation of organizations according to the sector of economy (15% primarily, 15% secondary, 70% tertiary) and organizations' size (65% small, 20% middle, 15% large). In order to ensure the representativeness of the group of respondents the questionnaire survey was completed by a person who held a managerial position, mostly by the company manager or the human resources department manager.

The questionnaire consisted of four parts which included 15 questions in total. The first section focused on knowledge transfer in organizations (11 questions) and the last section focused on classification questions. Most of the questions were closed-ended. By 2014, a total of 278 organizations had participated in the questionnaire survey:

- by economic sector: 3.6% from the primary sector, 16.9% from the secondary sector and 79.5% from the tertiary sector
- by size of business according to the number of employees: 71.6% small, 14.4% medium-sized and 14.0% large organizations.

The questionnaire focused on the areas of organizational support for knowledge, education and learning, employees' attitudes toward knowledge, education and learning and the targets for education and learning and its outcomes – innovations, promotions, organizational growth.

2.2 Data Processing

The first stage of processing the questionnaire results focused on the preparation of a data matrix. The data was described and then it was coded and sorted according to the type of variables (qualitative, quantitative). During this phase, the data was also cleaned and its quality was checked in order to uncover any extreme (eccentric) or deviating observations which could significantly influence the results of some analyses. An integral part of this stage included an analysis of any missing values which was meant to identify and replace any such missing values. The last part of the data matrix involved the transformation of the variables which was necessary for several reasons. When processing a multidimensional data file, the reason for this is usually the requirement for the fulfilment of the conditions of a certain statistical method.

The respondents' answers were categorized according to the identification questions which formed the first part of the questionnaire. In the survey, the measurement was based on closed questions with one or more possible answer(s) which had been selected on the basis of a study of the literature, documents and other related surveys.

A semantic differential which permitted the identification of nuances in the respondents' attitudes throughout the questionnaire was also applied. The respondents' reactions to

target statements and their attitudes to the given matter were restricted by offering a set of several statements. The extremes of the seven-point scale represented bipolar concepts of the evaluation dimension. Using a scale of 1 to 7, respondents expressed their inclination towards one of the pre-set extreme statements or, if it was not possible to favor either of the sides, selected a median, neutral value (the median value was characterized by the number 4). The scale permitted not only the specification of the respondents' attitudes, but also their intensity.

The second stage focused on the actual processing of the results. The research analysis of the data realized in this stage focused on investigating the important properties and the typical features of the statistical file. The statistical evaluation of the data was undertaken on the basis of:

- a one-dimensional analysis based on the frequency distribution, the calculation of descriptors, point and interval estimates and the testing of hypotheses about the frequency of the categories of individual variable values.
- a multidimensional analysis based on an investigation into the dependence of two or more variables. The goal of the comprehensive analysis of several variables was to uncover any multidimensional latent data structures and to find an interpretation for these structures. The retrieval of the information in the data file was realized using classic Pearson hypothesis testing, while the classification of the higher levels was achieved using a factor analysis. Pearson's Chi-square test and Cramer's V were applied. If the p-value calculated by means of the χ^2 test (Pearson Chi-Square) was lower than the selected level of significance $\alpha = 0.05$, the null hypothesis was rejected. Factor analysis performed a verification role in this paper. The Kaiser-Guttman rule was also applied to select the group of significant factors; based on the recommendations of Anderson (2009), only determinants with an absolute value of more than 0.3 were selected as being significant for factor development.

The processing of the results of the research was undertaken using IBM SPSS Statistics, version 22. This software is a comprehensive tool for the resolution of statistical tasks and analytical problems. The SPSS software

enables the transfer of results to all professional software packets and this also secures the subsequent transferability of the data.

2.3 Tested Hypotheses

A correlation analysis was used to review the survey output based on the stated results. The following hypotheses were postulated in order to review the results:

The main hypothesis in this paper is H0: The organizations do not support knowledge transfer.

The tested work hypotheses are stated below.

H1: There is no dependence between the supportive process in the organization and the support for the employees with regard to their knowledge development initiatives (training, education and learning).

H2: There is no dependence between the availability of mentors in the organization and the support for the employees with regard to their knowledge development initiatives.

H3: There is no dependence between the availability of feedback and the support for the employees with regard to their knowledge development initiatives.

H4: There is no dependence between inspiring leaders in the organization and the support for the employees with regard to their knowledge development initiatives.

H5: There is no dependence between the rewards for learning in the organization and the support for the employees with regard to their knowledge development initiatives.

H6: There is no dependence between the requirement for learning in the organization and the support for the employees with regard to their knowledge development initiatives.

H7: There is no dependence between the time invested in learning in the organization and the support for the employees with regard to their knowledge development initiatives.

H8: There is no dependence between the clear learning goals in the organization and the support for the employees with regard to their knowledge development initiatives.

H9: There is no dependence between the work-life balance in the organization and the support for the employees with regard to their knowledge development initiatives.

H10: There is no dependence between the succession in the organization and the support for the employees with regard to their knowledge development initiatives.

H11: There is no dependence between the innovations in the organization and the support for the employees with regard to their knowledge development initiatives.

3. Research Results

The objective of this chapter is to evaluate the results obtained from the primary surveys. The results of the quantitative research have been statistically evaluated and recommendations have been formulated upon this basis.

3.1 Knowledge Transfer in Czech Organizations

On the basis of long-term research into education and knowledge sharing in organizations, it can be summarized that the absolute majority of organizations are aware of the fact that the permanent development of their employees is currently an essential part of the organization's operations. Thanks to the constant increase in knowledge and the deepening thereof, it is possible to acquire key knowledge based on experience which secures a relatively long-term competitive advantage for the organization. Unlike general knowledge which wears out and loses its value over time, key knowledge is held by just a small number of individuals and the wear and tear of this knowledge actually increases its value.

The results which were acquired from the organizations whose representatives took part in the research can be summarized by saying that 82.37% of organizations place an emphasis on the education of employees and regularly invest in the development of their employees' knowledge. In total, 14.29% of organizations in the Czech Republic do not put any money into training, 64.29% of them invest 1–5% of the amount of their annual staff salaries, 14.29% of organizations invest 6–10% of the amount of their annual salaries and 7.13% invest from 11–20%. None of the observed organizations invested more than 20% of the amount of their annual salaries.

Most organizations realize education and knowledge development as a planned activity which is planned for a certain period with tasks which must be undertaken in the period between the individual courses (21.58%). A total of 7.19% of organizations realize permanent education with an internal or external teacher active directly in the workplace, 5.76% of organizations have education

focused purely on the compulsory area of education (the laws, occupational safety and so on) and 21.22% of organizations realize the education and development of their employees unsystematically, once the need has been identified. This involves small companies (up to 20 employees) which do not have sufficient funds and at the same time do not consider the development of their employees to be critical. On the other hand, 26.62% of organizations realize planned education, during which a series of educational activities is planned for a certain period.

In the currently ongoing research ($n = 387$), the situation is even more positive, because 299 (77.26%) organizations provide education for their employees. This involves a planned activity which is systematically realizable and evaluated by the management. This situation usually applies in medium-sized and large organizations which have created an HR Department and where the area of the education and development of the organization's employees is looked after by the organization's specialist employees who assist the individual employees.

Given the importance of preserving information within the organization and the continual support for the organization's knowledge base, it is necessary to preserve the knowledge in a suitable manner and to do so using technical means, etc. In total, 20.50% of the organizations ($n = 278$) stated that they were trying to maintain everybody's knowledge with regard to the competitive advantage they had achieved thanks to the knowledge, while 55.76% of organizations only stored key knowledge which provided the organization with a unique competitive advantage. These organizations most frequently make use of knowledge databases and information systems for the collection and sharing of knowledge in the organization. A total of 23.76% of organizations have not yet begun to store any such information as they have not yet had to resolve a crisis situation during a change of personnel (for example, the departure of a key employee to the competition).

The conclusiveness of the factors affecting employee willingness to knowledge sharing is shown in Tab. 1. A correlation analysis at the level of significance of 0.01 indicates direct, strong dependence.

Tab. 1: Relations between factors and employee willingness to knowledge sharing

Relation between factors and willingness to knowledge sharing	Pearson's coefficient
Culture	0.99072
Communication	0.88209
Relationships	0.92022

Source: data processed by the authors

Organisational causes of employees' decision to share knowledge are interwoven with personal and informal aspects, as shown in Tab. 1. Positive relationships and their experiencing create favourable predispositions for the strengthening of motivation of employees to work well, perform better and share knowledge. Personal satisfaction is the main precondition of work satisfaction. Internally balanced employees perform better even despite worse conditions.

The organization must inform its individual employees with regard to the procedure which supports the creation of the organization's competitive advantage. If this is a knowledge approach, the organization should acquaint its employees with a long-term systematic education and development plan, incorporate them in innovative teams, support them on internships abroad and enable them to participate at conferences etc., i.e. support research and development. The results have unequivocally shown that 44.24% of employees who identify with the organization's culture and have been acquainted with the organization's long-term goals are willing to share their knowledge with colleagues. They help their colleagues at work, because they believe in the positive effect achieved by spreading knowledge through the organization and they are aware of the impacts of the organization's higher knowledge base in relation to the competition. A better financial situation in the company based on the successes of individuals and teams brings a positive effect to all the participating parties (i.e. to the workers, the organization and the national economy). It can be summarized that support of cooperation forms between organizations, good and friendly communication between current employees and support of friendly relationships are the main areas which affect knowledge development in organizations nowadays.

3.2 The Parameters Pertaining to Knowledge Development in an Organization

According to the results of the quantitative research focused on education in Czech organizations, 66.5% of the surveyed organizations make use of some type of education or training at work. However, one third of Czech organizations still do not educate their employees and do not work with knowledge development and management in any way.

About the same percentage of organizations (73%) use some version of MBO (Management by Objectives). In consultation with their manager or supervisor, the employees set a specific goal which they want to achieve within a given time period and which is relevant to their area of learning and growth. Such a result gives the impression that organizational learning and development is a long-term process; 63% of the evaluated employees said they perceived their education and learning as a long-term process. Short-term goals and training or courses with a single purpose are used in 23% of organizations. One third of the organizations still do not set any specific goals and targets for education and knowledge development.

Similar results were obtained with regard to specific knowledge/skill training in organizations. Almost 66% of employees stated that their education and learning in the organization was focused on specific skills related to their work. Moreover, the surveyed organizations stated that they offered job positions with the option of growth (89%). But this option depended mainly on the employees themselves. 70% of organizations require their employees to invest additional time (to study at home in their free time). Therefore, employees are expected to be proactive and to work on their own development, otherwise they would have no possibility for future growth and development.

Only 37% of the organizations provide motivation for education and learning with long-term intangible rewards. As mentioned above, the main activity and initiative lies with the employees. Simultaneously, 44% of the organizations do not support or encourage their employees to undergo any education at all. Almost the same results were obtained when focusing on tangible rewards (money and benefits). Just 33% of organizations support education and learning in the aforementioned way; on the other hand, 56.5% of organizations do not reward their employees' active participation in education at all.

The hypotheses stated in Data and Methods were then tested further. All the hypotheses had two variables. Spearman's rank correlation coefficient (r) was thought to be the most appropriate way to test the hypotheses as these variables were measured on the ordinal scale. The parameters were tested at 5 per cent significance (Tab. 2).

Table 2 clearly shows that all the parameters correlate with the support for the employees in their initiative pertaining to knowledge development. It is, therefore, possible to evaluate the hypotheses.

Tab. 2: The parameters pertaining to knowledge development in the organization

		Spearman's rank correlation	Acceptance	Power dependence
H1	the support process in the organization – the employees' initiatives pertaining to knowledge development	0.48	Yes	Moderate
H2	mentors in the organization – the employees' initiatives pertaining to knowledge development	0.29	Yes	Weak
H3	feedback in the organization – the employees' initiatives pertaining to knowledge development	0.53	Yes	Strong
H4	inspiring leaders – the employees' initiatives pertaining to knowledge development	0.52	Yes	Strong
H5	rewards for learning in the organization – the employees' initiatives pertaining to knowledge development	0.47	Yes	Moderate
H6	required learning in the organization – the employees' initiatives pertaining to knowledge development	0.43	Yes	Moderate
H7	time invested in learning in the organization – the employees' initiatives pertaining to knowledge development	0.53	Yes	Strong
H8	clear learning goals in the organization – the employees' initiatives pertaining to knowledge development	0.34	Yes	Moderate
H9	work-life balance in the organization – the employees' initiatives pertaining to knowledge development	0.21	Yes	Weak
H10	advancement in the organization – the employees' initiatives pertaining to knowledge development	0.53	Yes	Strong
H11	innovations in the organization – the employees' initiatives pertaining to knowledge development	0.44	Yes	Moderate

Source: data processed by the authors

The first parameter of H1 the support process in organization was positively correlated at a 5 per cent level of significance with the support of the employees in their initiative pertaining to knowledge development.

The same situation occurred in the testing of the rest of the hypotheses. The variables were associated, because their parameters were positively correlated at a 5 per cent significance. Hypotheses H2–H11 have been rejected. Only hypotheses H2 and H9 have weak correlations. In the case of H2, this is due to the fact that mentors are not commonly used in Czech organizations (only one third of the organizations work with mentors). In the case of H9, it is possible to state that the fact that employees are also forced to study and develop themselves in their free time affects and does not correlate with their work-life balance. In summary, all of the tested variables are associated with knowledge development in Czech organizations.

4. Discussion

Based on the presented results of analysis it can be summarized that there is a relationship between knowledge support and knowledge development in organizations; organizations does support knowledge transfer (H0) but there are some promising areas of knowledge development in the organizations. The strongest and most significant statistical areas which affect knowledge development in organizations are based on cooperation and communication, hence the organizational culture, as mentioned by Kumaraswamy and Chitale (2012), Stahl et al. (2012) and Senge (2006). Another important area supporting knowledge transfer in an organization is relationships. This area has also been mentioned in research undertaken by Bozionelos (2006), Hezlett and Gibson (2007) and Singh et al. (2009). Based on other similar research (Carter & Donohue, 2012; Shen & Hall, 2009; van Dam, 2007), the authors have also suggested the necessity of working with coaches and mentors in order to work with knowledge and ensure its transfer. This area has not been utilized in most of the studied organizations. It is also necessary to educate and develop employees with regard to their work, social values and behavior – each employee is an individual with a different perception and personality (Loke et al., 2012).

According to the survey, on-the-job methods such as coaching, shadowing, succession planning etc. are not commonly used. Surprisingly, the surveyed organizations also have partial problems with goals, aims and planning the process. The process goal is the crucial part of successful knowledge development and transfer according to Badura (1997), Judge, Thoresen, Bono and Patton (2001). There are still some blind spots to be filled and upgraded.

The process of knowledge transfer also takes time; this has been validated by many different pieces of research, i.e. Lord, Diefendorff, Schmidt and Hall (2010). The primary survey conducted in Czech organizations also found that the time investment strongly correlated to the employees' initiatives pertaining to knowledge development. Employees are bearers of knowledge, skills and abilities and their talent and willingness to provide these to an organization are key to the development and success of that organization (Claussen et al., 2014; Vivas-López, 2014). Similar approaches have also been stated by Stahl et al. (2012) and Al Ariss et al. (2014).

The acquisition, retention and development of knowledgeable, high quality employees is a priority for every organization (Nahapiet & Ghoshal, 1998; Collings & Mellahi, 2009; Ahsan et al., 2013).

The only thing that remains truly crucial in the effort to upgrade the organizations' level and economy is human capital and knowledge (McDonnell et al., 2014; Gururajan & Fink, 2010; Manning, 2010). Therefore, organizations should focus on each individual and his or her knowledge management.

Employees who are being educated and developed are usually highly interested in working towards organizational goals and following the organizational strategy; they are communicative, cooperative, proactive, respectful, customer-friendly, willing and able to learn constantly (Li et al., 2009; Vnoučková, 2013). As Mazouch and Fischer (2011) and Gururajan and Fink (2010) have stated, measuring the level of education in organizations is necessary for predicting future development.

Bureš and Hájek (2007) stated that the significance of innovation is increasing for the national economy, which was also confirmed by the managers of significant corporations in

the Czech Republic (for example, Microsoft, IBM and so on). The 21st century represents a stage which has been marked by a radical increase in innovations, changes and shifts from information to knowledge and from knowledge to wisdom.

Knowledge has been and increasingly will be the basic building block for every organization and national economy as a whole. With regard to the emphasis on the creation of a competitive advantage using a resource approach, organizations can use an entire range of tools for both acquiring and deepening knowledge and the organization's knowledge base. The organizations in the national economy can make use of the option of research and experimental development, the acquisition of intangible techniques and know-how, industrial design, training (the development of employees) or software development, etc.

Based on research by Levy (2011), the most problematic thing is not currently the creation or acquisition of knowledge, but the preservation of knowledge and its transfer to those who need it. The transfer of explicit knowledge is easier (Bocquillon et al. 2015; Massingham, 2015), but the most valuable knowledge is the tacit knowledge which the workers have in their heads. This knowledge is the most valuable for organizations and for the entire economy: intellectual property creates valuable goods and services which bring positive effects for individuals, organizations and the economy as a whole.

The correlations found in the presented article show the main ways which are utilized by employees and organizations to use and transfer their knowledge and potential. These results can be taken into account in a further analysis of knowledge transfer and the willingness of employees to transfer their knowledge based on organizational support.

There are also several other promising avenues of further research as well as this study. The impact of organizational relationships on knowledge transfer should be studied more deeply. Another interesting area is the analysis of the intrapersonal perception of knowledge transfer. This is another important and rarely studied area.

Conclusion

This paper has analyzed possible approaches to employee knowledge development in

organizations nowadays. The results of the research have identified individual attributes and practices in organizational learning. This paper and its results describe the main ways which are used by organizations in order to grow constantly and to utilize their potential talents and leaders.

The main areas which affect knowledge development in organizations are based on cooperation and communication. This refers to both the organizational culture and the climate. Those areas are crucial for employee and organizational knowledge transfer and development. Another important area which supports knowledge transfer in an organization is relationships. It is suggested that organizations should work on and manage their knowledge in compliance with the organizational strategy. The surveyed organizations have partial problems with the goals, aims and process plans. However, set goals are a crucial part of successful knowledge development and transfer.

The analysis has also revealed the necessity of working with coaches and mentors in order to work with knowledge and its transfer. On-the-job methods such as coaching, shadowing, succession planning etc. are not commonly used. It is necessary to constantly educate and develop employees with regard to their work, social values and behavior.

The process of knowledge transfer also takes time; this has been validated in many pieces of research, i.e. Lord, Diefendorff, Schmidt and Hall (2010). A primary survey conducted in Czech organizations also found that the time invested strongly correlates to the employees' initiatives pertaining to knowledge development.

The following recommendations can be given based on the results of this paper: (1) identify and overcome the barriers to knowledge sharing through fostering effective relationships, (2) the employees' willingness to participate in the learning process needs to be enhanced, (3) the organization's management should introduce a reflective process and a career development process leading to effective knowledge sharing and (4) the role of the mentor and coach is crucial in efficient organizational learning. This paper has reviewed the approaches to employee and organizational learning practices in the Czech Republic. The results of the paper can be taken

into account in further analyses and in the organization of adult education.

The paper's theoretical contribution lies in its general overview of the theoretical assumptions of knowledge transfer and support for the knowledge economy in organizations. On the other hand, the paper's practical contribution lies in the presentation of the results obtained from Czech organizations in the area of knowledge transfer and employee development, including recommendations for those organizations which plan to support knowledge transfer.

This contribution is a follow-up to the project of University – wide internal grant agency (CIGA), number 20141002 – Human resource branding using of the new strategic trends in organizations in the Czech Republic and is a follow-up to the project of University of Economics and Management.

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KNOWLEDGE TRANSFER IN A KNOWLEDGE-BASED ECONOMY**Hana Urbancová, Lucie Vnoučková, Šárka Laboutková**

The knowledge economy currently presupposes that each organization manages its knowledge and in doing so intentionally endeavors to achieve a long-term competitive advantage. In other words the key source of success is no longer information as such, but the right knowledge which is associated with a specific bearer – employee who must constantly develop this in a currently highly competitive environment. The goal of this article is to identify and evaluate the conditions for the use of the resource approach focused on the management of knowledge in the current knowledge economy across all economic branches. The research is descriptive and empirical by nature, because the primary data has been collected using the survey method, including fact-finding techniques such as questionnaires and interviews. According to the results of the quantitative research focused on education in Czech organizations, 66.5% of the surveyed organizations make use of some type of education or training at work. However, one third of Czech organizations still do not educate their employees and do not work with knowledge development and management in any way. The following recommendations can be given to organizations nowadays: (1) identify and overcome the barriers to knowledge sharing through fostering effective relationships, (2) the employees' willingness to participate in the learning process needs to be enhanced, (3) the organization's management should introduce a reflective process and a career development process leading to effective knowledge sharing and (4) the role of the mentor and coach is crucial in efficient organizational learning. The main areas which affect knowledge development in organizations are based on cooperation and communication. This refers to both the organizational culture and the climate. Those areas are crucial for employee and organizational knowledge transfer and development.

Key Words: Knowledge transfer, knowledge-based economy, learning, organizations, survey.

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A NOVEL SORTING METHOD TOPSIS-SORT: AN APPLICATION FOR TEHRAN ENVIRONMENTAL QUALITY EVALUATION

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Introduction

Multiple Criteria Decision Making (MCDM) is all about making choices in the presence of multiple, generally conflicting criteria. Many real-life problems are multi-objective by nature that requires evaluation of more than one criterion. Therefore, MCDM has become an important issue and many researches are devoted to help people make better decision (Montibeller & Franco, 2011; Wang et al., 2015). However, there is no consensus between authors on classification and categorization of MCDM methods. Vincke (1992) suggest the following categories: (1) multiple attribute theory, (2) outranking methods, and (3) interactive methods. Apart from the above, Carlsson & Fuller (1996) classifies these methods into four quite distinct groups: (1) the outranking methods, (2) the value and utility theory approaches, (3) the interactive multiple objective programming approach, and (4) the methods based on group decision and negotiation theory. Comprehensive reviews of MCDM methods can be found in Figueira et al. (2005), Greco et al. (2010), Zavadskas and Turskis (2011), Liou and Tzeng (2012), Zavadskas et al. (2014) and Mardani et al. (2015), their comparative strengths and weaknesses are presented in Belton & Stewart (2002), Zopounidis and Doumpos (2002) and Zardari et al. (2015).

Following Pery (1998), Fernandez et al. (2010), two main categories of problems can be distinguished: preference oriented problems and similarity oriented problems. In preference oriented problems, the decision-maker (DM) wants to select the best alternative or rank all the alternatives from best to worst. In these problems, alternatives are evaluated and compared according to a set of criteria. Usually, higher ranking value means a better performance of the alternative, so the alternative with the highest rank can be considered as best

one, like in ELECTRE, TOPSIS, PROMETHEE and TODIM methods. The similarity oriented problems require sorting of the alternatives into either homogeneous clusters (relative classification) or into pre-defined categories (absolute classification) (Perny, 1998). In case of relative classification, alternatives are divided into clusters based on a set of criteria. According to this approach, most similar alternatives are grouped into a cluster and each alternative's membership in a specific cluster is determined. Therefore, alternatives in the same cluster share many characteristics (i.e. are "similar" to one another), but are very dissimilar to alternatives not belonging to that cluster. In case of absolute classification, alternatives are assigned to some predefined and preference-ordered classes. This group of decision problems is referred to as sorting. Profiles are used to define the classes beforehand as, usually, the bound and limits of each class are determined.

In the outranking methods (OMs), the alternatives are compared pairwise or each alternative is compared to the ideal solution. OMs build a preference relation between alternatives evaluated on several attributes or criteria; in other words, comparison between alternatives is internal. Such methods have nothing to do with the distribution of data, and it is possible there is no one alternative fits into some classes have already defined. However, multiple criteria sorting methods assign alternatives to pre-defined ordered categories taking into account several criteria. Multiple criteria sorting methods differ from standard classification in two main features (Zheng et al., 2014): (1) categories are predefined and ordered, and (2) the sorting model integrates preferences of a decision maker.

The outranking methods are able to provide models that assist for sorting purposes by

employing the outranking relation concept. A representative example of MCDA sorting methods based on the outranking relations approach include methods such as ELECTRE TRI (Mousseau & Slowinski, 1998; Mousseau et al., 2001; Lourenço & Costa, 2004; Brito et al., 2010; Sánchez-Lozano et al., 2014; Bouyssou & Marchant, 2015) and ELECTRE-SORT (Ishizaka & Nemery, 2014), the extensions of the ELECTRE III method. As sorting methods, ELECTRE TRI (also called the non-compensatory sorting model (Bouyssou & Marchant, 2007a; 2007b)) and ELECTRE-SORT are used to assign alternatives to pre-defined categories (Mousseau et al., 2000; Ishizaka & Nemery, 2014). Similar schemes are also employed by other outranking relations sorting methods such as PROMSORT (Araz & Ozkarahan, 2005) and FlowSort (Nemery & Lamboray, 2008; Janssen & Nemery, 2013), which are based on the PROMETHEE method (Preference Ranking Organization Method for Enrichment Evaluation) (see Brans & Vincke, 1985), a well-known multiple criteria outranking method.

In recent years, many MCDM methods have been developed; the existing approaches have been improved and extended. During recent years, many researchers have investigated applicability of MCDM methods and tools to tackle problems that deal with environmental issues. Among numerous MCDM methods developed to solve real-world decision problems, Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) continues to work satisfactorily in diverse application areas (Jiang et al., 2011; Behzadian et al., 2012; Wu, 2015).

The advantage of TOPSIS is its logicity, rationality and computational simplicity (Jiang et al., 2010; Chen et al., 2011). The classical TOPSIS method (see Jia et al., 2012; Ahmadi et al., 2014; Bilbao-Terol et al., 2014; Mulliner et al., 2016) and its extensions, such as interval TOPSIS (see Giove, 2002; Jahanshahloo et al., 2006; Dymova et al., 2013), fuzzy TOPSIS (see Awasthi et al., 2011; Awasthi & Chauhan, 2012; Bao et al., 2012; Ye & Li, 2014; Lee et al., 2014; Kusi-Sarpong et al., 2015; Şengül et al., 2015), interval-valued fuzzy TOPSIS (see Chen & Tsao, 2008; Ashtiani et al., 2009; Chen, 2015; Mokhtarian, 2015; Zhang & Xu, 2015), and grey TOPSIS (see Chen & Tzeng, 2004; Oztaysi, 2014; Siozinyte et al., 2014; Jiang et

al., 2015), have demonstrated their capabilities and potentials in dealing with MCDM problems of various fields.

Sustainability is a complex concept that requires comprehensive analysis (Książek et al., 2015; Xia et al., 2015). Multi criteria decision analysis has been regarded as a suitable set of methods to perform sustainability evaluations (Lazauskaite et al., 2015; Pourahmad et al., 2015). Among numerous MCDM methods employed to solve real world decision problems, Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) continues to be commonly used across different application areas. Jia et al. (2012) utilized both fuzzy AHP and TOPSIS methods for evaluation of the low carbon development (LCD) level of 47 countries (areas). Bilbao-Terol et al. (2014) used TOPSIS for evaluating the countries' sustainability and the sustainability performance of government bond funds. The proposed tool allows investors express their preferences regarding the financial and the ESG (environmental, social and governance) goals, thereby helps them make sustainable and responsible investment decisions. Awasthi et al. (2011) presented fuzzy TOPSIS based approach for evaluation and selection of sustainable transportation systems. Ahmadi et al. (2014) presented an integrated approach that combines the input-output analysis and the TOPSIS method to evaluate sustainability in terms of environmental protection in different sectors of the Iranian economy. Aghajani Mir et al. (2016) proposed an improved version of TOPSIS, which is applied to evaluate the environmental performance of municipal solid waste (MSW) management systems. The proposed model could be used to evaluate various environmental problems associated with solid waste management (e.g. waste reduction, transfer stations for MSW, resource recycling, decommissioning and implementation of waste treatment facilities). Mulliner et al. (2016) presented an empirical application and comparison of different MCDM approaches – the Weighted Sum Model (WSM), the Weighted Product Model (WPM), the revised Analytic Hierarchy Process (AHP), Complex Proportional Assessment (COPRAS) and TOPSIS – for assessing sustainable housing affordability. Therefore, TOPSIS is one of the most commonly used MCDM methods to solve problems associated with different environmental issues.

In this paper, we propose a novel sorting method, TOPSIS-Sort, based on the TOPSIS method. TOPSIS was selected because of its logical concepts and simple computations. Similar to methods discussed previously (e.g. ELECTRE TRI, ELECTRE-SORT and PROMSORT); in the proposed TOPSIS-Sort approach an outranking relation is used for sorting purposes.

The remaining of this paper is organized as follows: In Section 1, we briefly introduce the classical TOPSIS method. Section 2 elaborates the proposed novel sorting method TOPSIS-Sort. An application of the methodology for Tehran environmental quality evaluation is depicted in Section 3. Finally, our conclusions are presented.

1. Overviews of Sorting Theory and TOPSIS

1.1 Problems of Sorting

The sorting problem involves the assignment of a set of alternatives $A = \{a_1, a_2, \dots, a_n\}$ into K predefined ordered classes C_1, C_2, \dots, C_K . Here the order of classes is based on its importance, respectively, C_1 is the best class and C_K is the worst class. The defined classes can be denoted by linguistic variables such as 'surely accepted', 'acceptable', 'rejected', etc. (Norese & Viale, 2002)

A set of reference points is used for sorting, and the alternatives are compared to these reference points. This set of reference points includes a value of reference profiles which specify the theoretical limits between the classes, such as in ELECTRE TRI (Roy & Bouyssou, 1993), or multi-criteria models of a valid (ideal) and a critical (anti-ideal) project, such as in n-TOMIC (Massaglia & Ostanello, 1991).

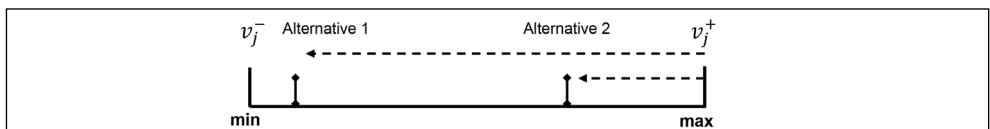
It is worth noting that sorting problems usually refer to absolute evaluation, i.e., the assignment of an alternative does not depend on the remaining ones (Figueira et al., 2005; Bouyssou & Marchant, 2015). In this case, each alternative is assigned to a class on the base of a predefined rule. On the contrary,

both choice and ranking problems are based on relative judgments, involving pairwise comparison between the alternatives (Douplos & Zopounidis, 2002). Consequently, the evaluation result depends on the considered set of alternatives, i.e., each alternative is compared to the others to determine a preference relation.

1.2 TOPSIS; a Brief Reminder

Technique for order preference by similarity to ideal solution (TOPSIS) is one of the most widely used classical MCDM methods, was first developed by Hwang and Yoon (1981). A set of criteria g_1, g_2, \dots, g_m is used to rank the alternatives a_1, a_2, \dots, a_n . Two reference points are determined as ideal solution v_j^+ and anti-ideal solution v_j^- on each criterion. The ideal solution v_j^+ represents the best value for the j th criterion and, conversely, the anti-ideal solution represents the worst value for the j th criterion among all available alternatives. The alternatives with other values lie between these two extremes (v_j^+ and v_j^-). The closer an alternative is to v_j^+ , better performance on the attribute it represents. Contrarily, the farther an alternative is from v_j^+ and the closer to v_j^- , lower value for the attribute it has. As depicted in Fig. 1, Alternative 1 is closer to the negative ideal solution, but farther from the positive ideal solution, whereas Alternative 2 is closer to the positive ideal solution but farther from the negative ideal solution. Thus, Alternative 2 is better choice than Alternative 1 according to the j th criterion. The positive ideal solution (A^+) is composed of all best values attainable of criteria, and the negative ideal solution (A^-) consists of all the worst values attainable of criteria. Finally, all alternatives are ranked according to their distances from the ideal and the negative ideal solution, i.e., the best alternative has simultaneously the shortest distance from the ideal solution and the farthest distance from the negative ideal solution.

Fig. 1: Distance of alternatives from the positive ideal and negative ideal solutions



Source: own

The TOPSIS method consists of the following steps (Vahdani et al., 2011; Dymova et al., 2013):

1. Normalize the decision matrix $X = (x_{ij})_{n \times m}$ using the equation below.

$$r_{ij} = \frac{x_{ij}}{\sqrt{\sum_{i=1}^n x_{ij}^2}}, \quad i = 1, \dots, n; j = 1, \dots, m. \quad (1)$$

2. Calculate the weighted normalized decision matrix $V = (v_{ij})_{n \times m}$.

$$v_{ij} = w_j r_{ij}, \quad i = 1, \dots, n; j = 1, \dots, m, \quad (2)$$

where w_j is the relative weight of the j th criterion, and $\sum_{j=1}^m w_j = 1$.

3. Determine the positive ideal and negative ideal solutions.

$$A^+ = \{v_1^+, \dots, v_m^+\} = \{\max_j v_{ij} | j \in J, \min_j v_{ij} | j \in J'\}, \quad (3)$$

$$A^- = \{v_1^-, \dots, v_m^-\} = \{\min_j v_{ij} | j \in J, \max_j v_{ij} | j \in J'\},$$

where J and J' are the set of benefit criteria and cost criteria, respectively.

4. Calculate the Euclidean distances of each alternative from the positive ideal solution and the negative ideal solution, respectively.

$$D_i^+ = \sqrt{\sum_{j=1}^m (v_{ij} - v_j^+)^2}, \quad i = 1, \dots, n, \quad (4)$$

$$D_i^- = \sqrt{\sum_{j=1}^m (v_{ij} - v_j^-)^2}, \quad i = 1, \dots, n. \quad (5)$$

5. Calculate the relative closeness of each alternative to the ideal solution. The relative closeness of the alternative A_i with respect to A^+ is defined as.

$$c_i = \frac{D_i^-}{D_i^+ + D_i^-}, \quad i = 1, \dots, n. \quad (6)$$

6. Rank the alternatives according to the relative closeness to the ideal solution: the bigger is the c_i , the better is the alternative A_i . The best alternative is the one with the highest relative closeness to the ideal solution.

2. TOPSIS-Sort Method

The TOPSIS-Sort method, proposed by this paper, pertains to the extension of TOPSIS in order to sort the alternatives. The sorting of the alternatives requires their comparison to the reference profiles that distinguish the classes. For each class k , two reference profiles, the upper limit profile \overline{p}^k and the lower limit profile \underline{p}^k , are specified. Upper limit is higher value than the lower limit, i.e., the upper limit of the profile of the first class is greater than the lower limit of the first class $\overline{p}^1 > \underline{p}^1$, and the lower limit of the last class equals the values which are less than the upper limit of the last class $\underline{p}^k < \overline{p}^k$. In other words, all the data values greater than the lower limit of the first class are assigned to the first class, and all the data values less than the upper limit of the last class are properly placed to the last class.

There are two ways to use profiles in the proposed model. The first way is to define the threshold values for each profile based on the decision matrix X . Therefore, 'good' and 'bad' values are assigned to each attribute, and then the position of the attribute values of each alternative in the same interval is determined. The second way is to define the profiles based on the normalized matrix ξ which is calculated using Eq. (7), and then the data can be arranged in the interval $[0, 1]$. Then, some certain intervals are defined for the profiles, for example, very good class $C^1 = \{p^1 = 0.9, p^1 = 1\}$, good class $C^2 = \{p^2 = 0.7, p^2 = 0.9\}$, etc.

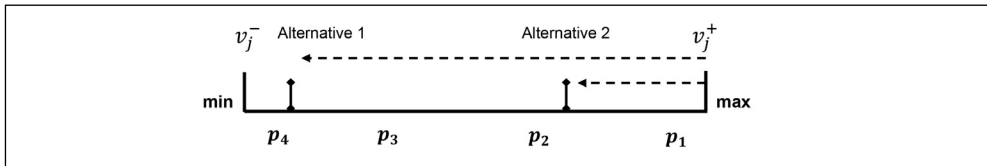
The decision maker's preferences are a significant determinant in solving MCDM problem and should be integrated into the decision model. Each criterion has its own domain of possible values. Taking into account this and DM's preferences with respect to the criteria, the profile values are determined for each class. The criteria can be classified as either benefits or costs. As for the benefit criteria, the values of the profiles of the higher classes are greater, but they decrease towards the lower classes as their appropriateness decreases. In the cost criteria, the values of higher classes are smaller, but they increase towards the lower classes, because the less costly alternative is the most appropriate one. This technique is very useful when there are some evaluation standards.

The TOPSIS method is based on determination of the distance of each alternative from the positive and negative ideal solutions

according to the decision criteria. The profiles are defined as references in the decision matrix, and the distance of the profiles is measured from the positive and negative ideal solutions similar to alternatives (i.e. $cl_{p^k}^+$ and $cl_{p^k}^-$). These two values represent the relative closeness

of the upper limit of the class K to the ideal solution as well as the relative closeness of the lower limit of the class K to the ideal solution. The values of $cl_{p^k}^+$, which lie within the interval $cl_{p^k}^-$ and $cl_{p^k}^+$ fit into the class K (see Fig. 2).

Fig. 2: Distance of alternatives from the positive ideal and negative ideal solutions and position of profiles



Source: own

2.1 TOPSIS-Sort Procedure

The TOPSIS-sort technique for sorting of multiple criteria alternatives includes the following steps:

1. Establish the decision matrix $X = (x_{ij})_{n \times m}$.
2. Determine a set of profiles $P = \{(\overline{p^1}, \underline{p^1}), \dots, (\overline{p^k}, \underline{p^k})\}$, where $\overline{p^k}$ is the upper limit of the class K and $\underline{p^k}$ is the lower limit of the class K .
3. Add the profiles to the decision matrix $\xi = \{X, P\}$.
4. Normalize the decision matrix ξ using the equation below.

$$r_{ij} = \left\{ \frac{\xi_{ij}}{\max} \mid J, 1 - \frac{\xi_{ij}}{\max} \mid J' \right\}, \tag{7}$$

where J and J' denote the sets of benefit criteria and cost criteria, respectively.

5. Execute Steps 1 to 5 of the TOPSIS method.
6. Calculate the values of cl_i for the decision matrix ξ .
7. Determine the values of $cl_{p^k}^-$ and $cl_{p^k}^+$ for the profiles of each $\overline{p^k}$, $\underline{p^k}$ where $cl_{p^k}^-$ refers to the deviation of the upper limit profile of the class K from the ideal solution, and $cl_{p^k}^+$ is the deviation of the lower limit profile of the class K from the ideal solution.

8. Compare the values $cl_{p^k}^+$ with the values $cl_{p^k}^-$ in the profiles using the equation below.

$$a_i^k \in K^k \mid \underline{cl_j^{p^k}} < cl_j < \overline{cl_j^{p^k}}, \tag{8}$$

$$\forall i = 1, \dots, n, k = 1, \dots, K$$

9. The alternatives whose cl_j values are greater than $\underline{cl_j^{p^k}}$ and less than $\overline{cl_j^{p^k}}$ are assigned to the class K . At this stage the alternatives are sorted and assigned to the classes that are already defined.

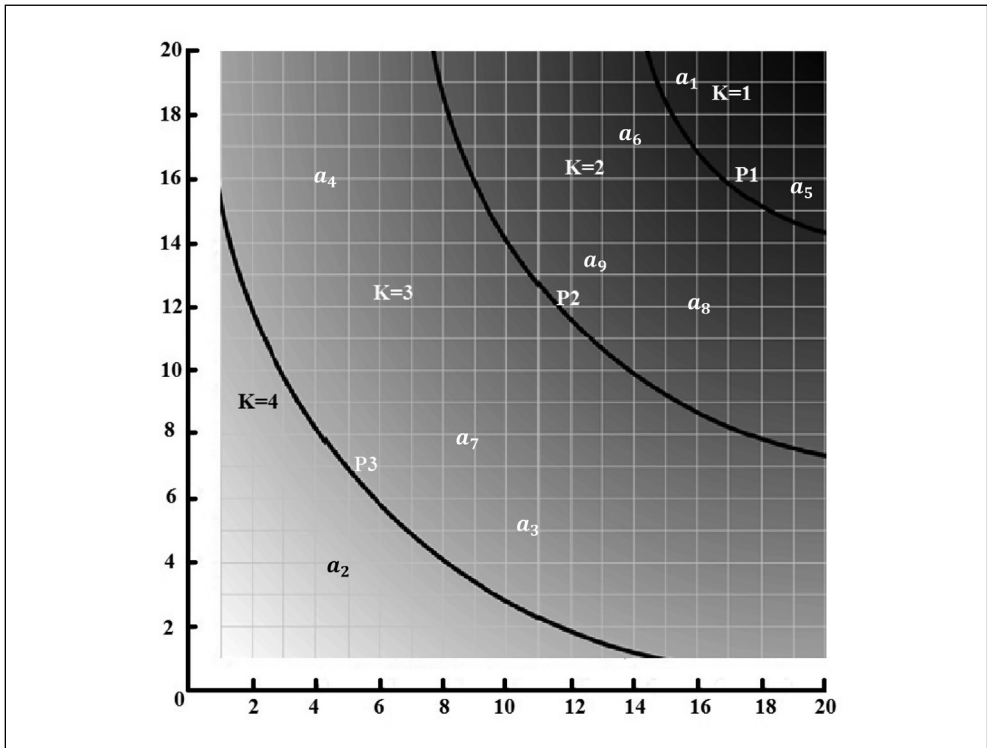
For example, Fig. 3 shows the positive and negative ideal solutions as well as the position of a few assumed alternatives. The curved lines denote a position of the profiles. P1 is the upper limit of Class 1, and all the values that lie within the interval higher than P1 fit into Class 1. P2 is the lower limit and P1 is the upper limit of Class 2, and all the values that lie within this interval belong to Class 2. Alternatives 5 and 1 belong to Class 1, Alternatives 6, 8 and 9 belong to Class 2, Alternatives 4, 7 and 3 belong to Class 3, and Alternative 2 fits into Class 4.

3. An Empirical Case of Tehran

3.1 Classification of Environmental Quality Management

Tehran is the capital city of Iran; it is located in the northern part of the country. Tehran is located on the southern slopes of the Alborz Mountains. With an estimated population of

Fig. 3: Position of profiles and alternatives in the attribute space



Source: own

8.4 million, it is also Iran’s largest urban area and city, the largest city in Western Asia, one of the largest in Southern Asia, and the 19th largest city globally. The daily inflow of people, commuting in and out of Tehran, increases the daytime population of the city up to more than 15 million.

Tehran is divided into 22 districts that show remarkable disparities from social, economic, cultural and political points of view. Tehran performs many of national and international functions as a capital city. The ministries, government institutions and other institutions, private companies and branch offices of foreign companies are located in the city. Tehran is the most important transportation hub in Iran in air, rail and road transportation. Almost half of the country’s industrial activity is concentrated in Tehran, and it is a significant economic driver across the whole country. However, this has

significant negative impacts on the environment.

The Tehran Metropolis shelters about a quarter of the urban population of Iran, which in itself has led to expansion and escalation of pressures on the environment (Research & Planning Center of Tehran, 2012). Tehran’s air pollution is made even worse by the city’s geographic position. The city is semi-enclosed in three directions by high altitude mountains, blocking air movements. Therefore, Tehran is facing with numerous environmental problems and issues, such as air pollution mitigation and management, waste management, water and wastewater management, urban safety and greening.

An analysis and assessment of the environmental conditions in Tehran helps to identify the districts with the poor environmental quality. Priority should be given to these areas to maintain and improve the quality

of environment. Tehran's districts can be classified into five classes according to their environmental conditions: high suitable, suitable, moderately suitable, low suitable and very low suitable. The annual report of Tehran municipality was used to define the criteria in order to assess the quality of environment. Five criteria were chosen for evaluation of the urban districts of Tehran. The thresholds of each class were identified using data from the detailed plan of Tehran, Tehran comprehensive plan of greenery, Tehran comprehensive plan of environment and Tehran comprehensive plan of water and wastewater and the specialists' opinion.

Air Pollution

Air pollution is one of the most challenging problems in Tehran. In December 2015, Tehran authorities have decided to close all schools and kindergartens in the capital for two days because of dangerous environmental situation caused by high air pollution. Iran has twice closed schools and government offices because of air pollution, most recently in 2010. According to the office in charge of monitoring air quality, the air in Tehran was pure for only 219 days during the past 16 years (24.com, 2015). Based on AQI (Air Quality Index), during a 10-year period (1983–1993) Tehran experienced 1 dangerous day, 7 very unhealthy days, 67 unhealthy days, 926 unhealthy days for vulnerable people, and 2,481 healthy days out of 3,654 days (<http://air.tehran.ir>). Air pollution was unequally distributed within the city: the pollution was higher in the central areas where the activities were concentrated than in the surroundings.

The national government and local authorities endeavour to develop an efficient air quality management system in Tehran. In order to improve, control and manage the air pollution in Tehran, eleven monitoring stations provide real-time information on air quality and identify the polluted districts. These results can be used by public and involved organizations responsible for the control of air quality.

Urban Green Space

Development of urban green space and landscapes are one of the effective ways for improving air quality, aesthetics and environment. Urban green spaces are known as the lungs of a city (Singh, 2015). Urban

greenery has a natural ability to filter pollution from the air and provide cooling effects during extreme heat (Tiwary et al., 2009; Zupancic et al., 2015). Urban green space improves the environmental quality of life, promotes public health and provides valuable ecosystem services, urban tourism, active and passive recreations to urban dwellers (de Vries, 2003; ECOTEC, 2008; Abraham et al. 2010). Green assets provide benefits both for people, by enhancing public use opportunities, and for the environment by improving urban ecosystem health.

Although the World Health Organization (2010) suggests a minimum of 9 sq. m of green space per capita, this amount is only suitable if the greenery is accessible, good quality and well-maintained. It should be noted that currently accepted standard in Iran for urban green space in cities is 7–12 sq. m. per capita (Ebrahimzadeh et al., 2013). However, access to green spaces is unequally distributed across different areas of Tehran. These problems are caused by the shortage of water and space for urban greenery development, poor soil quality, etc. Unfortunately, over the past years, the urban sprawl and endless construction projects have denuded the city of its green spaces. At present, the green space per capita in Tehran is about 9.2 sq. m, though this amount differs among the districts. This figure indicates that one of environmental challenges in Tehran is shortage of green space. Due to this, air pollution and other environmental problems are becoming crucial in the city. Thus, this criterion is of great importance for evaluation of the quality of urban environment.

Waste

According to the Tehran Waste Management Organization, every resident of Tehran produces 320 kilograms of solid waste per year. In other words, annually every resident produces an average 6 times more waste than his/her weight. While the average per capita production of solid waste in the world is 250–300 grams per day, Iran daily produces an average 600 grams per person. In northern Tehran, this amount reaches 1,200 grams. In central Tehran, especially District 20, where the commercial facilities are concentrated, the waste production rate reaches its peak. Statistics show that business districts of Tehran produce more waste, and the waste produced

in the northern Tehran is at least 2 times more than the country average and 4 times more than the world average.

Water and Wastewater

Urban water is used to meet commercial, industrial, institutional and residential needs of the city. Water is involved in domestic and productive/irrigation activities. Citizens should be provided with sufficient and safe water to meet their basic needs, i.e., for drinking, cooking, and personal and domestic hygiene. Tehran is located in a semi-arid region with little rainfall and frequent droughts. The mean annual precipitation is only 250 millimeters, most of which falls during winter and spring. Tehran is facing with a water shortage of more than 100 million cubic meters (MCM) per year in drought years. The most important freshwater resources in Tehran are the Karaj, Lar, Latian, Mamloo and Taleghan reservoirs. Tehran supplements surface water with groundwater to mitigate the water shortage, and at least 250 MCM of water is discharged from wells annually in Tehran (Tajrishy et al., 2014).

According to the Tehran Water and Wastewater Company, over 703 MCM of water is supplied to Tehran, and on average 85 MCM per month is extracted and supplied to the city, out of which 71.7 come from surface water and the rest from the groundwater. The total water consumption of the Tehran province was about 980 MCM in 2008. During summer months water consumption and demand for domestic water increases as the summer heat rises in densely populated Tehran.

Expansion of urban population and increased household water consumption and sewerage give rise to greater quantities of municipal wastewater. With emphasis on environmental health issues, there is an increasing awareness of the need to dispose the wastewater safely and beneficially.

Ratio of Incident to Station

According to the Fire Organization, 12,620 fires incidents have occurred in residential, commercial, administrative and industrial properties in Tehran during 2007. The highest number of fires was in District 2, while District 13 experienced the least number of incidents. Population density, old electrical wires and connections, storage of flammable materials in residential places, using substandard electric

and gas appliances, and ignoring safety regulations, these are some of the causes of fire in residential property in Tehran.

3.2 Application of TOPSIS-Sort

Five criteria are used to classify Tehran’s districts on the quality of urban environment: urban green space per capita (g_1), waste and soil pollution management (g_2), quality of environmental management of water and wastewater projects (g_3), air pollution management (g_4), ratio of incidents to station (g_5). These criteria are taken into account in order to identify five classes of districts, also to determine the costs and benefits of each alternative and the weight of the criteria. Therefore, Class 1 is considered as the best and then Classes 2 to 5 are ranked respectively. Taking into account the specialists’ opinion and data from the comprehensive plans of Tehran, the upper limit profile and the upper limit profile for each class was defined. The standards compatible with Tehran have been deployed in defining the profiles, so the profiles are independent from the alternatives and their scores. The profiles are shown in Tab. 2. The weight of all criteria is assumed the same (0.2). The scores of 22 districts of Tehran according to the criteria were collected and entered into the decision matrix (Tab. 2). Then, the matrix and the profile were combined together (Tab. 3). Fig. 4 provides a graphical representation of the position of three districts (1, 6 and 21) according to the defined profiles. At the next step, the decision matrix and the profile were normalized by Eq. (7). The weight normalized matrix is obtained by multiplying the normalized decision matrix with the weights vector. At the next step, the values of the positive and negative ideal solutions were determined for each criterion (Tab. 3).

In the next step, the distance from the positive and negative ideal solutions is calculated using Eqs. (4) and (5) (Tab. 4). According to Eq. (6), the deviation of the alternatives cl_j from the ideal solution is determined and the deviation of profile from the ideal solution (cl_j^{pr} and cl_j^{pr}) is also calculated. Final step, the deviation of profile from the ideal solution is calculated and then the alternatives are assigned to the classes through comparison between cl_j of each alternative and cl_j of profiles. For example, cl_j of District 1 is 0.54753 which is less than Profile 1, so it does not fit into Class 1. This value is greater than Profile 2 (0.51037),

so it belongs to Class 2. The cl_j of Alternative 3 is 49,401 which is less than the lower limit of Class 1, so it does not fit into Class 1. Now it is the turn of Class 2. This value is compared to the lower limit of Class 2. Alternative 3 does not fit into Class 2, because it is less than the lower limit of Class 2. Alternative 3 belongs to Class 3, since it is greater than the lower limit of Class 3 but less than its upper limit. In this way cl_j of all alternatives are compared to the

values of cl_j^k and $\overline{cl_j^k}$ in order to determine their related classes. It should be noted, that none of the alternatives fits into Classes 4 and 5 (see Fig. 5). Thus, all the alternatives are classified; Class 1 turns out to be the best and Class 5 would be the worst. Sorting results of 22 districts of Tehran according to the set of criteria are shown in Tab. 5.

Tab. 1: Specifications of the classification for the quality of Tehran environmental management

	Criteria				
	g_1	g_2	g_3	g_4	g_5
Cost/Benefit	benefit	benefit	benefit	benefit	cost
Weight	0.2	0.2	0.2	0.2	0.2
p_1	25	80	40	80	150
p_2	20	75	30	60	300
p_3	10	70	20	30	400
p_4	0	65	10	20	700

Source: own

Tab. 2: Decision matrix for environmental quality evaluation in districts of Tehran (Part 1)

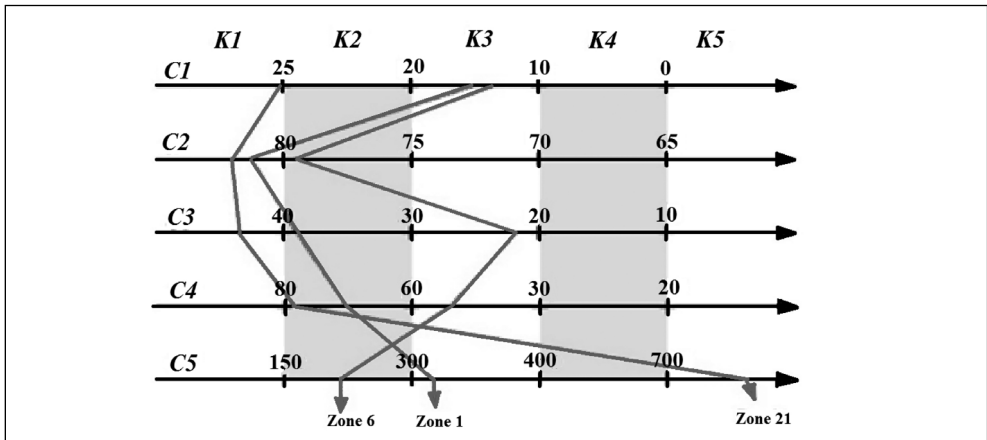
Districts	Criteria				
	g_1	g_2	g_3	g_4	g_5
1	15.50	82.40	40.10	70.66	313.69
2	9.90	90.80	22.00	82.21	130.61
3	15.20	82.30	25.20	65.57	269.37
4	23.40	88.30	60.20	69.28	119.03
5	16.60	76.80	22.70	69.28	116.82
6	12.40	78.60	22.60	50.28	199.55
7	4.00	85.00	27.80	51.40	188.94
8	4.40	78.20	25.60	56.59	126.37
9	5.20	80.20	27.60	86.29	108.82
10	2.30	80.70	24.20	79.88	97.95
11	4.90	77.70	26.30	61.28	122.58
12	5.70	80.90	26.80	70.75	82.75
13	33.40	85.30	28.10	67.68	126.14
14	5.90	82.50	29.80	82.61	149.32
15	14.00	88.50	24.60	90.71	335.24
16	11.40	81.80	26.50	61.04	139.62
17	3.50	78.90	22.40	60.82	99.42

Tab. 2: Decision matrix for environmental quality evaluation in districts of Tehran (Part 2)

Districts	Criteria				
	g_1	g_2	g_3	g_4	g_5
18	12.96	78.40	25.20	67.25	180.18
19	28.00	82.40	25.30	56.89	102.78
20	15.70	82.10	27.70	24.64	193.52
21	25.00	91.30	67.10	79.81	916.67
22	48.00	85.10	49.20	86.71	173.79
p_1	25	80	40	80	150
p_2	20	75	30	60	300
p_3	10	70	20	30	400
p_4	0	65	10	20	700

Source: own

Fig. 4: Profiles and classes of environmental quality evaluation and the position of Tehran Districts 1, 6 and 21



Source: own

Tab. 3: Profiles and normalized weight matrix (Part 1)

Districts & Profiles	Criteria				
	g_1	g_2	g_3	g_4	g_5
1	0.0646	0.1805	0.1195	0.1558	0.0684
2	0.0413	0.1989	0.0656	0.1813	0.0285
3	0.0633	0.1803	0.0751	0.1446	0.0588
4	0.0975	0.1934	0.1794	0.1528	0.0260
5	0.0692	0.1682	0.0677	0.1528	0.0255
6	0.0517	0.1722	0.0674	0.1109	0.0435

Tab. 3: Profiles and normalized weight matrix (Part 2)

Districts & Profiles	Criteria				
	g_1	g_2	g_3	g_4	g_5
7	0.0167	0.1862	0.0829	0.1133	0.0412
8	0.0183	0.1713	0.0763	0.1248	0.0276
9	0.0217	0.1757	0.0823	0.1903	0.0237
10	0.0096	0.1768	0.0721	0.1761	0.0214
11	0.0204	0.1702	0.0784	0.1351	0.0267
12	0.0238	0.1772	0.0799	0.1560	0.0181
13	0.1392	0.1869	0.0838	0.1492	0.0275
14	0.0246	0.1807	0.0888	0.1821	0.0326
15	0.0583	0.1939	0.0733	0.2000	0.0731
16	0.0475	0.1792	0.0790	0.1346	0.0305
17	0.0146	0.1728	0.0668	0.1341	0.0217
18	0.0540	0.1717	0.0751	0.1483	0.0393
19	0.1167	0.1805	0.0754	0.1254	0.0224
20	0.0654	0.1798	0.0826	0.0543	0.0422
21	0.1042	0.2000	0.2000	0.1760	0.2000
22	0.2000	0.1864	0.1466	0.1912	0.0379
Profile 1	0.1042	0.1752	0.1192	0.1764	0.0327
Profile 2	0.0833	0.1643	0.0894	0.1323	0.0655
Profile 3	0.0417	0.1533	0.0596	0.0661	0.0873
Profile 4	0.0000	0.1424	0.0298	0.0441	0.1527
Ideal	0.2000	0.2000	0.2000	0.2000	0.0181
Anti-Ideal	0.0000	0.1424	0.0298	0.0441	0.2000

Source: own

Tab. 4: Distances of alternatives and profiles from the ideal solution (Part 1)

Districts & Profiles	Ideal	Anti-Ideal	CI
1	0.17230	0.20850	0.54753
2	0.20910	0.23320	0.52724
3	0.19850	0.19380	0.49401
4	0.11520	0.27680	0.70612
5	0.19480	0.22170	0.53229
6	0.22130	0.18410	0.45412
7	0.23570	0.18710	0.44253
8	0.23430	0.19890	0.45914
9	0.21540	0.23820	0.52513
10	0.23180	0.22890	0.49685
11	0.22850	0.20460	0.47241
12	0.21900	0.22340	0.50497

Tab. 4: Distances of alternatives and profiles from the ideal solution (Part 2)

Districts & Profiles	Ideal	Anti-Ideal	CI
13	0.14160	0.25510	0.64306
14	0.20980	0.22940	0.52231
15	0.19800	0.21990	0.52620
16	0.20680	0.20730	0.50060
17	0.23920	0.20590	0.46259
18	0.20210	0.20620	0.50502
19	0.16860	0.23510	0.58236
20	0.23260	0.18290	0.44019
21	0.20700	0.24600	0.54305
22	0.05920	0.32170	0.84458
Profile 1	0.13070	0.25570	0.66175
Profile 2	0.18420	0.19200	0.51037
Profile 3	0.26390	0.12620	0.32351
Profile 4	0.33870	0.04730	0.12254

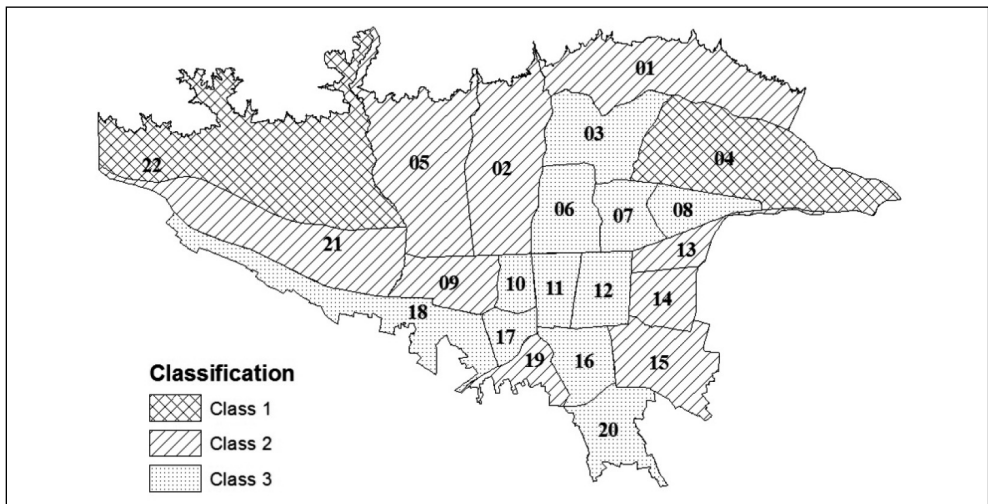
Source: own

Tab. 5: Sorting of the districts of Tehran by the method TOPSIS-Sort

District	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Class	2	2	3	1	2	3	3	3	2	3	3	3	2	2	2	3	3	3	2	3	2	1

Source: own

Fig. 5: Classification of Tehran districts by the method TOPSIS-Sort



Source: own

Conclusions

For solution of a MCDM problem, there exist different methods for outranking alternatives, in which the alternatives are compared pairwise or each alternative is compared to the ideal solution. The best and worst values of attributes as reference points are internally defined, and the alternative with the best performance on all attributes is regarded as ideal to which other alternatives are compared. The alternatives can also be compared pairwise against each of the criteria for preference, and a complete ranking of alternatives from the best to the worst one is provided. If reference points are externally defined for comparison, we achieve a set of methods that sort the alternatives into pre-defined categories.

The TOPSIS-Sort method, proposed in this paper, pertains to the extension of the classic TOPSIS method in order to sort the alternatives. In the proposed method, the profile and reference points determine a range from the best to the worst values independently from the data. Application of the proposed approach was demonstrated by classifying 22 districts of Tehran into five classes (but none of the districts fits into Classes 4 and 5), representing areas with different levels of environmental quality. The results obtained by the TOPSIS-Sort give credence to its success, because the results of sorting confirm our and specialists' evaluation of the districts. This research provides appropriate results with respect to the development of sorting models in the form of outranking relations. The model, proposed by this study, is applicable to the other outranking methods such as ELECTRE, PROMETHEE, etc.

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A NOVEL SORTING METHOD TOPSIS-SORT: AN APPLICATION FOR TEHRAN ENVIRONMENTAL QUALITY EVALUATION

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Many real-life problems are multi-objective by nature that requires evaluation of more than one criterion, therefore MCDM has become an important issue. In recent years, many MCDM methods have been developed; the existing approaches have been improved and extended. Multi criteria decision analysis has been regarded as a suitable set of methods to perform sustainability evaluations. Among numerous MCDM methods developed to solve real-life decision problems, Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) continues to work satisfactorily in diverse application areas. In this paper, a novel sorting method (TOPSIS-Sort) based on the classic TOPSIS method is presented. In the TOPSIS-Sort approach an outranking relation is used for sorting purposes. The proposed approach uses characteristic profiles for defining the classes and outranking relation as the preference model. Application of the proposed approach is demonstrated by classifying 22 districts of Tehran into five classes (but none of the districts fits into Classes 4 and 5), representing areas with different levels of environmental quality. An analysis and assessment of the environmental conditions in Tehran helps to identify the districts with the poor environmental quality. Priority should be given to these areas to maintain and improve the quality of environment. The results obtained by the TOPSIS-Sort give credence to its success, because the results of sorting confirm our and specialists' evaluation of the districts. This research provides appropriate results with respect to the development of sorting models in the form of outranking relations. The model, proposed by this study, is applicable to the other outranking methods such as ELECTRE, PROMETHEE, etc.

Key Words: TOPSIS-Sort, multiple criteria decision making (MCDM), outranking, sorting.

JEL Classification: C02, C44, C61, C88, O18, Q56.

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VALUE ALLOCATION – CONTRIBUTION AND RISK TO THE RELIABILITY OF FINANCIAL REPORTING

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Introduction

The decision-usefulness theory (Staubus, 2008) connects the quality of the financial information disclosed with the right business decisions made by its users, and it is based on the notion that the relevance and reliability of financial reporting is crucial, having important practical implications. Moreover, according to the basic economic theory, it is shown that high financial reporting quality is a natural outcome of private equity monitoring and governance (Beuselinck & Manigart, 2007). All these firstly imply that the standard setters develop quality accounting standards that are accessible to preparers, understandable and useful for internal (managers) and external users to make their decisions. Secondly, this implies the correct use of accounting standards and regulations and correct estimates. The most important estimation in accounting is due to the use of the fair value concept, a value connected to the market, which is an alternative to historical cost, as the later was the dominant valuation basis up to two decades ago.

The debates on the fair value paradigm are not recent. They had a gradual evolution and became more intense with the awareness of the current financial crisis effects. Fair value can be analyzed theoretically and normatively. In this study we treat the normative approach of fair value, namely accounting and valuation standards. Focusing on the international referential issued by the International Accounting Standards Board (IASB), our research shows that the International Financial Reporting Standards (IFRS) intensify fair value use, peaking with the issue of IFRS 13 *Fair value measurement*. This FV accounting standard clarifies the definition of fair value, establishes a framework for measurement and requires disclosures about this measurement. Estimations are done in three stages, with a strict

preference for market-based measures, fair value being an exit value under idealized conditions (Deaconu & Buiga, 2010). International Valuation Standards Council (IVSC), the professional association that brings under regulation the activity of assets and businesses valuation at the international level, has its own amendments regarding the concept of fair value. According to IVSC, the definition of fair value is presented in the accounting standards, as the concept is generally consistent with the concept of market value. International Valuation Standard (IVS) 300 entitled *Valuations for Financial Reporting* presents the view of valuation regulators in what concerns the valuation bases in accounting and fair value estimates.

Starting from these coordinates and the interdependence between valuation practice for financial reporting and a correct estimate of fair value, we established as research question the analysis of the risk inherent to the process of value allocation. This is one stage in the sequence of value estimate techniques for an asset or business and it is implied by the use of two classical valuation approaches, namely the market and the income approaches. These two approaches lead to the estimate of a global value for a group of assets. However, for recognition in the financial statements the value needs to be allocated to each asset. The allocation process is somewhat artificial, at least for a part of the assets in the group, as allocation keys need to be used. Usually, these can be based on value estimates made by valuers or on book values which are not always revaluated according to the requirements of valuation standards. The later solution presented needs to be treated with caution, and this is what we will be focusing on in our present research, especially as we discuss atypical economic contexts. According to (Deaconu & Buiga, 2010) atypical

markets refer to assets that are not held for sale or specialized, illiquid markets or non-ordinary transactions, and markets less active specific to emergent economies. The literature shows that the exit price and the premises regarding a perfect market are not applicable to any type of economy (Hitz, 2007; Ronen, 2008; Whittington, 2008).

Focusing on an emergent context, we consider the relevance of historical cost, which is sometimes used in financial reporting, and the relevance of fair values obtained by using a key for value allocation, while considering the case study of the Romanian market. Practically, we adopt an empirical approach in order to investigate the value allocation process in what concerns types of assets under valuation, valuation approaches used, and value allocation keys used by professional valuers. All of these enable us to conclude on the relevance of the value allocation process for financial reporting, and thus the reliability of fair value.

The remainder of the paper is organized as follows: Section 1 explains the research framework, presenting reference to the items important for this research in the literature; Section 2 presents the research design, while describing the research question and the construct of the empirical approach; Section 3 reveals the results of the statistical analysis; and the final section concludes.

1. Research Framework

1.1 Value Allocation Process

Without going into details regarding the debate on fair value versus historical cost – debate which is still ongoing – we only wish to mention that fair value is characterized by relevance and accounting neutrality (Casta, Colasse et al., 2001), while historical cost is more objective and reliable as there are no technical issues for its estimation. The parallel presentation of the two concepts underlines the importance of correct fair value estimation as this leads to another imagine of the transactions and activities of a business compared to the traditional system of historical cost, to another economic reality (Ronen, 2008; Rérolle, 2008; Whittington, 2008).

In what concerns the reference to fair value in the accounting and valuation standards, we start with the accounting standards out of which IFRS 13 *Fair value measurement* clarifies the accounting valuation system and

repeals earlier definitions on this subject from various IFRS. IFRS 13 defines the fair value of an asset as the price that would be received to sell an asset in an orderly transaction between market participants at the measurement date. IFRS 13 includes a 'fair value hierarchy' which classifies measurements according to the nature of available input data, namely, in the case of assets: level 1 inputs are quoted prices (unadjusted) in active markets for identical assets that the entity own at the measurement date; level 2 inputs are inputs other than quoted prices included in level 1 that are observable for the asset either directly or indirectly; level 3 inputs are inputs unobservable for the asset. There are additional accounting requirements concerning measurements done using level 3 inputs. A valuation report is adequate if it includes sufficient information on the valuation inputs used (especially level 3 inputs) to enable the reporting entity to correctly categorize assets within this hierarchy (IASB, 2013).

Within the valuation standards, the standard dedicated to fair value measurement, in other terms financial reporting, is IVS 300 *Valuations for Financial Reporting*. The valuation standard shows that IFRS takes on two models for assets' recognition in the financial statements: a model based on cost, entitled basic accounting approach, and respectively a model based on fair value which represents the alternative accounting approach admissible in certain particular cases. Market values are determined when the fair value approach is applied. According to IVSC (2011), the references to market participants, an orderly transaction, the transaction taking place in the principal or the most advantageous market and to the highest and best use of an asset make it clear that fair value under IFRS is consistent with the concept of market value as defined and discussed in the IVS *Framework*. According to IVS 300 (IVSC, 2011), when the book value of an element is based on its fair value, and when the value of individual components cannot be reliably determined, the fair value needs to be allocated to each component. Just like accounting standards, IVS recommend that the value allocation process should be described so that the logic behind the allocation can be followed, and the allocation keys should be presented, and their usage justified (IVSC, 2011). In what concerns the allocation keys, IVS 300 shows that the ratio between the cost of the element

and the cost of the aggregated group could be considered an adequate allocation basis.

The three traditional valuation techniques for assets or businesses are: the market, the income and the cost approach respectively. In relation to the estimation levels mentioned in the accounting standards and in the light of the value allocation process, we could state that the market approach is adequate only for assets or businesses that are frequently subject of market transactions and thus have an active market. It is the only approach that leads to values which could be classified as part of Level 1 in the fair value hierarchy, when they are compared to identical assets. The income approach is applicable when future income/profits generated by the asset can be estimated reliably, the forecast period should be reasonable for these predictions as well as the capitalization/ discount rate used for the forecast period and the profitability of the asset discounted with the risk to obtain the income. Estimates based on the income approach could lead to Level 2 and 3 data in the value hierarchy. The cost approach is generally adequate in the case of specialized and/or new assets, when active markets cannot be identified. Generally, its implementation does not incur allocation issues and will lead to estimates that fall into Level 3 of the fair value hierarchy.

In what concerns the valuation approach chosen, the values obtained could belong to an individual asset or to a group of assets. In the second case the value is obtained globally. The issue of value allocation among the components of the group occurs in the case of market and income approaches, as the global value needs to be differentiated for each asset/ property in order to disclose it separately in the accounts. From the standpoint of valuers the process is entitled value allocation to components. Value allocation is implied by several scopes of the valuation process. The main one, and the subject of our research, is financial reporting (revaluation, goodwill measurement), but in the valuation practice there are also the cases of valuation for tax purposes, loan collaterals, insurance, cases when the tax and financial requirements are different for each component.

As objects of value allocation, the cases mentioned in the international valuation standards IVS (IVSC, 2011) are mainly: land and buildings that form the same property, several buildings (after the initial allocation

of land), several pieces of equipment from a production line, capitalized subsequent expenditures, according to IAS 16 *Property, Plant and Equipment* and IAS 23 *Borrowing Costs*, which need to be allocated to different fixed assets, the allocation of the acquisition cost for an entire business according to IFRS 3 *Business Combination*. The first three cases often occur in practice and are sometimes mentioned in the literature which only refers to the difficulties of value allocation between land and buildings. One of the major issues that arise is the possibility that a market for buildings without land does exist, and the second issue is the difficulty to separate the two components (Hendriks, 2005).

The most frequent case of value allocation as his object refers to real estate (land + building), as sometimes the land is not subject to valuation (Matonis & Derango, 1993). As techniques used by valuation professionals, the literature recommends two deductive approaches from the estimated value for the real estate formed of land and building (Hendriks, 2005): (a) estimating the market value of the land without the building and then deducting this from the carrying amount of the property, and (b) estimating the net replacement cost of the building and then deducting this from the carrying amount of the property. Approach (a) is also recommended by IVS 300 which considers the result a 'theoretical value' ('notional value') of the building (Kucharska-Stasiak & Zelazowski, 2006). The literature also presents a third approach (c) for value allocation, namely the use of a proportional ratio established through statistical analyses (Hendriks, 2005). The first two approaches are based on the theory of residual value (Hendriks, 2005). The third approach takes into account the fact that the two elements contribute together to the value created.

In the case of real estate, the net replacement cost is the reconstruction cost or the gross replacement cost decreased by physical impairment and functional inadequacy of the building, sometimes even external (economic) inadequacies (Fishman et al., 2007). The valuation approaches that are applicable to any solution adopted for value allocation are the cost approach, which is mandatory, and respectively one of the other two approaches, namely the income or the market approach (Fisher & Lentz, 1990; Belfarge, 2001). The argument behind the use of at least two

approaches is achieving some control keys. Thus, if the value of the building established after the market value of the land was deducted from the result of the income approach or market approach is less than the value of the building established through the cost approach, using only two forms of impairment (physical and functional), then in addition a third form of depreciation (external) will have to be applied in order to obtain the value of the building. If in the previous mentioned case the ratio is vice versa then the value of the building is given by the cost approach, and the difference is considered to be the value of the land.

A second case of value allocation mentioned in the IVS, but insufficiently detailed in what concerns methodology, and very poorly discussed in the literature is (2) the case of several buildings that are subject to different depreciation techniques and thus have to be recognized separately in the financial statements. IVS 300 indicates as a possible alternative the use of a ratio suggesting the contribution of the items to the cost of the whole. In the Romanian practice, the valuation professionals resort to one of the following techniques: (a) a residual alternative that implies the measurement of distinct values for those fixed assets (usually the most important) for which it is possible, and value allocation based on a key in the case of the other assets; this implies that the characteristics and features of these assets are known; the most frequently used approach is the net replacement cost; (b) an alternative that is based on value allocation according to a key applied to the whole value in order to obtain individual values. The allocation key can be determined based on market information transformed into net or gross replacement cost or net or gross book values (with or without deduction of depreciation).

The literature on particular valuation cases such as the cash generation units (Fisher & Kinnard, 1990; Mard, 2009; Fisher & Kinnard, 2001). *The* presents yet another method for value allocation, based on the market values of the components (as often as this is possible). In this case the income is allocated to the components according to the performance ratio of the investment in those components. The residual income is determined for the residual component, either real estate or intangible assets, as the difference between the total income generated by the cash generating

unit and the income allocated to the other components. Afterwards, the residual income is capitalized by an adequate rate in order to obtain the value of the residual component.

The literature also mentions that the process of value allocation in general implies thorough professional knowledge from the valuer and at the same time the responsibility to know and apply national valuation standards on this subject (Harper, 2008). Likewise, other regulatory bodies in the field of valuation (for example the American regulatory body) include in their standards requirements for their members to provide in the value allocation process accuracy and an objective opinion regarding the value of the components. The importance of the subject leads to preliminary discussions in the valuation practice between the valuer and the auditor of financial statements regarding a consensus about the valuation approaches and residual techniques. Professional reasoning is extremely important in the value allocation process as long as there is no intensive practice or line of reasoning that can be followed.

1.2 Emergent Markets

For emergent markets in particular there is a multi-tiered valuation practice and a very limited availability of investment transactional evidence, with effects on the accuracy of valuations (Kucharska-Stasiak & Zelazowski, 2006; Mansfield & Royston, 2007). Although investors require a common denominator such as property indices for assets valuation and income prediction, there are differences regarding public information availability in a unitary framework in comparison to developed countries. When it does exist, the information is not consistent and complete among the valuers in a low information environment such as the emergent one. The history of the sale and rent transactions is recorded by real estate agents, such as real estate brokers and appraisal practitioners who assemble their personal databases, a central database development being at an incipient stage (Cohen & Galiniene, 2013). Thus, the market approach is not applicable for all types of assets and at every given time, as Levels 1 and 2 of the value hierarchy (mark-to-market model) cannot be obtained.

When the markets are volatile, such as emergent markets or are affected by economic crises, the main approach sustainable on the

long run is based on income (Baumgarten, 1978; Fanning et al., 2011; Hrdý & Šimek, 2012). However, even this approach poses the issue of obtaining the market information necessary for the assessment. Likewise, professional reasoning becomes very important when the markets are unbalanced (including emergent markets), and valuers need to be able to distinguish between information that will enable a measurement based on efficient, balanced and stable data (Mard, 2009). This approach will lead in general to Level 2 and 3 values in the fair value hierarchy. Thus, if the specific market of an asset does not exist or is not active, efficient, then the fair value will not be established directly, based on information that is generally described as objective, but rather by using valuation models based on several subjective estimates, less verifiable.

Regarding level 3 of measurement (mark-to-model) which concerns the income or cost approach, the risk of value allocation is connected to the income approach. In order to mitigate this risk, the accuracy of allocation needs to be taken into consideration as well as the way in which the valuers disclose their undertakings. The literature issued after the start of the financial crisis insists on the need for disclosures to provide some details concerning the construct of fair value and its influence over the result of the period (Hitz, 2007; Gottdiener, 2008). For example, in the case of the income approach one needs to estimate: the useful life of the asset, its residual value, the cash inflows the asset will generate over time and the discount rate. Estimates themselves are subjective. In addition, intentional distortion of certain metrics can occur. Thus, the valuation model implies an inherent risk, plus another risk connected to intentional manipulation of information (Gélard, 2002).

We could say that the Romanian context has been characterized by inflation for the past two decades, with a high risk for the historical cost to move further away from reality. This is also due to the fact that some revaluations were not always conducted according to the requirements of the valuation profession. Other difficulties concerning fair value estimates are connected to the income approach which has been difficult to apply given the possibility of forecasts to be invalidated by the ever-changing economic context, and respectively to the market approach which has been sometimes impossible to apply

because of the lack of transactions, as shown above. Statistical techniques for value allocation based on the history of previous transactions cannot be applied on such a market as a result of the lack of transparency in what concerns the specific evolution of the market for different types of assets.

If we were to present the evolution of the Romanian real estate market – which is the subject of our analysis – in the last decade there are three different periods. First there is the period between 2002 and 2007 when prices significantly grew including because of the fact that Romania was preparing to adhere to the European Union (the adherence took place in 2007). Then the prices plunged as a result of the economic crisis. After three years of powerful decline, 2008–2010, in the last part of 2010 the recovery of the real estate market started, with positive signals for 2011. The slight recovery of the market is suggested by the growing number of transactions for all types of real estate, even with increasing prices. In what concerns our analysis period, the year 2013, we could state that the market is relatively stable, and the market approach in valuation can be applied, even if not for all types of assets.

2. Research Design

2.1 Research Question

Good valuations depend upon proper analysis and weighing of the factual matrix in any situation. These are guided by the professional standards. Then, certain characteristics of valuation practice are determined by the context of the asset and the market, along with the professional reasoning of the valuator. In our paper, starting from the requirements in the standards, we verify the practical approaches to value allocation, a suggestive theme to the reliability of valuations for financial reporting. The process of value allocation is an influential factor of a reliable and relevant value, considering that the use of an inadequate allocation key and/or an incorrect implementation of the keys could lead to distorted values of the components. The consequences can be found in accounting recognition of an asset that is the subject of a different efficiency analysis of investments or they are tax related with impact on the value of property tax and profit tax, in the case of assets subject to depreciation.

For atypical/emergent markets the issue of value allocation is all the more important

as market information is insufficient, few transactions occur, and book values lose their significance due to monetary depreciation and hard to predict volatile markets of certain assets. Thus, the valuation of each type of asset to the market could not be possible, and so allocation keys need to be used. The value allocation technique that uses a ratio established through statistical analyses is to be used with caution because such contexts confront with the lack of a reliable database which would provide historical trends statistically validated. The compromise solution would be to use book values. On the other hand book values cannot reflect the state and viewpoint of the market, correlated with the best possible use identified for the assets under valuation. Moreover, the use of allocation keys based on accounting information could lead to distorted results, especially if the book values have been distorted by old revaluations that were inaccurately made, or due to different depreciation approaches used for the assets taken into account.

The research question needs to be correlated with the Romanian context. Firstly, we verify the degree to which fair value is used in the Romanian context, thus the frequency of valuations for financial reporting, and from here the value allocation. In the Romanian accounting regulations, issued by the public authority, the Ministry of Finance (OMPF no 3055 from 2009) fair value is explicitly mentioned for revaluation of tangible assets and for financial instruments. Other references to fair value are implicit, such as the value determined for the non-cash increase of capital that has to be established as a result of valuation. Considering the valuation approaches permitted by the Romanian accounting legislation, the market and valuation professionals which should determine fair value are mentioned in the alternative valuation rules section. Also, other valuation methods besides market comparison are accepted if there is not enough market information. The regulations described are applicable to all companies and coexist with the regulation that envisages the implementation of IFRS by listed companies for their consolidated accounts, starting with January 2007 (OMPF no 1121 from 2006). Because the use of financial instruments has an extremely slow evolution in Romania, we can conclude that tangible fixed assets revaluation was the most common case of

fair value estimation explicitly stipulated in the Romanian regulations. Thus, we will focus on a survey answers provided by the valuers for this objective of valuation for financial reporting, and we will further discuss the premises for revaluation operations in the Romanian companies.

A specific importance has been given in Romania to revaluation, and the approach we are going to describe can also be found in other countries, as the value established has fiscal connotations. Local taxes on company real estate are determined as a percentage of the book value of those assets, which may or may not be revaluated. The effects are obvious, both for the financial performance and profitability of the company reflected in the financial statements after the revaluation, and for the income of public authorities.

The legal permissive nature of revaluations manifested for all fixed assets such as plant, properties and equipment by the gradual issue of certain normative acts. These acts had the objective to adapt the elements in the financial statements of companies to the economic environment by the update of historical cost and the unimpaired value of assets. We are talking about Government Decision (GD) no 945/1990, GD no 266/1992, GD no 500/1994, GD no 983/1998 amended and restated by GD no. 95/1999. These regulations were applicable either to all fixed assets or only to plants and properties. The regulations had either a compulsory nature (for the companies in which the state was the major shareholder) or an optional nature (as the case of GD no. 983/1998). All of these revaluations used the index updating method and were classified in the literature as administrative revaluations, as they have been subject to criticism because of the method in which the indexes are selected and because only one method of valuation is used. They did not lead to true market values, but they did represent a first step toward market approach in valuation. The process of value update was the responsibility of a committee formed by company employees. GD no 403/2000 leaves fixed assets revaluation up to the companies. The difference in comparison to previous revaluations is that companies which conducted revaluations (in the circumstances described by the GD regarding the economic environment, measured using the inflation rate) are able to use other valuation methods

considered adequate, and can also resort to an external professional valuator. Concluding, at this date, we can talk about fair value in the true sense of the concept, if the companies have resorted to authorized valuers that applied dedicated valuation approaches, and did not just update the value by the inflation rate. The consequence for our study is that book values must be considered with precaution in general on the valuation market, as there is the possibility they contain revaluations that have not been made according to the requirements of valuation standards.

In this context our research focuses on the way in which value allocation is made. Thus our research question is: to what extent do valuers from emergent markets apply in their valuation reports value allocation to components, what are the valuation approaches most frequently used, and what are the allocation keys most often used. The use of the market approach would reduce the risk of the model triggered by the other two approaches, the income and the cost approach. In what concerns the allocation keys, we want to determine if the valuers base their opinion on keys that do not lead to distortions in the financial position which affect the decisions made by stakeholders of financial situations.

2.2 Instrument, Sample and Statistical Tests

Considering the objective of our research, the empirics of the study try to capture the perceptions of Romanian valuers as producers of fair value for financial reporting purposes. By using a survey we test the experience of valuers and their approaches in more complex situations that imply the use of professional reasoning, particularly if they are familiar with and apply several methods of value allocation between components of fixed assets with different accounting treatments.

In this respect, we designed a self-constructed instrument, of semi-structured type, addressed to the Romanian valuers community. The survey contains in the first part a series of support questions that are designed to gather information on the quality and experience of the respondents. These questions focus on the qualifications and experience with valuations of the respondents, their affiliation to professional bodies, and the size of the businesses they valued, which gives insight on the experience they have with more complex cases. The instrument was also designed to investigate the elements prior to the value allocation process which relate to the nature of the asset under valuation and the applied methodology, and respectively, to deepen the practical process of value allocation.

Table 1 shortly presents the interview instrument, which is detailed in Appendix 1.

The survey instrument was conducted online from February 2013 to March 2013, on a web platform which was available for four weeks, while the proposed investigation was made public on the official website of the National Association of Romanian Valuers (ANEVAR). ANEVAR also made the investigation public through its regional centers, by e-mailing the message to its members.

The population studied is represented by valuers, current members of ANEVAR, which is also a member of the international body IVSC and the European forum TEGoVA. We addressed the members who are enlisted with an e-mail account in the database of the association, out of the total number of 4,718 existing members. The number of active members that could have answered is lower, although we do not hold public information regarding the number of inactive members, which we can only estimate to 3,200–3,500. This is the reason why we did not use samples,

Tab. 1: The survey instrument for valuers

<i>Parts of the instrument</i>	<i>Number and type of items</i>
<i>Part 1 Characteristics of the activity of valuers practical experience as seniority and qualification, respectively size and nature of the valued assets and type of valuation approaches</i>	3 open-ended questions 3 categorical questions
<i>Part 2 Perceptions on the process of value allocation regarding means of value allocation and keys for value allocation</i>	3 open-ended questions 1 categorical question

Source: own

but the whole database of ANEVAR. The initial volume of the sample summed up to 377 valuers. The surveys not filled out to a minimum of 90% were eliminated from the analysis. And thus we reached the final sample of 250 subjects.

In what concerns statistical test, we used descriptive statistics (frequencies), and the T-test, One-Sample version. The T-test is usually used for the analysis of a sample out of a defined population in order to determine if there are significant differences between the different analyzed categories.

3. Analysis Results

3.1 Descriptive Statistics

The characteristics of the valuers' activity are presented below. In what concerns qualification we noticed an overspecialization regarding real estate and plant & Equipment. As a result, we reduced the weights of these specializations also in order to have a structure almost similar to the structure of the population. In what concerns the frequency of valuations according to the nature of the asset, we compared the obtained values to the binomials formed by the categories in order to establish the connection between the values.

Tab. 2: Characteristics of the valuers' activity

<i>Characteristics of valuers</i>	<i>Professional experience (years)*</i>				
	Less than 2 years	10%			
	Between 2-5 years	18%			
	Over 5 years	72%			
	<i>Qualification**</i>				
	Real estate	78%			
	Business, intangibles, goodwill	55%			
	Plant & equipment	30%			
	Financial instruments	0%			
<i>Magnitude of valuations for financial reporting purposes</i>	<i>Weight in the total volume of activities undertaken*</i>				
	Less 10%	24%			
	Between 10 and 25%	35%			
	Between 25 and 40%	20%			
	Over 40%	21%			
	<i>Frequency of valuations for companies with patrimony of different sizes***</i>	Consistent	Medium	Low	Insignificant
	Consistent patrimony	–	47%	47%	46%
	Medium patrimony	12%	–	46%	43%
	Low patrimony	10%	22%	–	45%
	Insignificant patrimony	12%	25%	31%	–
<i>Characteristics of the valuations according to the nature of the assets and the valuation approaches</i>	<i>Categories of assets***</i>	Land	Buildings		Plant & equipment
	Land	–	65%		17%
	Buildings	14%	–		9%
	Plant & equipment	39%	51%		–
	<i>Valuation approaches*</i>	Market	Income		Cost
	Land	93%	6%		1%
	Buildings	27%	34%		39%
Plant & equipment	37%	8%		55%	

Notes: *We used the percentage without taking into consideration the non-answers; **The gross sample became a weighted sample by relating it to the population, in order to extrapolate the distribution observed for the whole population; ***The differences in frequency between the categories with bolded values are statistically significant, for a significance level (threshold) of 95%.

Source: own

In what concerns the years of experience held by the valuers, compared to the seniority of the valuation profession in Romania, which is institutionalized through ANEVAR that was incorporated 20 years ago, we consider that the obtained distribution is relevant for the valuers in Romania. The observations in Table 2 also indicate that the valuers are multi-specialized, and the dominant specialization is real estate. At the same time a considerable part of the sample is specialized (also) in business, intangible and goodwill valuations, and more than a third are (also) specialized in plant & equipment. These findings confirm the competencies of professionals considering the value allocation process that implies knowledge of several disciplines.

Moreover, we note that these professionals are familiarized with financial reporting valuation, as long as over half of the sample conducts this type of valuation between 10% and 40% of their activity. A further argument for the validation of the sample is the number of valuations for financial reporting purposes compared to the size of the patrimony valued. Valuers conduct relatively often complex valuations, for companies with consistent patrimony, although the most frequent valuations are conducted for companies with low patrimony, and the frequency of the valuations decreases as the size of the patrimony increases.

The frequency of valuation reports conducted for financial reporting purposes follows the succeeding general order: buildings, land and plant & equipment. In comparison to land valuations, buildings are more often the subject of valuations in 65% of the cases, while the opposite situation occurs only in 14% of the cases. After applying the One-sample T-test we observed that 51% of the valuers consider buildings are more often subject of valuation compared to plant & equipment while 9% consider the opposite situation. Furthermore, with respect to valuation approached applied, while 93% use the market approach for land valuations, for buildings the market, income and cost approaches are equally used, and for plant & equipment the cost and market approaches are mainly used. What is useful for our further analysis is that valuers have mostly applied the market and income approaches, which are considered global approaches. This shows, theoretically, that value allocation was applied in the valuation reports of all the three types

of fixed assets, thus the premise for further analysis exists.

3.2 The Analysis of the Valuers' Perceptions Regarding the Value Allocation Process

Our findings confirm that value allocation as a stage of the valuation process for financial reporting purposes is correctly applied in the Romanian practice. Thus, 98% of the valuers state that they deliver the value of each component, after using one of the allocation options. Out of these, 64% conduct the valuation as a whole and afterwards they allocate the value to the components, while 34% estimate the value directly for each component, and an insignificant percentage state they leave the value allocation at the will of the beneficiary, without getting involved in this process. We conclude that Romanian valuers apply valuation standards as they resort to value allocation if this is needed, despite the difficulties triggered by the atypical market.

In what concerns value allocation between land and buildings, 78% for the answers described the preference for deducting the estimated market value of the land without the building from the estimated value for the property. Only 17% of the respondents confirmed they use the second alternative i.e. deducting the estimated net replacement cost of the building from the total estimated value of the property. What is interesting is that 5% of the valuers use other alternatives for value allocation, depending on the property rights for the land, the best possible use of the asset compared to its current use, or the test of enclosing the residual value of the building into the estimated net replacement cost. We note the focus on market values and market approach (correlated with the answers regarding the approach mostly used, which in the case of land valuations is the market approach), which is more reliable than the cost approach, and also the advanced technical knowledge of valuers that resort to allocation techniques.

In what concerns value allocation between different types of buildings, 69% of the respondents with an opinion on this subject state they deduct the value of the buildings that was possible to be estimated separately by using a classical valuation approach, and for the remaining buildings they allocate the rest of the value by using allocation keys. A quarter

of these respondents allocate value by using directly an allocation key. Very few, around 3%, use other methods of allocation. We observe that more than half of the sample tries to avoid arbitrary allocation by using keys, as they try to estimate the value through the approaches required in the valuation standards.

We tried to identify the allocation keys most frequently used by valuers, and based on the frequencies (Tab. 3) we found that the allocation keys' hierarchy is: net replacement cost (NRC), gross replacement cost (GRC), net book value (NBV), and gross book value (GBV).

Tab. 3: Value allocation keys used by valuers

	GBV	NBV	NRC	GRC
GBV	–	25%	27%*	35%
NBV	21%	–	24%	35%
NRC	14%	18%	–	36%
GRC	12%	13%	13%	–

Note: *The differences in frequency between the categories with bolded values are statistically significant, for a significance level (threshold) of 95%.

Source: own

The result of the T-test (Tab. 4) shows that in the case of value allocation between buildings, there is no clear difference between the use of GBV and NBV, and respectively between GRC and NBV. Instead the findings show a clear difference between the use of GRC compared to GBV. Moreover, NRC is more often used than

the other three allocation keys we proposed. If we conduct the analysis of groups of keys, the first one being values estimated by the valuers and the second group representing the book values (net or gross) then the replacement cost (net or gross) turns out to be significantly more often used than book values.

Tab. 4: Differences in allocation keys usage

Compared allocation keys	One-Sample Test		
	<i>t</i>	<i>Df</i>	<i>Sig. (2-tailed)</i>
GBV-NBV	0.895	115	0.373
GRC-GBV	3.375	101	0.001
NRC-GBV	5.903	119	0.000
GRC-NBV	1.584	106	0.116
NRC-NBV	5.563	122	0.000
NRC-GBV	5.869	122	0.000
Groups of keys compared			
NRC-GRC versus NBV-GBV	5.653	95	0.000

Notes: Test value = 0.5; the values are statistically significant for a significance level (threshold) of 95%.

Source: own

Conclusions

Our study pleads in favor of reliable fair value estimates that enable accurate decision making for stakeholders of the financial reporting market. The paper is particularized to emergent contexts, having the Romanian market and fixed assets as case study, and it shows how fair value estimation is critical and implies risks on such an atypical market. The research focuses on the process of value allocation between the elements of a group of assets when a valuation approach that leads to a global value is applied, namely the income and market approaches. The value allocation process is described with reference to accounting and valuation standards and to the literature. We show how this process can lead to a significant level of subjectivity regarding fair value accounting. We also confirm the importance of applying correctly the valuation methodology in what concerns the nature of the property and the available market information, alongside the choice of allocation keys.

Our analysis shows that the most suited allocation key for groups of assets formed of fixed assets (land, buildings and plant & equipment) should be based on the net or gross replacement cost, thus on values estimated by the valuer and not on book values, in order to avoid results distorted by historical cost. In what concerns the revaluation of fixed assets, we showed that if previous revaluations would have been accurately conducted then net or gross book values could have been considered allocation keys. However, despite the acceptance of the public authority that issues accounting regulations and the intervention of professionals in valuation and their methodology, the history of revaluations for the past two decades in this country shows the risk of revaluations conducted in the alternative solution permitted, namely values updated by the inflation rate or valuations conducted by individuals unauthorized by the national professional association ANEVAR. In this case the revaluated book values cannot be considered relevant for the evolution of the markets specific to different fixed assets.

The empirics of our study show a consistent expertise of Romanian valuers that prove to be familiar with their own value allocation methodology and the alternatives for allocation keys, as they sometimes apply other keys than the replacement cost, keys that are market based. We also present that allocation keys

usage comes in second place, as valuers first try to estimate market values for each component of the group of assets, without allocating from the very beginning the value estimated for the whole group to each component based on allocation keys. The majority of valuers allocate the value to each component from the start, as opposed to the alternative of estimating the value of the whole group and then allocating the value to components with the inherent risks. Furthermore, the most often used alternative for allocation implies the deduction of those values that have been estimated by using the market approach and not those values estimated through the cost or income approach (the latest was less used for the fixed assets under analysis). Other findings confirm the main usage of replacement cost, gross or net, to the detriment of book values, a very important aspect for an emergent market, all the more as revaluation in Romania does not guarantee the usage of dedicated valuation methods. These results are all the more important as land and buildings were the majority of fixed assets valued, with the highest values as a result of the real estate bubble prior to the financial crisis, and with an essential role in the activity of the companies, thus being highly considered for accurate and reliable valuations.

All of these findings lead us to the conclusion that fair value estimates for financial reporting purposes, in the Romanian companies, in the case of global value allocation to the components of a group of assets (the case most exposed to the subjectivity of the valuator), is reliable at this date. The inherent risks of this valuation process are acknowledged by the Romanian professionals, and avoided if market information exists, specific to each type of asset from the group. The limits of our study are related mostly to the shortcomings of the survey methodology. In this case we refer to the risk of the quality and authenticity of the answers, the risk of conducting the survey via internet, and the relatively low response rate (Fricker & Mathias, 2001; Fox et al., 2003; Evans & Mathur, 2005).

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Appendix 1: Interview instrument administered to valuers

Part 1 Characteristics of the activity of valuers

1. Practical experience
a) Less than 2 years; b) Between 2 and 5 years; c) Over 5 years.
2. Qualifications in valuation activity (multiple responses)
a) Real estate; b) Business, intangibles, goodwill; c) Plant & equipment; d) Financial assets.
3. Weight of financial reporting valuations in the total volume of activities undertaken
a) Les than 10%; b) Between 10 and 25%; c) Between 25 and 40%; d) Over 40%
4. Frequency of valuations for companies with patrimony of different sizes (multiple responses)?
(Low) 1.....2.....3.....4 (High)
a) Consistent patrimony, nationally or regionally spread; b) Medium patrimony (maximum 2–3 sites or approximately 20 buildings with associated equipment); c) Low patrimony (only one site with maximum 5 to 10 buildings); d) Insignificant patrimony (one site with 1 to 3 buildings)

5. Categories of fixed assets most frequently valued for financial reporting purposes (multiple responses)
(Low) 1.....2.....3.....4 (High)
a) Land; b) Buildings; c) Plant & equipment; d) Other (please describe)

6. Valuation approaches most frequently used for each category of fixed assets?
(Low) 1.....2.....3.....4 (High)
6.1. Land: a) Market approach; b) Income approach; c) Cost approach
6.2. Buildings: a) Market approach; b) Income approach; c) Cost approach
6.3. Plant & equipment: a) Market approach; b) Income approach; c) Cost approach

Part 2 Perceptions on the process of value allocation

7. Approaches applied in the case of the complex property (several types of fixed assets, for example land + buildings or land + buildings + associated equipment):
a) Estimate the value of the property as a whole, then allocate the value to each component of the property and disclose this in the valuation report; b) Estimate the value directly for each component; c) Estimate the value of the property as a whole and disclose this in the valuation report, while leaving the value allocation at the will of the beneficiary; d) Other (please specify)
8. Methods of value allocation to each component, in the case of property composed of land and buildings, when market or income approaches are used for valuation:
a) Deduct the market value of the land (estimated separately) from the total estimated value in order to obtain the fair value of the buildings; b) Deduct the net replacement cost of the buildings (estimated separately) from the total estimated value in order to obtain the fair value of the land; c) Other (please specify)
9. Methods of value allocation to each component, in the case of property composed of several buildings (including specialized property):
a) Value allocation using one key (pro rata); b) Deduct the value of the buildings that was possible to the estimated separately by using a classical valuation approach, and allocate the rest of the value to the remaining buildings by using pro rata; c) Other (please specify)
10. Value allocation keys used
(Low) 1.....2.....3.....4.....5 (High)
a) Gross book value ; b) Net book value (deduced depreciation); c) Gross replacement cost; d) Net replacement cost; e) Other (please specify)

Abstract

VALUE ALLOCATION – CONTRIBUTION AND RISK TO THE RELIABILITY OF FINANCIAL REPORTING**Adela Deaconu, Sorana Crisan, Anuta Buiga**

Our study argues in favor of the reliability of fair value estimates for correct decision making by the stakeholders of the financial reporting market. The analysis is singularized to emergent contexts, as the Romanian market is the case study, and it is focused on the process of value allocation between the components of a group of assets. Having an application on fixed assets, the paper shows how fair value estimation is critical and implies risks on such an atypical market. The process of value allocation may bring a high level of arbitrariness to fair value accounting, this being crucial to apply correctly the valuation methodology in relation to the nature of the asset and market information available, and the selection of the allocation keys. The empirics of our study show a consistent expertise of Romanian valuers, as the most frequently used method for value allocation is the deduction of the value of those assets that was estimated based on the market approach, and not the values that were estimated based on the cost or income approach. Other findings show the frequent use of replacement cost, gross or net, to the detriment of book value, a very important aspect for an emergent market, even more so as revaluation in Romania does not guarantee that dedicated valuation methodology was used. These results are all the more important as land and buildings were the majority of fixed assets valued, with the highest values as a result of the real estate bubble prior to the financial crisis, and with an essential role in the activity of the companies.

Key Words: Value allocation, financial reporting, international valuation standards, international financial reporting standards, fair value, real estate, credibility.

JEL Classification: M21, G32.

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THE INFLUENCE OF TRUST ON COLLABORATIVE RELATIONSHIPS IN SUPPLY CHAINS

Sonja Mlaker Kac, Irena Gorenak, Vojko Potocan

Introduction

Collaborative business relationships have been considered as very important in business and academic world. Supply chains are defined as a set of three or more organizations directly involved in (the upstream and downstream) flows of products, services, finances and/or information from a source to a customer and where all companies strive to achieve the same goal (Mintzberg et al., 1996). So, collaborative behavior is very important for supply chain management.

We discuss and examine the influence of trust between partners in supply chain on collaborative behavior in supply chains. Our basis is KMV – key-mediating-variable model (Morgan & Hunt, 1994), which places the role of trust as a central to successful partnerships with different stakeholders, including partners in supply chains.

The concept of an integrated logistical organization was introduced and generalized in early 1970's (Bowersox et al., 1989). Many firms have responded to dynamic business environment in last decades by building collaborative relationships in supply chains (Doney & Cannon, 1997).

The researched topic involves several different point of views and impacts of marketing, organization, sociology and economics.

The aim of our article is to examine whether there is an influence of trust on collaborative behavior in supply chains and detect which are factors influencing trust and how strong are these influences. For partners in supply chain this can be an important issue when planning activities with partners in supply chains. We assume that trust is an important factor when companies want to achieve long-term successful relationships.

1. Theoretical Background

The main theories that we deal with in our research are social exchange theory and relationship commitment – trust theory, which point out the importance of trust in cooperative relationships. Relationship commitment – trust theory also suggests that there are three crucial antecedents of trust: shared values, communication and opportunistic behavior (Morgan & Hunt, 1994).

The relationship commitment trust theory points out the importance of marketing perspective in modern business world (Morgan & Hunt, 1994; Deepen, 2007). Since it can be implemented to relationships with all partners of an organization: suppliers, buyers, lateral partners and internal partners. This theoretical background is very appropriate for our research.

Contemporary management theorists (Adobor, 2006) have continued to identify trust as one critical element for performance in strategic partnerships. One of forms of strategic partnerships is also supply chain (Adobor, 2006).

1.1 Trust in Supply Chains

Trust is a multidimensional concept (Svensson, 2005) and can be defined from several different perspectives: sociological, psychological, economical etc. point of view (Anderson & Narus, 1984; Anderson & Weitz, 1992; Morgan & Hunt, 1994; Svensson, 2005; Young, 2006; Castaldo, 2007). And its definition differs from the context in which the concept has been researched (Nicholson et al., 2001).

Trust is from sociological point of view in general defined as “a willingness to rely on an exchange partner in whom one has confidence” (Bradach & Eccles, 1989; Moorman et al., 1992). Trust exists when one party believes the other party has incentive to act in his or her

interest or to take his or her interests to heart (Cook et al., 1995).

Trust can be also defined as a relationship (trust always results in a relationship as direct or indirect exchange and it points out the quality of a relationship), as personality trait (psycho-social perspective treats trust as a quality of a truster and not of the relationship between the truster and the trustee) and as a cultural rule (decisions to trust or distrust occur in the pre-existent cultural context and normative rules push someone toward or away from trusting the other person or organization) (Sztompka, 1998). In sociological theory trust also means a reduction of social complexity (Luhmann, 1968; Castaldo, 2007).

Different authors (Morgan & Hunt, 1994; Humphrey, 1998; Harland et al., 2004; Baron et al., 2010; Murphy & Wood, 2011) argue that trust is very important factor influencing supply chain management relationships. It is recognized as an important element in successful, strategic relationships with suppliers (Harland et al., 2004; Castaldo, 2007).

Trust can influence the development of customer orientation, which means, the greater the level of trust, the more chance of a positive attitude being developed (Baron et al., 2010).

So, in business world trust is defined as the firm's belief that another company will perform actions that will result in positive outcomes for the firm as well as not take unexpected actions that result in negative outcomes (Anderson & Narus, 1990).

Thus, there are many definitions of trust; we can group these definitions into two types of conceptualization. Trust can be defined as (1) a belief, sentiment or expectation about an exchange partner's trustworthiness. This results from expertise and reliability of partner in interaction. Trust can also mean (2) a behavior (or behavioral intention) that reflects a reliance on a partner and involves vulnerability and uncertainty on the part of the other party (in this case trustor) (Moorman et al., 1992).

Since we are researching inter-organizational relationships, it is important to discuss inter-organizational trust. Trust within inter-organizational networks (such as supply chains are) support the formation of collective strategies, facilitate the coordination of economic activities, promote open exchange of information and open up opportunities for strategic action, enhance system stability and at the same time

support organizational changes (Sydow, 1998). Since inter-organizational network is conceived of as a long term institutional arrangement among related organizations (Sydow, 1998) its definition of trust can be used as a basis for defining trust in supply chains.

Success of each company that cooperates with other companies depends on the actions taken by all other companies and enhances the uncertainty and risk. This means that trust is, on one hand, the precondition for collaboration and, on the other hand, also the product of successful collaboration (Sztompka, 1998).

The relations between trust and relationships, which also means relationship commitment, can be different. Trust was examined as a feature of relationship quality or as a determinant of relationship quality. In first case different authors view trust as a feature of relationships, in addition to power, communications and compatibility in addition to satisfaction. In second case trust determines relationship quality (Moorman et al., 1992).

Some authors (Morgan & Hunt, 1994) claim that trust is required to produce collaboration in order to make societies function productively. Other authors (Cook et al., 1995) argue that trust works primarily at the interpersonal level. So, trust is no longer the central glue of social order (Cook et al., 1995).

In today's society every company cooperates with several different stakeholders: internal partners, supplier and buyer partners and also lateral partners (such as competitors and government) (Johanson & Mattsson, 1987; Morgan & Hunt, 1994; Chen & Paulraj, 2004). Good and effective cooperation between organization and its stakeholders leads towards being better than other companies, so being better than organizations' competitors. At the end greater trust leads indirect and in many cases even directly to greater competitive advantage of an organization.

Trust can be seen as a key managerial concept and sometimes it is considered as a governance mechanism and other times as a mechanism to reduce opportunism in strategic networks (Kumar, 1996; Achrol, 1997). Trust reduces the uncertainty in a relationship (Skandrari et al., 2011). If one organization trusts another one, it will assign collaborative intentions to the trusted organization. Several studies have shown that inter-organizational trust leads toward a cooperative behavior

between organizations (Jap & Anderson, 2003; Payan & Svensson, 2007).

Relationships characterized by trust are highly valued and parties will desire to commit themselves to such relationships (Morgan & Hunt, 1994).

Next we will define three main antecedents of trust: shared values, communication and opportunistic behavior.

First, we have to consider shared meanings as an essential element for the constitution of social life (Humphrey, 1998). Shared values are included as important part in model of fundamental partnership variables (Dwyer et al., 1987; Morgan & Hunt, 1994; Deepen, 2007) and in this context trust is produced among social actors when they hold shared beliefs and hence to build up mutual expectations (Humphrey, 1998).

Shared values are defined as the extent to which partners have beliefs in common about what behaviors, goals and policies are important or unimportant, appropriate or inappropriate, right or wrong (Morgan & Hunt, 1994).

Furthermore, we will discuss communication. Communication is where an individual or a group of people establish a common and coordinated activity through the exchange information of concepts, suggestions and attitudes to obtain a specific goal (Wang, 2009). Relationship components are experienced through communication which is possible only if there is a two way flow of communication (Baron et al., 2010).

Improved (internal and external) communication enables the supply chain integration. It is difficult to find an area of logistics that is not affected by improved communication (Waters, 2007). Communication is essential in relationships as it implies dependence and commitment (Baron et al., 2010).

Effective and efficient communication with external markets is a fundamental marketing responsibility. Integrating outgoing marketing communication leads on long turn toward development of value exchanges with customers. One way messaging should be replaced by two way communication with several partners in supply chains (Christopher et al., 2009).

Effective inter-organizational communication can be characterized as frequent, genuine and involving personal contacts between buying and selling side (Brankenburg Holm et al., 1996).

Trust is often discussed in the context of opportunism (Humphrey, 1998). Therefore opportunism is often defined as an explanatory variable (Dwyer et al., 1987; Morgan & Hunt, 1994; Knemeyer & Murphy, 2004; Deepen, 2007). In business world opportunistic behavior is defined (Humphrey, 1998) as the organization intentionally transmitting incomplete or twisted information to others that would mislead, twist, hide or confuse others in interaction (Wang, 2009).

Opportunistic behavior could be active or passive, so it may occur when a party either engages in or refrains from particular actions (Heide & John, 1992; Wathne & Heide, 2000).

1.2 Collaborative Behavior in Supply Chains

Several authors (Moorman et al., 1992; Morgan & Hunt, 1994; Humphrey, 1998; Denise, 1999; Harland et al., 2004; Knemeyer & Murphy, 2004; Payan & Svensson, 2007) pointed out the importance of working together in today's unstable economic and social environment. Basically, there are three different and frequently discussed and researched ways of working together: coordination, cooperation and collaboration (Denise, 1999; Pollard, 2005; Cao & Zhang, 2013).

We will describe the collaboration as a form of modern relationship formation used in inter-organizational alliances, and therefore in supply chains. Higher levels of integration allow a supply chain to work together (Waters, 2007).

Coordination (Pollard, 2005) is based on shared objectives and understanding of who needs to do what until when. It is problem resolution mechanism, where both sides in relationship want to efficiently receive results. Degree of interdependence is minimal. Coordination achieves efficiency of motion but tells us nothing about the consequence of motion (Denise, 1999).

Cooperation is defined as situations in which different partners work together so that they can achieve mutual goals (Anderson & Narus, 1990; Cumming & Bromiley, 1996). Cooperation means acting together, collectively. Both parties have the same common goal that cannot be achieved individually by each of them. This shows us that the success of each party depends on the actions taken by all others and enhances the uncertainty and risk (Sztompka, 1998). So, cooperation is based on

shared objectives, mutual trust and respect and acknowledgment of mutual benefits of working together. The goal is that both sides efficiently receive results and at the same time save time and money. Degree of interdependence is considerable (Pollard, 2005).

Cooperation in business relationships means “working together to the same end” and can be regarded as understanding in coordinating exchange activities in the relationship (Brankenburg Holm et al., 1996).

Collaboration is based (Pollard, 2005) on shared objectives, sense of urgency, commitment and belonging, on open communication, mutual trust and respect, complementary skills and knowledge. The main goal is achieving innovative and extraordinary results efficiently. Degree of interdependence of partners in relational exchange is substantial. Collaboration (Denise, 1999) does not anchor in the process of relationship but in the pursuit of a specific result. Collaborations are established to solve problems, develop new understandings, design new products (Denise, 1999).

Supply chain collaboration is from all concepts the best concept to capture the joint relationship between autonomous supply chain partners. The collaboration means that the pie gets larger so that all partners can get a larger piece than they had before (Cao & Zhang, 2013).

Based on social exchange theory, we can

claim, that collaboration in inter-organizational relationships may be supported by trust (Dwyer et al., 1987).

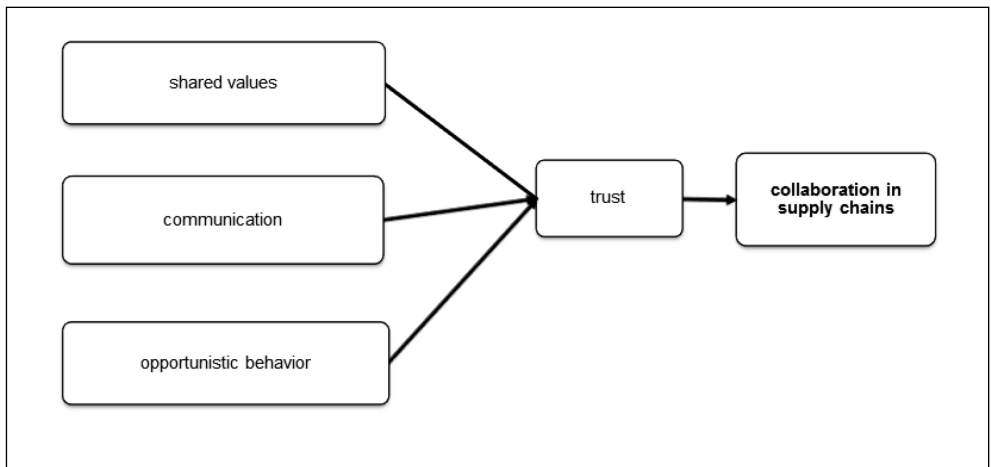
2. Research Model

Having closely studied various scientific and professional literatures about relationship marketing and supply chain management we have determined that a combination of various theories could be included in our research model. We use key mediating variable model for the basis of our research and so we set a trust as a main variable that influence collaborative relationships in supply chains. According to the theory three main antecedents of trust are shared values, communication and opportunistic behavior. We adapted those factors to our model, shown in Fig. 1.

Trust can be seen as a determination of the amount of cooperation between parties (Anderson & Narus, 1990; Morgan & Hunt, 1994). Mutual trust can be seen as an antecedent of cooperative behaviors (Castaldo, 2007). Shared values, communication and opportunistic behavior are seen as key factors influencing trust (Morgan & Hunt, 1994). We predict that shared values and communication influence trust positive and opportunistic behavior negative.

The aim of the research was to test the validity of the model shown in Fig. 1. To this

Fig. 1: Research model



Source: own

end, our main research question was: **Is there a statistically significant influence of trust on collaboration in supply chains?**

In order to answer this research question the following research hypothesis was set up:

H1: Trust has a statistically significantly positive influence on collaboration in supply chains.

Through trust better understanding of strategic and managerial collaboration and long term orientation can be achieved (Skandrari et al., 2011).

As it is seen from research model, we also research antecedents of trust. So we also discuss following hypothesis:

H2: Shared values have a statistically significantly positive influence on trust in supply chains.

Several authors (Anderson & Narus, 1990; Morgan & Hunt, 1994; Zineldin & Jonsson, 2000; Wang, 2009) have pointed out the important issue of shared values between organizations influencing business to business relationships. Shared values as the foundation of trust signify that both parties have similar symbolic system and explanatory logic which means that the goal and benefits of both parties can be compatible (Wang, 2009).

H3: Communication has a statistically significantly positive influence on trust in supply chains.

Different studies (Anderson & Narus, 1990; Denise, 1999; Zineldin & Jonsson, 2000; Wang, 2009) have shown that communication is one of the main antecedents of trust. According to these researches (Anderson & Narus, 1990; Zineldin & Jonsson, 2000; Wang, 2009) made on different inter-organizational relationships communication and trust have positive relationship.

H4: Opportunistic behavior has a statistically significantly negative influence on trust in supply chains.

Opportunistic behavior can hurt trusting relationship of two parties involved in a relationship (Wang, 2009) and different studies (Deepen, 2007; Morgan & Hunt, 1994; Zineldin & Jonsson, 2000; Wang, 2009) have shown that opportunistic behavior has a negative influence on trust in inter-organizational relationships and would reduce trust between organizations. According to research made on topic buyer's risk of third party opportunism opportunistic behavior has a negative influence on trusting relationships between partners (Moore, 1998).

3. Methodological Framework

The correlations were tested using an online questionnaire survey. Logistics managers, chief buyers, sales managers, project managers and employees in logistics departments were included in our online survey (see Tab. 1). The survey was made in the primary, secondary and tertiary sector of Slovene economy (see Tab. 2). We included companies of all sizes (see Tab. 3), both local and foreign ones with a presence in Slovenia (see Tab. 4). Our research was made in November and December 2013. There were 118 questionnaires completed and used in the research.

According to the demographic data, our sample reflects the population in terms of economy branch and size of companies. Based on the findings we can conclude that the research sample could be generalized to the whole population.

The questionnaire comprised 38 statements related to (1) collaboration in supply chains, (2)

Tab. 1: Employees included in the survey

Position of employees	Responses	%
Logistics managers	26	22.2
Project managers (with logistics tasks)	25	21.4
Chief buyers	24	20.5
Sales managers	17	14.5
Employees in logistics departments	20	17.1
Total	112*	100.0

*Only 112 out of 118 respondents that finished our survey answered to this question.

Source: own

Tab. 2: Sectors included in the survey

Sector	Responses	%
Primary	3	2.6
Secondary	45	38.5
Tertiary	69	58.9
Total	118	100.0

Source: own

Tab. 3: Size of organizations included in the survey

Size	Responses	%
Micro	50	42.7
Small	32	27.3
Medium	17	14.5
Large	18	15.4
Total	117**	100.0

**Only 117 out of 118 respondents that finished our survey answered to this question.

Source: own

Tab. 4: Local/foreign organizations included in the survey

Type	Responses	%
Local	57	49.6
Foreign	58	50.4
Total	115***	100.0

***Only 115 out of 118 respondents that finished our survey answered to this question.

Source: own

trust, (3) shared values, (4) communication, (5) opportunistic behavior and (6) respondents' details (age, gender, number of working years, level of education etc.).

4. Research Results

Factor analysis produced a combination of five factors ((1) collaboration in supply chains, (2) trust, (3) shared values, (4) communication, (5) opportunistic behavior) and we examined the relationships and influences among them. We tested the validity of the questionnaire using the Cronbach's alpha test, calculating the coefficient for each set of variables, which were merged in factors. We have

performed this test on variables that measured collaboration first; the value was 0.864, which indicate great reliability of measurement. The value of Cronbach's alpha test for variables that measured trust was 0.877, for variables measuring communication 0.779, for variables measuring shared values the value was 0.832 and for variables measuring opportunism the value was 0.832. These values indicate great reliability of measurement.

After forming new merged variables (factors) we have measure mean values and standard deviations in these newly formed factors. Results are shown in Tab. 5.

Tab. 5: Mean values and standard deviations of measured factors

	Mean value	Standard deviation
Collaboration	3.70	0.59
Trust	3.48	0.68
Communication	3.67	0.68
Shared Values	3.63	0.69
Opportunism	3.52	0.68

Source: own

Tab. 6: Correlations between measured factors

	Collaboration	Trust	Communication	Shared Values	Opportunism
Collaboration	1				
Trust	0.732**	1			
Communication		0.604**	1		
Shared Values		0.603**		1	
Opportunism		-0.594**			1

** p≤0.01

Source: own

Further interest was related to the measurement of correlations between factors collaboration, trust, communication, shared values and opportunism. Therefore the Pearson's correlation coefficient test was examined and results are shown in Tab. 6.

Among the data shown in Tab. 6 we have highlighted the correlations that we are according to the model interested in. All the highlighted correlations are important for the research model.

Closer look to the results shows the strongest correlations among research models is correlation between trust and collaborative behavior (0.732**). The correlations between trust on one hand and communication and shared values on the other hand are quite similar (0.603** – correlation shared values – trust; 0.604** – correlation communication – trust). The correlation between trust and opportunism (-0.594**) is negative and semi strong.

We have also conducted a linear regression analysis, where the influence of independent variables towards dependent variables has been analyzed. The influence of each of

the independent variables was evaluated separately, so that it does not depend on influences between various independent variables. Tab. 7 demonstrates the values of regression among pairs of variables, as proposed in our research model:

- trust (as independent factor) – collaboration (as dependent factor),
- shared values (as independent factor) – trust (as dependent factor),
- communication (as independent factor) – trust (as dependent factor),
- opportunism (as independent factor) – trust (as dependent factor).

Tab. 7 shows the results of linear regression analysis. The first pair includes the independent variable *trust* and the dependent variable *collaboration*. Results ($\Delta R^2 = 0.532$; $F = 133.973$; $p = 0.000$) show that the influence of *trust* can explain 53.2% of variability of value collaboration. The regression analysis for the second pair (independent variable *shared values* and dependent variable *trust*) shows ($\Delta R^2 = 0.358$; $F = 65.555$; $p = 0.000$) that the

Tab. 7: Regression analysis between measured factors

Regression	ΔR^2	F	P
Trust – collaboration	0.532	133.973	0.000
Shared values – trust	0.358	65.555	0.000
Communication – trust	0.359	65.904	0.000
Opportunism – trust	0.347	62.566	0.000

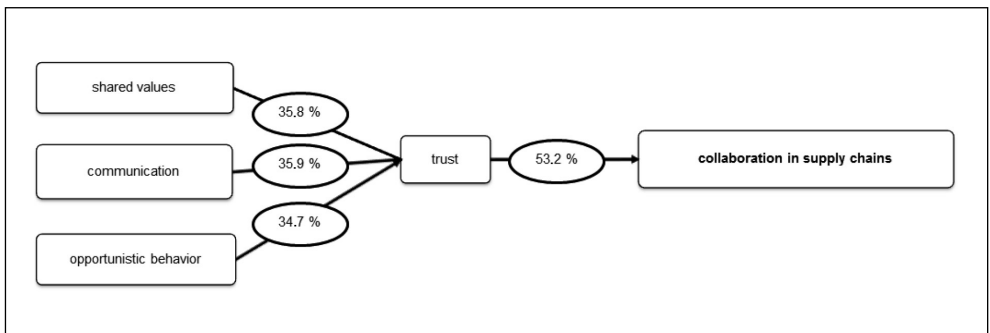
Source: own

influence of *shared values* explain 35.8% of variability of value trust. In the third pair we mark the independent variable *communication* and the dependent variable *trust*. The findings show ($\Delta R^2 = 0.359$; $F = 65.904$; $p = 0.000$) that the influence of *communication* can explain 35.9% of variability of value *trust*. The fourth

pair was *opportunism* (as independent variable) and trust (as dependent variable). Results ($\Delta R^2 = 0.347$; $F = 62.566$; $p = 0.000$) show that the influence of *opportunism* explain 34.7% of variability of value trust.

The results of our research are the best shown in Fig. 2.

Fig. 2: Research model with results



Source: own

Based on the results presented above (the Pearson’s correlation coefficient and the linear regression analysis), we can **confirm** our main hypothesis H1: “Trust has a statistically significantly positive influence on collaboration in supply chains.”

Results also show that we can **confirm** hypothesis H2: “Shared values have a statistically significantly positive influence on trust in supply chains.”

Furthermore, we can **confirm** hypothesis H3: “Communication has a statistically significantly positive influence on trust in supply chains.”

At the end, also hypothesis H4: “Opportunistic behavior has a statistically

significantly negative influence on trust in supply chains.” can be **confirmed**.

Conclusions

We can say for sure that every organization needs to build good, long term partnerships with all stakeholders, which means in our study with all partners in supply chains. Only such organization can see the possible threats and recognize them in time and prepare solutions. If all partners work together for their own good (suppliers’, buyers’, lateral partners’ and internal partners’ good) and have the same goal, that they want to achieve, the success cannot fall behind.

As seen from the results of our research, trust is very important in achieving supply chain collaboration, which means that managers have to be aware of this and try to build trust in their business activities with partners in supply chains. Our research also shows that shared values, communication and opportunistic behavior influences trust in a great way. Shared values and communication between partners in supply chains have positive and opportunistic behavior has negative influence on trust. These are also concepts that have to be taken in consideration, when planning long term inter-organizational relationships with partners in supply chains.

Good relationships in supply chains can be achieved only in good collaboration. To sum up, we can confirm that there is a statistically significant influence of trust on collaborative behavior in supply chains. The results clearly indicate that all factors included in research (trust, shared values, communication, opportunistic behavior) are very important for today's supply chain management. Managers should take these finding into consideration when they manage supply chains.

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Abstract

THE INFLUENCE OF TRUST ON COLLABORATIVE RELATIONSHIPS IN SUPPLY CHAINS**Sonja Mlaker Kac, Irena Gorenak, Vojko Potocan**

In this paper we theoretically discuss and empirically examine the influence of trust on collaborative behavior in supply chain relationships. These concepts are very important in today's inter-organizational business world, and therefore in supply chains.

In theoretical part of this article we presume that establishment and development of relationships in supply chain depends on development of trust. Trust is defined as a willingness to rely on a partner in a supply chain in whom one has confidence. The stress is on expectation that another partner can be relied on to fulfill obligations and at the same time previous experience with partners in exchange relationships are taken in the consideration. Collaborative behavior is defined as a concept where two or more organizations, which work together in a supply chains, can through complementary characteristics gain shared means and goals that could not be achieved individually.

Logistics managers, purchase and sales managers, project managers and employees in logistics department were included in our survey made on primary, secondary and tertiary sector of Slovene economy. We included companies of all sizes, both local and foreign companies present in Slovenia. 118 questionnaires were completed and involved in our research. According to the demographic data, our sample is comparable to population in terms of economy branch and size of companies.

The Pearson correlation coefficient and linear regression analysis demonstrate statistically significant strong correlation between trust, shared values and communication and strong negative correlation between trust and opportunistic behavior. At the end we can confirm that there is a statistically significant influence of trust on collaborative behavior in supply chains. The results clearly indicate that all factors included in research are very important for today's supply chain management.

Key Words: *Trust, collaborative behavior, shared values, communication, opportunism, supply chain.*

JEL Classification: M11.

DOI: 10.15240/tul/001/2016-2-008

LOCAL ECONOMIC IMPACT OF THE WHITE NIGHT FESTIVAL IN KOŠICE

Peter Džupka, Miriam Šebová

Introduction

Culture, in the way of cultural infrastructure, events and cultural heritage, generates a series of economic effects, both direct effects in the cultural sector (employment, production etc.) and induced effects in other sectors of the local economy (construction, tourism, transport, etc.) (Herrero et al., 2006). The promotion and development of the cultural sector has gained increasing popularity as a medium of urban transformation. This concept has been labelled “culture led urban regeneration” (Garcia, 2004; Lähdesmäki, 2012). The best practises were popularized by cities such as Glasgow, Liverpool, Barcelona and Bilbao. This phenomenon of cultural renaissance accompanied by the vital cultural participation of residents and booming cultural tourism became a stimulus for European cities to apply for the European Capital of Culture (ECOC) title. Košice, the second largest city in Slovakia with around 250,000 inhabitants, was designated for the title ECOC 2013 in 2008. The designation started the process of cultural progress led by the building of new cultural infrastructure (e.g. Kunsthalle) and the organisation of various cultural events. The largest and most popular events have been the open space festivals especially the summer art festival and White night.

Cultural festivals can be described as events held on a regular basis with evidence of high cultural value. They usually involve a specific programme with culture which differs from year to year (Palma et al., 2013). A more comprehensive definition of festivals has been given by the South Australian Tourism Commission: “Festivals are celebrations of something the local community wishes to share and which involves the public as participants in the experience. Festivals must have as a prime objective a maximum amount of people

participation, which must be an experience that is different from or broader than day to day living.” (SATC, 1997 In Arcodia, Whitford, 2006).

The objective of the current paper is to evaluate the economic impact of the all-night arts festival the White night (from the original French title *Nuit Blanche*) which is the spin-off of the Košice European Capital of Culture 2013. The festival is the largest open-space cultural event ever organised in the city. It was inspired by the international *Nuit Blanche* network, which is associated with several cities worldwide. Museums, art galleries and other cultural institutions are open with free entrance at night time. The centre of the city is turned into an “open art gallery”, providing space for art installations and performances (music, film, dance etc.) all mainly linked to modern art. The *Nuit Blanche* concept has been followed by many European capital cities (Rome, Amsterdam, Brussels, Copenhagen, Bucharest, Madrid) and has also spread outside Europe to New York, Melbourne and Tokyo. Only a few provincial cities have gained the licence to organise this prestigious event because of the demanding organisation and high quality standard of arts performances. The organisers of the Košice European Capital of Culture 2013 included this special event in the cultural city programme with the clear objective of attracting tourists and redefining the city image – from an old industrial city to a modern city with a vibrant cultural life. The paper is organised into two parts. The first part is a review of the literature in the field of economic impact studies and used methodology. The second part contains the case study about the economic impact of the White night which draws on a unique dataset obtained from a survey carried out amongst the attendees. The research was conducted during 2012 and 2013.

1. The Rationale for the Economic Impact Assessment of Cultural Events

Cultural festivals and special events can play a significant role in community life and economic development. Their popularity is based on the increased importance of cultural tourism as one of the largest and fastest growing global tourism markets in recent years. Cultural tourism is viewed as a “higher form” of tourism because of the assumption that visitors have a higher education and better behaviour (OECD, 2009; Richards, 2005). Cultural events have the potential to generate diverse benefits, ranging from their economic contribution (additional income to the local economy and employment), to the social involvement of the community. Their link to a specific area means that they can be perceived as tourist attractions that revitalize local traditions, positively impact living standards as well as the image of the city or region (Palma et al., 2013; Slach et al. 2013; Sucháček & Seďa, 2011).

Cultural festivals have grown in their amount, popularity and variety in recent years. As a result of their growing importance in regional development, there are a number of scholars working on developing valid models to evaluate the economic aspects of the festivals in their host communities.

Most cultural economics research has focused on economic impact assessment (EIA), economic footprint analysis or CBA (Gazel & Schwer, 1997; Fleischer & Felsenstein, 2002; Gursoy et al., 2004; (Estonian Institute of Economic Research, 2012). There are other studies which have valued cultural festivals using methods such as contingent valuation, conjoint analysis, hedonic pricing models or travel costs methods which estimate the socio-economic impacts of events (Sanz et al., 2003; Navrud et al, 2002; Castiglione & Infante, 2015). There have been few published studies which have focused on the social, cultural, and/or political impacts of festivals (e.g. Guetzkow, 2002; Arcodia & Whitford, 2006; Quinn, 2006) or which have analysed the determinants of cultural participation in depth (Palma et al., 2013).

O’Sullivan and Jackson (2002) have however, developed a festival typology. They have identified three festival types: home-grown, tourist-tempter and big bang events.

A “home-grown” festival is essentially a small scale, bottom-up event which is run by one or more volunteers for the benefits of the locality. A “tourist-tempter” festival is one that is aimed specifically at attracting visitors to stimulate local economic development. A “big-bang” festival is essentially a marketing tool that promotes a myriad of related activities over a defined geographic area (Hackbert & College, 2009).

The rationale for measuring the economic impact of cultural events such as festivals is based on several motives. There is an increasing interest in identifying and understanding the various costs and benefits associated with festivals. The economic impact analyses serve as tools to get accurate data which is useful in further economic analyses (e.g. CBA). The contribution of economic impact analysis is the provision of information about the structure and amount of attendees especially at ungated events without any sold tickets. The calculation of the additional economic contribution of an event into the local economy can strengthen the event marketing and its advocacy. The advocacy purpose could be associated with the temptation to calculate the size of the local economic impact (e.g. GDP contribution, jobs created) and make it as large as possible which has been criticized in the research community (e.g. Stanley et al., 2000; Crompton, 2010; Tyrrel & Johnston, 2011). The level of economic impact could easily be overestimated if a carefully structured working methodology has not been used. The number could be overestimated if the organisers claim that all or most of the visitors’ expenditure was motivated by the event. In order to avoid this problem the methodology includes thorough procedures to separate the spending of incidental visitors.

2. The Impact Studies Methodology

There is a general consensus that whilst measures related to economic impact assessment are conceptually simple, the actual collection of such information is extremely difficult and time consuming (Bond, 2008). Economic impact studies are used to estimate the economic importance of big cultural or sporting events as well as important infrastructure projects. The effects of hosting big events are mainly evaluated in two fields. The first focuses on the short-term impacts which have wide diversity in their range of

economic and intangible positive and negative effects on the city and local community. The second concentrates on the long-term impacts which concern the legacy of the construction of facilities and infrastructure improvements (Barghchi et al., 2009).

Well-developed economic impact studies involve several practical applications of the methodology e.g. the assessment of cultural events and festivals (Estonian Institute of Economic Research, 2012; Hill Strategies, 2003; Vrettos, 2006), cultural institutions (Economic Development Research Group, 2002; Bollo, 2013), and significant cultural projects e.g. European Capital of Culture (Herrero, 2006; Plaza et al, 2013). All of these studies have used similar steps of the universally recognized methodology for the estimation of local economic impact in the cultural sector. The local economic impact is presented by the quantification of the additional income to the local economy received by visitor spending due to visiting the event. The comprehensive methodology for economic impact analyses of cultural events was used for example in the evaluation of Salamanca European Capital of Culture 2002. (Herrero, 2006). An adjusted methodology was used to estimate the overall economic impact of the White night festival in Kosice.

According to Crompton (2010) the economic impact of visitor spending is estimated by the formula: *number of visitors * average spending per visitor * multiplier*. The number of visitors is clear in gated events (with controlled points of entry/exit). A more challenging task is counting the attendees at an ungated event. An "ungated" or open access event is one that takes place in a whole or in part of an open area where access is not controlled (Guidelines, 2007). The estimating process of the total attendance at an event faces a number of problems. People can come and go at different times and places and it is difficult to distinguish event attendees from passer-bys. Generating unduplicated counts of attendees and their characteristics requires special and complex procedures. Six approaches are discussed as tools for estimating attendance at ungated events: aerial photography; parking lot counts; parade counts; tag and recapture; entrance/exit counts; and accommodation data (Guidelines, 2007) The next problem is that the organisers tend to overestimate the number of visitors at an event, so called "attendance hyperbole" (Crompton, 2010).

There are three different types of measurable impacts (or effects) of the event: direct impact, indirect impact and induced impact. **Direct impacts** are directly related to cultural event expenditures, which were spent in the hosting city (or region) within the analysed period of time. These expenditures can be of a different kind (investment costs of cultural infrastructure or cultural equipment, salaries of employees organizing cultural events, cultural program expenditures etc.) It is very important to collect all the direct impacts, no matter what source they were funded from (public or private). To ensure the correct implementation of the methodology it is important to cleanse these costs from the expenses causing no additional economic activity within the analysed region (VAT, social insurance etc.).

Visitor impacts include all visitors spending directly related to the analysed cultural events including direct expenses for tickets, accommodation, restaurants etc. The source of this information is usually primary research among visitors. According to several authors (Crompton, 2010; Šipikal et al., 2010) not all visitor expenditure means new additional economic input for the region. The expenditure of local visitors, for example, would probably have been spent in the region even if the analysed cultural event had not taken place. Therefore, residential spending is completely excluded because it does not reflect new money in the local economy.

The main additional economic impact for the region comes from foreign and domestic visitors – tourists. Here again, the question is what proportion of visitor expenditure is directly related to the analysed cultural event? A tourist's main reason for visiting the city could be a business trip or visiting family and a cultural event could be only on the side. According to the basic principles of economic impact, it is important to identify a tourist's reasons for visiting the analysed locality. Herrero (2006) formulated a reducing coefficient to calculate expenditure based on a tourist primary motivation for visiting the analysed cultural event. The repetition coefficient enables the avoidance of duplicities in visitor spending.

Induced impacts are changes in the economy caused by the additional production of subcontractors as a result of further rounds of economic activity in the analysed region. These changes include all further rounds of

production induced by backward linkages of direct suppliers and their subcontractors (Raabová, 2011). Through induced impacts, direct expenditure and visitor expenditure are reflected in all other sectors of the economy. The size of induced impact is proportional to the propensity of local firms to purchase inputs from regional suppliers. It is therefore crucial to select the correct methodology for induced impact quantification. Induced impacts of cultural events are usually estimated by regional multipliers. The multiplier concept recognizes that when visitors to a facility or event spend money in a community, their initial direct expenditure stimulates economic activity and creates additional business turnover, personal income, employment, and government revenue in the host community (Crompton, 2010). The induced impacts are calculated using several kinds of multipliers (e.g. Keynesian regional multiplier, multiplier based on Input-output (I-O) matrix) or econometric models as REMI or HERMIN.

There is an unambiguous lack of research about the economic aspects of the cultural sector especially about the economic effects of cultural events and infrastructure in Slovakia. It is grounded in poor data availability about culture as well as regional multipliers. The regional multipliers are not provided by statistical offices in Slovakia as in most of the CEE countries (Macháček et al., 2013). The regional multiplier used in this paper was calculated with the purpose of accurately evaluating the total economic impact of the Košice European Capital of Culture. The demanding calculation was provided by derivation multipliers from national I-O tables using Flegg's Local Quotient (Flegg et al., 1995). A detailed calculation of the regional multiplier was published in Hudec et al (2014).

3. The Data Collection

The aim of the paper is to estimate the economic impact of the White night on Košice. The choice of the study region was determined by the locality of the event. The analysis deals only with the impact of visitors' expenditure. The analysis of other direct impacts is not addressed because of the reluctance of the organisers to publish it.

The gathering of primary data was based on the methodology developed by the European policy group for the ECoC projects evaluation and on the methodology of economic impact

assessment. The authors of the paper were directly involved in the evaluating process of the ECoC in 2012–2014. The findings of the evaluation process have been summarized in a report published by Hudec et al (2014). Two types of questionnaires were used in the robust primary research: event questionnaires and stationary questionnaires which in total amounted to 4607. The event questionnaires were collected at selected cultural events organized under the Košice ECoC project during 2012–2014.

One of the investigated events was the White night festival. The survey aimed to estimate the socio-economic structure of the event audience, to evaluate the visitors' satisfaction and collect information about visitors' expenditure to evaluate the economic impact of the festival. During 2012, 360 questionnaires were collected and during 2013, 524 questionnaires were collected.

According to the previously mentioned methodology of local economic impact, the current research was carried out in several steps:

1. Estimation of the number of visitors attracted by the event.
2. Estimation of the average level of spending of visitors in the local area.
3. Calculation of the direct local economic impact of the event.
4. Multiplication by the regional multiplier and calculation of the total economic impact of the event.

4. Results

At the White Night, all performances were free and took place over the whole night, so the counting of attendees was labour intensive. The research methods for the estimation of the total attendance were a tally questionnaire and aerial photographs in 2012, and a tally questionnaire and parade count in 2013. Given that the tally information for an ungated event is instrumental in estimating total audience size as well as the proportion of attendees who are tourists and local residents, the research method was precise in the sampling and weighting processes.

In 2012 a methodology of the aerial photographs was used. In 2013 a modified methodology of "parade counts" was used, as described in the Guidelines (2007). It was predicted that the "parade" that would be

expected to attract the “peak” attendance would be the newly reconstructed City Park, where the most beautiful light performances took place during the night. The reconstruction of the City Park was one of the main infrastructural projects carried out within the Košice ECoC 2013 projects. The City Park is surrounded by a fence with six entrances. Therefore, there was a possibility to count the people coming to the city park. According to the counting, 18,373 visitors entered the City Park between 7 p.m. and midnight. At the same time, a questionnaire survey was done among the White night visitors. One of the questions in the interviews was, whether the respondent already was or had planned to visit the City Park during the night. Our calculation of 21,613 White night attendees is derived from the combination of the counting in the City Park and the information that had been captured by the tally questionnaire. However, considerable attendance hyperbole was detected. The organisers reported around 50,000 attendees, while the current research

estimated around 17,000 visitors in 2012 and 21,000 visitors in 2013.

The statistics provided by the National Statistical Office or City council include visitors who stay in a destination for one night or more (i.e. tourists) in recognised accommodation establishments. They do not provide full coverage of tourism activity as same-day visitors are not included, nor are visitors staying with friends and relatives. However, the research questionnaires are designated to capture these visitors too. The questionnaire was designed to obtain basic information about the origin, socio-economic structure and expenditure of the visitors. The following chart (Tab. 1) shows the estimation about the visitors according to the geographical origin. As can be seen from the table, the majority of visitors came from Košice, and nearly 20% came from Slovakia. Only 5% of visitors originated abroad. Similar results were achieved in an impact study of the White night in Rome (Cherubini & Iasevoli, 2006) with only 6% of foreign visitors.

Tab. 1: Geographical origin of visitors who attended the White night festival

	2012	2013
Local visitors	12,890	15,540
Slovak tourists	3,210	4,410
Foreign tourists	900	1,050
Total	17,000	21,000

Source: own

From table 2, it can be seen that around 51–55% of the attendees were male. The most attendees were between 21 and 30 years and secondary school-educated. According to the occupation almost 40% of the visitors were students. The demographics highlight the popularity of the festival among the younger generation in the city.

The White Night is organised in Košice on the first Saturday night in October every year. On Sunday morning the largest sport event starts, the Kosice Marathon, which is the oldest in Europe and has been organised since 1924. The synergy between the cultural and sporting attraction has resulted in vital tourism in the first October weekend. Local tourist providers have named it the “Golden Weekend” in Košice because all accommodation is usually fully

booked. Therefore, visitors were asked about their reason for visiting Košice to separate the spending of visitors as a result of the White night and what would have occurred even if the White night had not been in Košice. The application of a reducing coefficient was based on the question: *How important is this event for your visit to Kosice from 1 to 10?* (10 – maximum importance) The reducing coefficient was calculated using the formula, where t_i is the percentage of positive answers for one of the questions from the scale 1–10 (Herrero et al, 2006).

$$C_{re} = \sum_{i=1}^{10} (t_i \times 0,1i) \tag{1}$$

The reducing coefficient was much higher by foreign tourists in 2013. We assume that the

Tab. 2: The demographics of visitors

	2012	2013
Gender		
Male	51%	55%
Female	49%	45%
Age		
0–20	19%	18%
21–30	46%	47%
31–40	11%	15%
41–50	8%	10%
51–60	10%	6%
61 and more	6%	4%
Education structure		
Elementary education	13%	7%
Secondary education	53%	55%
Higher education – university degree	34%	38%

Source: own

ECoC year attracted foreign students to visit Košice and join cultural festival.

In the next step the average spending of visitors was calculated in specific sectors of the local economy (accommodation, food, retail, transport etc.). The expenditure of local visitors from Košice was excluded from the analysis. It was assumed that their spending would have occurred in the local economy whether the White Night had happened or not. If local visitors had not attended a festival, they would have spent their money in a local venue at another

time. This approach is used by most economic impact studies as previously mentioned.

The average expenditure of visitors was calculated and multiplied with the reducing coefficient. The result presented the visitors' impact on the local economy – the additional income of visitors' expenditure.

The average spending of a Slovak visitor was 38 Eur in 2012 and 45 Eur in 2013. The average spending of a foreign visitor was 95 Eur in 2012 and 110 Eur in 2013. Table 3 presents the expenditure of visitors according to the basic

Tab. 3: Attribution of spending by visitors of the White night festival

	Slovak tourists		Foreign tourists	
	2012	2013	2012	2013
Reduction coefficient	0.71	0.7	0.45	0.65
Reduced expenditures for accommodation and food	36,473	49,369	19,995	26,542
Reduced expenditure for retail	29,607	37,385	4,794	30,333
Reduced expenditure for transport	6,347	13,574	3,490	2,708
Total expenditure	72,427	100,328	28,279	59,583

Source: own

groups of expenditure. The biggest spending occurred in the sector of accommodation and food. The direct economic impact of visitors spending in 2012 was 100,706 € and in 2013 it was 159,911 €. The impact of the festival evidently increased in 2013 caused by higher attendance, higher spending of foreign tourists and higher reducing coefficient.

The last step was the calculation of the induced effects of visitor spending. The induced effects present the benefits gained in the local economic system derived from the primary expenditure of visitors. The induced impact was estimated through the concept of the regional multiplier following the methodology explained in the previous section. The regional

Tab. 4: The induced economic impact by visitors of White night festival

	Output	Income	Employment	Value-added
2012	168,970	35,819	2	73,974
2013	268,678	56,458	3	118,074

Source: own

input-output multiplier derived from the national Input-Output Tables of Slovakia was used for each economic branch separately. The results are presented in table 4.

The expenditure of visitors led to changes in demand in the local economy and thereby to the additional production of goods and services to the amount of 169,970 Eur in 2012 and 268,678 Eur in 2013. The income of people who worked in this additional production increased by 35,819 Eur in 2012 and 56,458 Eur in 2013. The employment multiplier expresses new jobs in the local economy. However, it is important to note that estimates done by employment multipliers estimate the increase in jobs measured as full-time job positions. A one night event probably didn't produce any full-time jobs, but it opened up more part-time jobs during the organisation and realisation of the festival. The growth of the local economy could be expressed by a value added multiplier which caused the increase of 73,973 Eur in 2012 and 118,074 Eur. This can be considered approximately as the increase in regional growth. As seen in table 4, the economic impact of the festival based on visitors spending was much higher in the ECoC year 2013 compared to the year before.

Conclusion

One of the goals of the ECoC designation of Košice was to attract more tourists and stimulate vibrant cultural tourism in the city and closer region. The White Night festival has become one of the most popular cultural events organized by the team of ECoC in Košice since

2010. In order to evaluate the real benefits and compare them with the expectation is only possible with accurate data. This empirical study presents results from the research focused on the economic impact of the festival on Košice. Attendance hyperbole was suspected given the estimation of attendees made by the organisers. The real amount of yearly visitors was less than double what the organisers declared. Information about the amount and structure of visitors could have valuable benefits for the organisers to optimize the infrastructure and human sources by organizing the festival. The economic impact number shows the worthy new amount of money achieved in the local economy through a cultural event. The value of an economic impact study could help the organisers obtain special support from private and public sources.

The originality of this empirical study is in the used methodology. It is the first implementation of the methodology of economic impacts to a cultural event in Slovakia. The adjusted methodology and the matrix of calculated regional multipliers have enabled the replication of the methodology on other cultural events and facilities. The results of the empirical study can also establish the first step for further deeper analysis of economic aspects of cultural events in Slovakia.

According to the evaluation findings, the festival has primarily captured local residents and national tourists. Similar results have been found in other analysed events during ECoC 2013. In terms of what is important for cultural

policy implications, it is vital to take into account the information about the increasing interest in street art culture and also the dominant participation of young people. The designation of European Capital of Culture has fomented vital cultural participation in Košice. It is visible not only in the organisation of various cultural events but also in further developing start-ups and spin-offs in the cultural and creative industries.

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Abstract

LOCAL ECONOMIC IMPACT OF THE WHITE NIGHT FESTIVAL IN KOŠICE**Peter Džupka, Miriam Šebová**

Košice is the second biggest city in Slovakia. In the last 25 years (following the period of Communism) Košice has passed through several waves of transformation involving economic, social and urban changes. Košice was awarded the European Capital of Culture (ECoC) in 2013. The winning project was based on the city transformation through culture and support of the creative economy (start-up and spin-off firms). Big cultural events have not only cultural and social benefits, but also an indisputable economic impact on the hosting city. These events represent an opportunity to not only attract visitors from outside the region but also for them to spend money on accommodation, food, transport etc. Visitors' expenditure presents additional income for the local economy and stimulates a considerable amount of economic activity and growth. The assessment of the economic impact of events has become popular of late and combines the economic approach with spatial marketing and tourism studies. A coherent methodology has also been developed to evaluate the economic impact of events in the geographical area.

This paper aims to estimate the local economic impact of the biggest cultural event organised in Košice, the White Night festival, a spin-off of the Košice European Capital of Culture 2013. This impact empirical study was done in three stages. Firstly, the measurement of attendees using appropriate methods for ungated events. Secondly, the estimation of the visitors' impact related to private spending generated by the event's visitors and thirdly, through estimating the overall economic impact by calculating the multiplying effects on the local economy (induced impacts). The study was based on research conducted during 2012 and 2013 in Košice. The result shows the attendance hyperbole and impact of visitor spending that was due to the festival in the local economy.

Key Words: *Economic impact, cultural economics, induced effects, regional multipliers.*

JEL Classification: O18, Z1.

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THE TOYOTA PRODUCTION SYSTEM – CZECH AND NIPPON CULTURAL PERSPECTIVES

Richard Brunet-Thornton, Michal Koža, Vladimír Bureš

Introduction

Japanese companies are considered a benchmark from various perspectives in the realm of business and management. Their foreign direct investments (FDI) have been considerable over the last decades in Central Europe. Multinational Enterprises (MNEs) are by their nature prone to cross-cultural interaction (Rozkwitalska, 2010). This is especially significant in the case of Japanese MNEs, which heavily rely on the use of expatriates to control foreign subsidiaries and implement foreign managerial systems (Harzing, 1999). Outside of Japan, host country employees in many Japanese subsidiaries interact with Japanese expatriates and management relocation activities on a daily basis. Such cross-cultural interaction often creates interpersonal friction, conflicts and other problems. In the global context, these conflicts between local employees and expatriates in subsidiaries are relevant, as they may impair the efficiency of the entire organisation (Pudelko & Tenzer, 2011). Although studies focused on comparison of European and Asian cultures have already been published recently, for instance Li et al. (2016) deals with the United Kingdom and China, or Linder (2015) investigates German expatriates in Philippines, recent comparison of a Central European country with Japan is missing in the literature.

One approach to explain and analyse these conflicts and the success of managerial systems is the application of the cultural differences concept (Ayoko, Härtel, & Callan, 2002; Vaara, 2003). Another stream of literature deals with the problem from a Human Resources Management perspective (Pudelko, 2000). To resolve expatriation-specific complications, both approaches stress the importance of cross-cultural awareness training programmes and overall support and assistance to expatriates

(Pudelko & Tenzer, 2011). This awareness and support is often vaguely defined and lacks analysis. Even though both approaches analyse the degree of acceptance of various tools, they focus only on the tools. Less attention is paid to a wider perspective that possibly serves as a definitive framework for these tools.

This discussion analyses the effect of Czech managers' cultural values on the acceptance of the Toyota Production System (TPS), a Japanese manufacturing and managerial framework and philosophy (Liker, 2004) shared by most automotive Japanese subsidiaries in the Czech Republic and elsewhere. It also examines the situation relative to the satisfaction and degree of conflict in Japanese MNEs in the Czech Republic from both Czech and Japanese viewpoints. In doing so, it determines the outcome of Czech and Japanese employees' knowledge and appreciation of the Toyota Production System on corporate performance. Equally, it analyses the amount and severity of conflicts between local and expatriate managers. Moreover, it addresses the insufficient research on performance in Japanese MNEs in a specific environment as there exists little literature that reviews job-satisfaction, conflict, and TPS training in the Czech Republic as a culturally specific environment (Brunet-Thornton & Bureš, 2012).

1. Theoretical Background

This section presents general frameworks developed in the area of cross-cultural management and highlights those applied in this study. Consequently, the main ideas and principles of the TPS are introduced.

1.1 Cross-Cultural Frameworks

Hall (1959) introduced three basic components to comprehend various aspects of cultures:

monochronic and polychronic time orientation, proxemics and high context and low context culture. Monochronic describes a culture, which tends to do one thing at a time sequentially. They plan and schedule. In contrast, polychronic cultures do things simultaneously, and are focused on an individual perception of time. Regarding space, Hall divided this dimension into four distances: intimate, personal, social and public. Various cultures perceive space differently, and what one culture perceives as intimate may be viewed as social space in a different culture.

The Hampden-Turner and Trompennars (1998) model compares cultures through seven bipolar dimensions: Universalism/Particularism, Individualism/Collectivism, Neutral/Affective, Diffuse/Specific, Achievement/Ascription, Attitude to Time, and Attitude to the Environment.

The Hofstede (1983) Cultural Dimensions model, based on a series of surveys conducted on IBM employees originally identified four dimensions of national cultures: Power Distance, Uncertainty Avoidance, Individualism, and Masculinity-Femininity. In later research, two additional values have been added to this group: Long-Term vs. Short-Term Orientation and Indulgence/Restraint. Although often criticised the Hofstede model is frequently cited (Brunet-Thornton & Bureš, 2012). Research (Bergiel, Bergiel, & Upson, 2012; Kohun, Burčik, & Skovira, 2012) indicates that the values evolve and therefore do not represent constants for the accurate calculation of the dimensions thereby, rendering comparisons difficult.

Based on the Hofstede model, Kogut and Singh (1988) developed the concept of cultural distance to express cultural differences and characteristics on the choice of market entry in foreign direct investments. The concept of cultural distance has been used in various other studies such as, the measurement of the efficiency of managerial networks (Manev & Stevenson, 2001), knowledge transfer (Holtbrügge & Berg, 2004), internalisation processes of firms (Clark & Pugh, 2001), MNE performance (Gómez-mejía & Palich, 1997), as well as to gauge the level of conflict between Japanese and western companies (Pudelko & Tenzer, 2011). The larger the cultural distance between two countries suggests the possibility of conflicts between two nations within one entity, as in the case of a Japanese subsidiary in the Czech Republic. Although there currently

exist a number of methodologies (Yeganeh, 2011; Gerschewski, 2013). This study utilises the Yavneh's (2011) formula. It accounts for cultural asymmetry, both negative and positive values; dimensions' alignment, does not aggregate opposing cultural dimensions, and weight, cultural dimensions have unequal importance, thus relative weights are factored.

Yeganeh's cultural distance formula for the Hofstede dimensions

$$CD_{ab} = \left\{ -0.1 \frac{(PD_a - PD_b)}{sd_{PD}} + 0.79 \frac{(IN_a - IN_b)}{sd_{IN}} - 0.09 \frac{(MA_a - MA_b)}{sd_{MA}} + 0.01 \frac{(UA_a - UA_b)}{sd_{UA}} \right\} \quad (1)$$

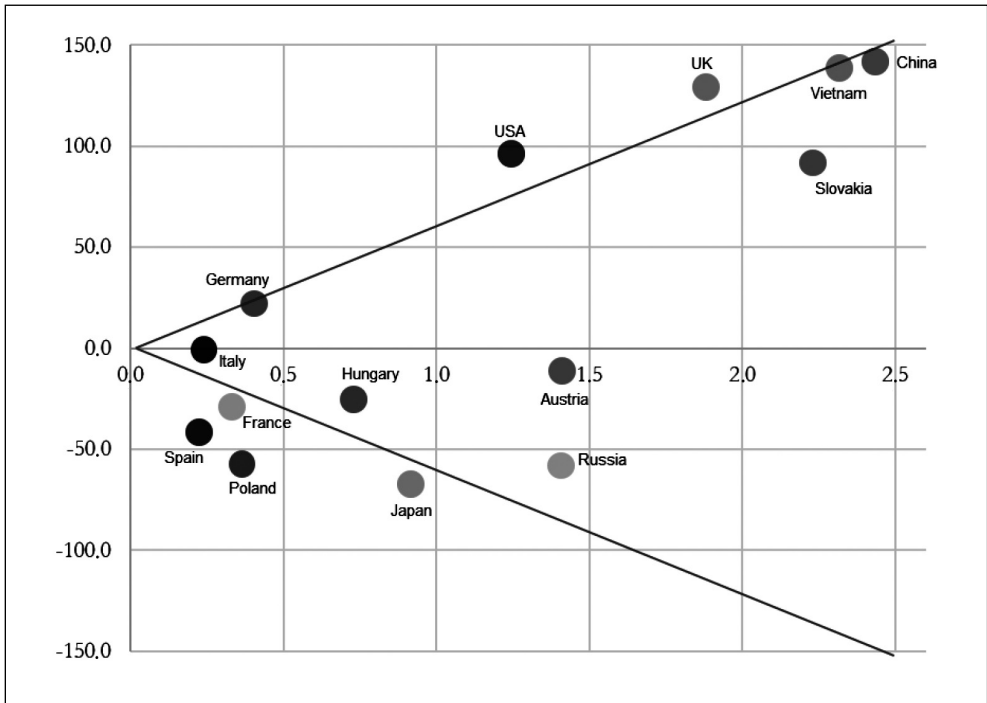
where CD_{ab} represents the cultural distance between countries a and b , variables PD_a , PD_b , ... UA_a , UA_b represent the Hofstede cultural dimensions for each respective country.

The cultural distance between the Czech Republic and Japan based on Yeganeh's (2011) formula and using a dataset acquired from Harzing (2014) is -67.37. Kogut and Singh's distance index is 0.9. Figure 1 compares these results with other countries. Kogut and Singh's distance index, X distance, indicates that the distance between the Czech Republic and Japan resembles the cultural distances between the Czech Republic and Hungary, Russia, USA, and Austria. The Yeganeh's index, Y distance, demonstrates that other countries with a similar distance to the Czech Republic as Japan are Poland, Russia and Spain. However, Italy, German, and France are countries with a relatively small cultural distance. The correlation between the Kogut and Singh's formula and absolute values of Yeganeh's formulae is 83.8%. The lines in the graph illustrate a theoretical 100% correlation between Yeganeh's and Kogut and Singh's formulae.

1.2 Toyota Production System

The TPS was originally created by a group of engineers in the 1950s as a set of manufacturing principles and tools for the Toyota Motor Company. It was developed as a system based on employee implicit know-how and common

Fig. 1: Plotted cultural distances



Source: own

knowledge. The rules are based on the premise to share tacit values within the group. Thus, to understand the TPS, acknowledgement of the cultural context within the organisation, and especially the working group is crucial. From the manufacturing position, the system uses various common within production environments, such as Total Quality Management (Liker, Fruin, & Adler, 1999), Kanban-based pull production, 5S, Just-in-time production, and others. Ultimately, its main purpose is "to eliminate through improvement activities various kinds of waste lying concealed within a company" (Monden, 2013). By themselves the tools do not create the TPS backbone but are just one part of the whole system. After studying more than 40 Toyota factories in the USA, Europe and Japan, Spear and Bowen (1999, p. 98) define these four rules:

1. How People Work – All work should be specified as to content, sequence, timing and outcome.

2. How People Connect – Every customer-supplier connection must be direct, and there must be an unambiguous method to transmit requests and receive responses.
3. How the Production Line is Constructed – The pathway for every product and service must be simple and direct.
4. How to Improve – Any improvement must be made in accordance with the scientific method, under the guidance of a teacher, at the lowest possible level in the organisation.

These four rules provide a foundation to create, organise, and view work. When compared with other tools, these rules highlight that true implementation of these ideas is impossible without a thorough process aimed at both the horizontal and vertical structures of the enterprise.

Originally a set of techniques and tools, TPS gradually developed into a deeper philosophy known as The Toyota Way (Liker,

2004). Today, it is a system of manufacturing as well as management principles used in various industries that include manufacturing or medicine. Liker (2004) views the philosophy as a concept that consists of four main components: Philosophy (Long-Term Thinking), Process (Eliminate Waste), People and Partners (Respect, Challenge and Grow Them), and Problem Solving (Continuous Improvement and Learning).

The Toyota Way (TW) is shaped by two basic pillars: Continuous improvement and Respect for people. In turn, these two value groups encompass five key principles: Challenge, Kaizen (improvement), Genchi Genbutsu (go and see), Respect and Teamwork (Toyota, 2003). Studies reveal that when empirically measured, these five principles are not statistically different from each other, as they are highly inter-correlated a to the measurement system used by Toyota to measure the TW (Jayamaha, Wagner, Grigg, Campbell-Allen, & Harvie, 2014, p. 2).

Liker (2004) presents 14 principles that constitute the TW. His perception is based on the 4-pillar model. The principles summarised are as follows:

1. Base your management decisions on a long-term philosophy, even at the expense of short-term financial goals.
2. Create a continuous process flow to bring problems to the surface.
3. Use 'pull' systems to avoid overproduction.
4. Level out the workload (work like the tortoise, not the hare).
5. Build a culture of stopping to fix problems, to obtain quality the first time.
6. Standardised tasks and processes are the foundation for continuous improvement and employee empowerment.
7. Use visual controls so no problems are hidden.
8. Use only reliable, thoroughly tested technology that serves your people and process.
9. Grow leaders who thoroughly understand the work, live the philosophy, and teach it to others.
10. Develop exceptional people and teams who follow your company's philosophy.
11. Respect your extended network of partners and suppliers by challenging them and helping them improve.
12. Go and see for yourself to thoroughly

understand the situation.

13. Make decisions slowly by consensus, thoroughly considering all options; implement decisions rapidly.
14. Become a learning organisation through relentless reflection and continuous improvement.

2. Problem Formulation

The increased number of Japanese subsidiaries in the Czech Republic indicates the importance of these companies to the Czech economy. Their performance is based not only on a macro-environment and international strategy of the organisation, but on the efficiency of local operations. Thus, it is crucial to analyse methods to mitigate possible friction and to improve management efficacy. The authors focus on two main problem areas.

The first consideration is the cultural fit of values within the Toyota Production System and the cultural values of Czech managers responsible for the implementation of these management and manufacturing techniques together with the Japanese expatriates. The TPS is often used as a synonym for "lean production" (Fujimoto, 1999) and many companies understand it as a process to improve performance. There exist Toyota Institutes in the USA and Thailand, wherein the rules and values of the TW are taught in explicit fashion. Such venues do exist in the Czech environment. Therefore, the first set of questions this study addresses is:

- **Prior to implementation, without well-defined TPS training, does a natural fit of values inherent to Czech managers and values exist?**
- **Without sufficient training, is TPS applicable within a Czech work environment?**

The second area of research is the question of usability of the TPS knowledge in terms of performance improvement. Research identifies basic approaches to improve the overall performance of cross-cultural management: cultural awareness, intercultural effectiveness, experimental or cognitive cross-cultural training and language-management. The cross-cultural training does not automatically provide successful outcomes. It is often concluded within an insufficient time-frame, or in an inadequate manner. The requirement for a successful language-management strategy

is a long-term oriented effort. In the case of Japanese companies with a large ratio of Japanese-only speakers, this effort is ignored, and in most cases, the official working language is Japanese (Harzing & Pudelko, 2013).

TPS could potentially combine these two approaches, and serve as a “common language” for both sides within a cross-cultural conflict. In doing so, thus foster cross-cultural awareness, smoothen daily operations and establish a basic platform for communication, problem solving and the setting of priorities. On one side of the cross-cultural conflict is the local managers’ position. The local manager becomes frustrated due to the centralised decision-making and lack of understanding. The other side of the conflict consists of the Japanese expatriates, who struggle to express the reasons for the behaviour often citing cultural or language differences. Thus, the second research question:

- **Do the rules and principles of TPS provide a basic platform for comprehension between two cultures, and therefore improve the satisfaction of employees and lower the amount of conflicts?**

Subsequently, three working hypotheses are tested:

- H1. Values inherent to Japanese management are closer to the values proposed by the TPS than the values inherent to Czech management.
- H2. If a company has Czech management trained in the area of TPS, the company enjoys a lesser degree of conflict between Czech and Japanese management.
- H3. If a company has Czech management trained in the area of TPS, the company realises a higher level of Czech employee job satisfaction.

3. Methodology

The presented study is intended to be in concordance with other cross-cultural studies. Therefore, instead of plain analytical statistical data processing that would not guarantee conformity in the given field of study, well-established cross-cultural metrics and approaches are applied. Thus, the presented study represents a mixed research approach that takes advantage of both quantitative and qualitative aspects of a research design. The hypotheses are tested using survey data. The

main questions are constructed to describe the respondents’ values relative to the TPS pillars and principles. A copy is found in the Appendix. TW pillars and Liker’s 14 principles are then compared and analysed. Out of Liker’s 14 principles, six are identified as technical: 2, 3, 4, 5, 7 and 12. They have not been taken into account during the creation of the survey. Two principles are categorised as corporate strategy: 11 and 14. The remaining six principles are merged together with observations from Spear and Bowen (1999). As a result, five different values are identified as Long-term orientation in thinking; Innovation perception; Human Resources development; Respect for rules; and Respect for supervisors.

The self-assisted questionnaire (SAQ) consists of 19 short questions related to cultural values and nine specific to the respondent. To quantify the respondent’s values, semantic differential scales, 5-scale Likert scales and single numeric value fields are used. Recent research demonstrates that various types of scales produce different results (Friborg, Martinussen, & Rosenvinge, 2006). Except for the name of the company, position and comments, optional fields used only for statistical purposes, none other qualitative data is collected. All questions used in the SAQs are built in three languages, English, Czech, and Japanese. Accidental sampling and snowball sampling methods are the primary techniques.

Prior to distribution, which took place in the mid of 2014, a pilot-run was conducted. One company with five Czech and five Japanese managers was contacted with the SAQ distributed through the Human Resources department. Following the trial, no major changes were required to the questionnaire. The survey was distributed using three separate channels scanned files sent and collected through email; online survey through a specialised platform; and physical distribution of printed surveys. Email recipients were informed on the survey purpose and provided with two URL links, one to the Czech and one to the Japanese versions.

Although distribution represented seventy-nine enterprise contacts, more than one third of respondents, 35%, $n = 45$, did not reveal their corporate name. A distribution list is included in the appendix. The survey targeted both Czech and Japanese managers, which includes, plant, quality, production process, maintenance and

improvement managers. Out of one hundred twenty-nine responses, 108 were relevant, a reply rate of 82.9%. Altogether, 45 responses were received from Czech managers and 63 responses from their Japanese counterparts. Seniority within the enterprise presents 7.2 years for Czech respondents and 5.8 years for the Japanese.

4. Results

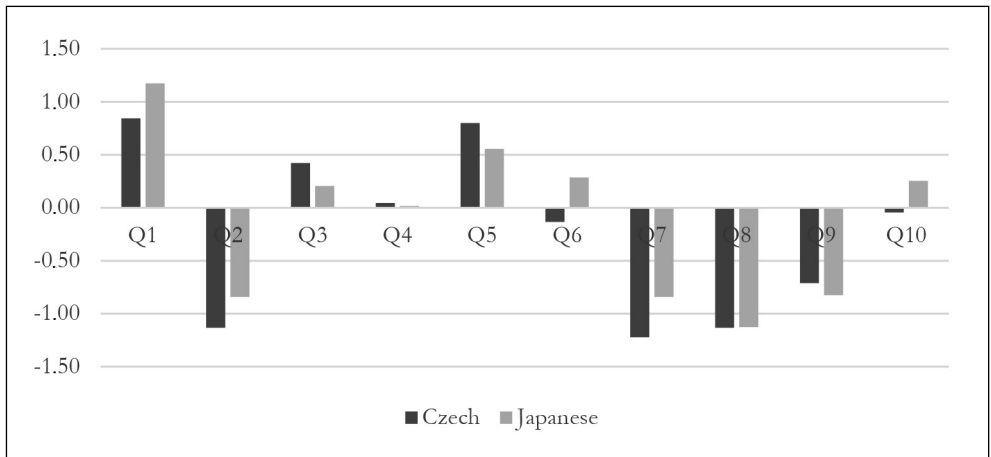
4.1 Value-Related Questions

Data collected associated with the ten relevant questions were summarised with averages for each respective value calculated. Figure 2 indicates the difference of each nationality

between its average value and the middle value used in the 5-point Likert scales and the 5-point semantic differential scales. The x-axis displays the number of questions that measure the respondents' values: section 1 with questions 1–6 and section two with questions 7–10. The left y-axis indicates the average values for respective question and nation with dark grey for Czech and light grey for Japanese.

This illustration displays the difference between the two groups. Questions 1, 2, 5, 7, 8, and 9 deviate most from the medium value. Questions 3, 4, 6, and 10 are the closest to the medium. The largest differences are with questions 1, 2, 3, 5, 6, 7, and 10. Questions

Fig. 2: Differences between average and middle values



Source: own

one through six are semantic differential scales, questions seven through ten are 5-point Likert scales.

4.2 Satisfaction-Related Results

Both groups are satisfied with the number of work-hours. The overall difference is $d = 0.29$. Although Czech companies have a standard 8-hour long work day, many Japanese workers remain at work longer. Official statistics state that the average annual work-time in Japan is 1,785 hours, which is lower than the Czech (OECD, 2014). This indicator however, considers part-time workers that includes 24.5% in 2006, more than seven times that of the Czech Republic.

It is therefore, difficult to use this absolute number for comparison. According to Fukuda (2012), 28% of Japanese employees work more than fifty hours per week. This renders Japan in second place preceded by South Korea (45%). The reason for this behaviour is more complicated than conscientiousness. Marsden (1999, p. 165–166) proposes that this behaviour reflects the stress on quality, job rotation and skill development.

Both cultural groups express satisfaction with the monetary reward ($d = 0.42$). Compared with the number of work-hours, Czech managers appear more satisfied with their salaries. Japanese managers indicate the

same level of satisfaction as in the previous question. Although compensation strategies differ by company, Japanese expats receive on average a remuneration package that consists of various bonuses equal to 2.8 times the salary of host country employees at the same grade and position (Wong & Hendry, 1999).

There is dissatisfaction with training and education. The result is most notable with Japanese managers, with a mean value of 3.02, 0.55 higher than their Czech counterparts. The role of Japanese expats in foreign countries is often two-fold (Delios & Bjorkman, 2000). The primary role is to control the activities of the subsidiary to align with the goals of head office. The second is to function as a knowledge base for local employees. Serving as a knowledge source lowers the number of opportunities for further formal expat education. As a result, they find themselves unprepared for new challenges when abroad.

Overall, the level of satisfaction of Czech managers is higher. This does not necessarily signify that Japanese workers are less satisfied in foreign assignments than at home. Though it is most likely possible that the workload, interpersonal relationships and overall working conditions in foreign countries are more demanding, the survey did not explore the possible differences between Czech and Japanese environments. Nevertheless, what may be concluded is that the perception of working conditions between the two groups is different.

4.3 Conflicts-Related Results

Questions were constructed with a 5-point Likert scale within a range of 1 for “absolutely true” and 5 for “absolutely not true”. The first question measures the number of conflicts between the respondent and the management

of the other culture. The difference between the two groups is large ($d = 1.34$).

The second question measures the same issues as the previous but with one difference. It enquires as to the general state of relations between Japanese and Czech management. The findings indicate that Czech managers estimate the tensions between the two groups to be larger than in-group conflicts ($d = 1.06$).

The third question measures the difference in conflict perception. Japanese managers perceive the degree of conflicts between them and the Czech operators to be greater than the Czech perception ($d = 1.24$).

One of the many definitions of culture describes it as “the method of solving problems” (Schein, 1985). According to the results of the fourth question, Japanese managers view problem resolution with the other culture as more effective, than their Czech colleagues ($d = 0.68$).

4.4 Testing of Hypotheses

H1: Values inherent to Japanese management are closer to the values proposed by the TPS than the values inherent to Czech management.

Out of the ten questions that measure values identified as relative to TPS, four were identified in contradiction of expectations. This suggests that Czech managers exhibited characteristics closer to values expected of Japanese managers. Four questions met expectations, and two questions produced unanimous results. Table 1 summarises the differences for each measured variable, and results for questions connected with these variables. Thus, the hypothesis H1 is refuted.

A positive integer indicates that the difference is in accordance with expectations. A negative, that the difference contradicts expectations. Zero indicates that the difference

Tab. 1: Overview of measured values and variables

	First question	Second question	Sum
Long term	-0.38	0.29	-0.09
Innovation perception	0.30	-0.33	-0.03
Supervisor respect	-0.42	0.22	-0.20
HR development	-0.24	0.00	-0.24
Rules respect	0.11	0.00	0.11

Source: own

is insignificant. The sum for four out of the five variables is negative as well as the total sum of all variables (-0.45). This does not necessarily suggest that the hypothesis is unambiguously denied. To do so, the variables would need respective weighting based on multiple observations in multiple environments. The actual relevance of these variables to TPS is unknown as no other quantifying research has been conducted. Hence it is impossible to clearly answer this issue. Nonetheless, for each measured variable, there exist contradictions.

H2: If the company supports TPS training of Czech management, the company enjoys a lesser degree of conflict between Czech and Japanese management.

To assess the second hypothesis, TPS-related training for each employee is divided into three groups. Group "0" consists of employees that did not receive any formal

or informal training. Employees in group "1" have noted that they received some training. To measure the degree of conflict, results for the first conflict-related question were used: *there exist many conflicts between you and management of other than your own nation.* Findings are found in table 2.

As the table indicates, there exists minimal difference in the amount of conflict between Czech managers with or without formal TPS training (0.11). The difference between Czech managers with or without informal training is larger (0.27). In the case of Japanese managers, the differences are 0.29 for formal training and 0.44 for informal training. Thus, the hypothesis H2 is refuted.

It appears that with increased training, the degree of conflict rises, the lower the number, the higher the perception of conflict.

Tab. 2: Average conflicts divided by level of TPS training

Level of training	Official TPS training				Non-official TPS training			
	Czech	(n)	Japanese	(n)	Czech	(n)	Japanese	(n)
0	4.03	32	2.76	46	4.18	17	2.86	37
1	3.92	13	2.47	17	3.89	28	2.42	26

Source: own

Tab. 3: Average job satisfaction by level of TPS training

Work hours	Formal TPS training		Informal TPS training	
	Czech	Japanese	Czech	Japanese
0	2.22	2.78	2.06	2.59
1	2.69	2.29	2.54	2.73
Training	Czech	Japanese	Czech	Japanese
0	2.22	2.76	2.41	2.68
1	2.23	2.35	2.11	2.62
Salary	Czech	Japanese	Czech	Japanese
0	2.66	3.11	2.71	2.95
1	2.00	2.76	2.32	3.12
Overall	Czech	Japanese	Czech	Japanese
0	2.13	2.50	2.24	2.35
1	2.08	2.29	2.04	2.58

Source: own

H3: If a company promotes Czech management training on the TPS, the company realises a higher level of Czech management job satisfaction.

Hypothesis H3 was assessed in a similar manner as hypothesis H2. First, two groups for the TPS-related training were identified with "0" for no training and "1" for at least some training. Based on these groups, satisfaction for all four sub-questions was averaged separately: Work hours, Salary, Training and Overall Satisfaction. A lower number signifies higher satisfaction and vice versa. Results are summarised in table 3.

Czech managers with formal or informal TPS training display lower satisfaction with the length of work hours. Formal TPS training does not appear to have any impact on the level of satisfaction related to training. However, Czech managers who experienced informal TPS rate higher satisfaction levels. Managers with both formal and informal training indicate a higher satisfaction with salary. Overall satisfaction levels for Czech managers specify a weak positive correlation in that managers with any type of training are more satisfied than managers without. Nevertheless, the hypothesis H3 is refuted.

Although Japanese managers exhibit similar trends within the satisfaction subgroups, the results are different. For example, Japanese employees with formal training indicate higher satisfaction with work hours. Japanese employees with informal training demonstrate an opposite trend. Formal training associates with higher satisfaction levels with training, salary, and inclusive approval. On the other hand, employees with informal training exhibit an indifference to training satisfaction, as well as a lower satisfaction in both salary and overall contentment.

5. Discussion

5.1 Values

Results of question 1 reveal a difference between the two groups ($d = 0.33$). In addition, the values contradict the expectations set by the literature review. According to Hofstede (2010), Japan's higher uncertainty index, 92 compared with 74 for the Czech Republic, implies that Japanese managers have a tendency to avoid risk and prefer to utilise well-established methods and technologies. It is feasible that Japanese managers see the importance of new technology as something more crucial in

the context of foreign subsidiaries as a means to improve structure and rules within an organisation (Cardon & Marshall, 2008).

The results for the second question are consistent with the literature review (Liker, 2004). The Czech managers' average is 1.87; Japanese managers' average is 2.17, thus higher by 0.31, and therefore more inclined towards the second statement. In the instance that a process does not produce the expected results, Czech respondents tend to innovate to modify the process and adjust the parameters. Alternatively, their Japanese counterparts deploy known solutions under the premise that changes require time to take effect.

Czech managers score higher values than the Japanese respondents ($d = 0.23$), that in turn signifies that the responsibility of possible misunderstandings resides with the supervisor. This result confirms previous research that the Japanese form a society with strong vertical connections. In the work environment, superiors are viewed as mentors (*senpai*), who paternalistically care for the younger inexperienced employee (Lincoln, Kerbo, & Wittenhagen, 1995, p. 428).

Responses associated with the fourth question account for a difference less than 0.03 points. However, the variance for this question was the highest among all value-related questions with 1.35 compared to an average variance of 0.93. Goal-setting depends on the employee's position and subsequently differs for a manual worker and a manager. Therefore, expectations are related to the role and level of responsibilities necessitated by the actual job.

With respect to the fifth question, Czech managers score higher than their Japanese counterparts, 3.80 to 3.56 respectively. It indicates that it is more important to hire and develop managers from internal resources than external. This finding contradicts expectations. Contrary to the Czech Republic, Japan is a coordinated market economy with participative labour relations, skill formation based on intensive training and a strong internal labour market (Olcott, 2009, p. 19). Moreover, Japan is repudiated for its "implicit code of restraint on the part of larger firms in the hiring of employees, particularly skilled ones, from other firms" (Olcott, 2009, p. 97).

In the sixth question, Czech managers tallied higher than their Japanese counterparts with 3.30 versus 2.87, a difference of 0.43.

Based on this data, Czech managers have a stronger tendency to experiment with their supervisors' ideas and suggestions, even if not fully understood or make sense. This is consistent with the "Švejk" characteristic of Czech culture (Brunet-Thornton & Bureš, 2012). This expression is often used to describe the adaptability and flexibility of the Czech business and cultural psyche.

The seventh question measures the pragmatic orientation of respondents in which Czech respondents indicate a stronger tendency towards long-term orientation. Question 8 measures the openness to adjust rules and improvise. Countries with high Uncertainty Avoidance scores exhibit a strong emotional need for rules and implement strong behavioural codes and laws (Hofstede, 2011, p. 10). The resulting difference in the responses is unexpected. The ninth presents a different perspective on a similar topic to that addressed by the previous question. Japanese managers stress the importance of "doing what is decided to be done", even if the individual reasons that modification of the rules benefits the company. Similarly, to the earlier, the results are comparable. The average values are higher for both that imply that both Czech and Japanese managers tend to disagree with this statement. Lastly question ten, which reveals that Japanese respondents show a slightly stronger tendency to improve gradually. Although the difference is 0.29, the results correspond with Liker (2004), who stresses the importance of continuous improvement over a longer period of time.

5.2 Conflict

Japanese respondents perceive more conflicts with their Czech counterparts than the reverse. Japanese culture is highly-contextual. It is feasible that the frustration and complexity of Japanese-centric problems remain relatively unnoticed by their Czech colleagues. Another explanation is the concept of *hansei* or contemplation, the reflection-reviews introduced to TPS (Adler, Goldoftas, & Levine, 1999). These reviews compel the employees to self-reflect on their approach to a process or an activity. In doing so, the member is encouraged to ponder over ways to improve in the future, both for their own benefit, and that of others.

Two insights can be concluded. Japanese managers resemble their Czech colleagues when estimating the degree of conflict between

Czech managers and operators. Secondly, the amount of conflict between Czech managers and manual workers is lower than that between Czech and Japanese management. It is not however as low as that between Czech managers as "individuals" and Japanese management.

Problem resolution with all group members is *nemawashi*, literally "going around the roots", as in "preparing the groundwork". This process creates mutual understanding thorough consideration in decision-making, or behind-the-scenes consensus (Kageyama, 2010). Typically, Czech managers tend to complete the task without consideration of long-term implication.

6. Study Limitations and Further Research

The utilisation of surveys to measure cross-cultural values has its restrictions and limitations. Nasif, Al-Daeaj, Ebrahimi and Thibodeaux (1991) identifies seven problems with methodological research in cross-cultural studies that are applicable to this study as well: criterion problem as there does not exist an operational definition of culture; methodological simplicity as to ethnocentricity, functional equivalence and time frame; sampling issues as to the number of cultures included in a study or using a nation as a one study unit; instrumentation that involves translation, equivalence of variables and scales; data collection elements that include research setting, timing equivalence, etc.; data analysis specifically, the use of qualitative versus quantitative data, simple statistical analyses and others and the level of analysis due to the confusion between country level with individual correlations.

In addition, there exists yet another wave of criticism directed towards Hofstede's research (Roberts & Boyacigiller, 1984; McSweeney, 2002) focused on his methodological simplicity, sampling issues and level of analysis. Hofstede (2002) addresses these problems:

1. Surveys are not the most suitable method to measure cultural difficulties, but should not be the only source of information for cross-cultural studies;
2. Nations are currently the only units available to study cross-cultural differences;
3. Studying subsidiaries of one company might not provide information about the qualities of various cultures, but demonstrates clear differences between cultures;

4. Data collected from Hofstede's studies are not new, but are based on values that have formed through many centuries, and therefore do not change quickly;
5. Five dimensions are not enough to comprehensively describe a culture, but meaningful to introduce other dimensions if they do not correlate with the existing ones.

When applied to this current work, the above defence is pertinent. The research uses quantitative data with its inherent risks and benefits, with descriptive statistics applied where appropriate. Within the risks related to qualitative analysis, it is crucial to understand that various Japanese subsidiaries in the Czech Republic hold different corporate values, education and training standards, and working relationships and structures between Czech and Japanese managers. The same applies to the background of the various employees. As only Japanese companies were polled, the amount of experience of each employee within the company impacts the results. Therefore, it is possible to mitigate this complication through the use of a sufficient dataset and a qualitative analysis of each company to account for the differences between each. Despite its qualitative nature, acquisition of a larger dataset enabling the application of sophisticated analytical techniques (e.g. MANOVA, or General Linear model) would be also fruitful.

The survey focuses on hidden values within a managerial system. Results suggest that these values are shared between the two cultures to a certain degree but that the application of the values creates issues. The extant literature emphasises the importance of clear TPS rules (Liker, 2004) but the actual application of these rules depend highly on actual situations. In this case, the values are prone to the specific circumstances and managerial priorities.

It is crucial to distinguish between correlation and causation. TPS training influences the values of the questionnaire respondents due to their positions held in the company. In addition, certain job functions are prone to higher degree of conflict or are subject to a lower level of employee satisfaction.

Differences in preference and approach together coupled with the perception of problem resolution reflect the Hall (1959) concept of high and low contextual cultures. The Toyota Production System was developed as a high-

context system in a high-context society, and therefore members of the Czech society, a low-context culture, behave differently than system expectations.

Conclusions

The values measured in the survey and their subsequent results both confirmed expectations, and in some instances, produced unexpected conclusions. A predominant example of which is the value-based testing utilised for Hypothesis 1. From which, it is impossible to determine whether the values identified as inherent and native to TPS correspond to either Czech or Japanese cultures. Based on the applied methodology and its limitation, this study identifies the need for future research in the areas of TPS training standards in other countries, the involvement in other culturally based organisations, TPS deployment in non-Japanese companies and the like. Furthermore, both a quantitative survey-based analysis with a larger sample and a quantitative oriented case-study analysis within a smaller number of entities will clarify and further explore other issues identified in this study.

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Appendix 1: Survey questions / statements

Section	Questions / Statements
Basic information	Your nationality: Your age: Your position in the company: Name of the company: How long do you work in the current company:
Personal views	In order to be competitive, it is better to stick with current technology because it is proven If a solution doesn't solve a problem, it is important to try something else because it might be a wrong solution If the supervisors' requests are not clear, it is my fault because I do not understand them enough In determining how to achieve goals, employees should have a certain degree of freedom It is more efficient to hire a manager from external sources who knows "new approaches" If supervisor's ideas don't make sense, subordinates should at least try them out Persistent effort is the best way to achieve results In real life circumstances, the occasional adjustment of rules to overcome problems is unavoidable A company's rules should not be broken, even when the employee thinks breaking the rule would be in the company's best interest. It is more efficient to improve things radically, than to improve them gradually over time (with the same outcome).
Job satisfaction	Number of hours spent working Wage (monetary reward) Training and education Overall satisfaction
Conflicts	There exist many conflicts between you and management of other than your own nation. There exist many conflicts between Japanese management and Czech management. There exist many conflicts between Japanese management and Czech operators. There exist many conflicts between Czech management and Czech operators. It is more effective to solve work-related problems without the presence of managers from another nationality
Experience	Have you worked for a Japanese company before? Have you taken a cross-cultural skills seminar, course or presentation? Have you taken an official Toyota Production System seminar, course or presentation? Have you obtained unofficial Toyota Production System education? (on-the-job training, discussions with colleagues, short presentations etc.)

Abstract

THE TOYOTA PRODUCTION SYSTEM – CZECH AND NIPPON CULTURAL PERSPECTIVES**Richard Brunet-Thornton, Michal Koža, Vladimír Bureš**

This text focuses on the cultural relationships between Czech nationals employed at Japanese subsidiaries located in the Czech Republic. The paper analyses the possibilities of implementation of Toyota Production System within Japanese subsidiaries in Czech Republic. Moreover, it explores both the fit between the cultural values of Czech and Japanese management and the values incorporated in the Toyota Production System, and the various relationships of employees of both cultures at a managerial and operational level. In order to conduct the study, 79 companies were contacted, and survey responses from a total of 108 Czech and Japanese employees were collected. Using a self-administered questionnaire created in Czech, English and Japanese language, the findings of both common and divergent culturally-induced perspectives are analysed. Due to consistency with other cross-cultural studies Hofstede's cultural dimensions are used as foundation. The discussion correlates the results to the extent that they are deemed appropriate. Hall's low and high context models supplement the discussion, where applicable, to further explain issues relative to perception and communication. The dialogue is rich in the knowledge of Japanese methodologies of quality and overall management practice known in this case as the Toyota Production System. Data from the survey show that both Czech and Japanese employees have similar values related to work and neither job satisfaction nor number of conflicts is connected with TPS training. The manuscript concludes with both the list of existing research limitations that can be overcome in next studies, and an analysis of the need for further research within other cross-cultural frameworks.

Key Words: Cross-Cultural Management, Toyota Production System, Czech Republic.

JEL Classification: M14, M16, F23, O15.

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THE REPORTING OF NON-FINANCIAL INFORMATION AND THE RATIONALE FOR ITS STANDARDISATION

Peter Krištofík, Marzanna Lament, Hussam Musa

Introduction

CSR (*Corporate Social Responsibility*) is an important part of communication with stakeholders and a response to the need for non-financial reports. Regrettably the rules of non-financial reporting are not regulated – except by Directive 2014/95/EU, which will apply to large enterprises of public interest, and which must be introduced by the member states by 6 December 2016. CSR reports are drafted using a variety of principles and guidelines, which limits comparisons across enterprises, transparency and the assessment of progress made on the realisation of CSR goals.

Communication of an organisation's performance in its economic, social and environmental dimensions to the parties concerned is the principal function of the CSR reporting process. In this way, an enterprise demonstrates effectiveness of its actions in the area of social responsibility management. Thus, CSR reporting should be part of the process of creating an organisation's strategy, implementation of its action plans and evaluation of results, as well as a tool for improvement of a CSR management system, involving stakeholders and obtaining their contributions to functioning of an organisation (GRI Second G4 Public Comment).

CSR reporting is an integral part of the concept of corporate social responsibility, according to which business is an economic institution responsible for both providing social services and generation of profits (Berle, 1931; Dodd, 1932). The European Commission defines CSR as responsibility of enterprises for their impact on society (Green Paper, 2011). According to Caroll (1979), responsibility of enterprises encompasses four key areas: economic, legal, ethical and philanthropic, all of which should be integrated into strategic management. They allow an enterprise to reach an equilibrium of three dimensions of its

activities: economic, social and environmental (*Triple-Bottom-Line – Three P's Balance: Planet, Profit, People*). ISO 26000 states integrating assumptions of the corporate social responsibility into a management system is an effective way of implementing the concept. According to Sopkova and Raškovska (2012), at present the concept of social responsibility is an important part of corporate strategies. Horehajova and Marasova (2008) have identified three main expressions of the CSR:

- hierarchical – represents the conception of the CSR with the leading role of managers,
- participative – represents a more balanced form of the CSR which is based not only on managers but also on employees or their representatives,
- minimalist – consists of compulsory CSR imposed by the state and voluntary CSR that appears as a limited commitment of a company.

The scope and quality of information and reporting disclosures play an important part in building socio-economic relations of an enterprise and its environment and are addressed by systemic theories, referred to as open system theories (Deegan & Unerman, 2011). They help to explain causes of extended information disclosures by enterprises that go beyond financial reports to additionally include environmental and social issues. The concept of corporate social responsibility is based on the theory of stakeholders, which assumes an enterprise is linked to a variety of groups that affect its activities and in turn are under its impact (Freeman, 1984). In the classic version, this objective was referred to maximisation of total benefits, mainly to shareholders, from capitals committed to an enterprise. At present, it is seen in a broader perspective and applied to other stakeholder groups as well, which means value optimisation for stakeholders, i.e.

achievement of sustainable value, becomes the enterprise's objective – benefits to shareholders do not detract from benefits accruing to other stakeholders. Due to varying scopes of benefits to stakeholders, their differing perception and extents of knowledge, it appears reasonable to enhance information openness of enterprises, that is, to standardise principles of reporting, which would be bound to help limit the information asymmetry between diverse groups of stakeholders.

Therefore, the subject appears topical and requires a solution by indicating principles of reporting prevailing with socially responsible entities and by verifying reasons for which enterprises select certain reporting standards.

The aims of this paper are to examine the reasons for reporting non-financial information cited in the specialist literature and by enterprises preparing CSR reports, and to determine the benefits of standardising reports on non-financial information.

The following hypotheses are tested:

1. Communication with stakeholders is the fundamental reason for compiling reports on non-financial information (H1). This will be verified by analysing the literature, and the results of a survey of enterprises implementing CSR ideas.
2. The need to standardise CSR reporting, to ensure its transparency and clarity, is noted by reporting organisations (H2). This will be verified by analysing the principles of reporting by socially responsible entities in 2010–2014, by regions of the world and by company size, evaluated jointly or separately.

The rest of the paper is organised as follows. Section 1 reviews the recent theoretical and empirical literature on CSR reporting and outlines some of its general themes. Section 2 presents the surveyed reasons for CSR reporting in enterprises. Section 3 contains the arguments for standardization of non-financial information. Section 4 examines trends in CSR reporting, evaluates extent of its standardization and concludes.

1. Benefits of Corporate Social Responsibility (CSR) Reporting – Review of the Literature

CSR reporting, part of CSR strategy, provides for the evaluation and monitoring of progress made on objectives and supports

the implementation of action strategies via the commitment of employees and other stakeholders. Thus, it assures effective action, raises awareness of CSR issues and improves the image of an enterprise. It is above all an opportunity for the presentation of an enterprise and for communication with stakeholders.

These arguments are the chief causes of CSR reporting and the subjects of research. Emphasis on the benefits of CSR reporting prevails in the relevant literature. Some claim, however, that CSR reporting is unnecessary and fails to positively affect business and the image of enterprises (Maignam, 2001; Jones, Pelsmacker, Driesen, & Rayp, 2005; Comfort & Hillier, 2006). The literature on the causes and benefits of CSR reporting distinguishes the following reasons for reporting:

- meet requirements of stakeholders – a form of communication with stakeholders,
- improve image and reputation of enterprises,
- enhance brand value,
- be a major element of strategic management that helps achieve objectives and realise corporate strategy,
- increase profits and minimise risk,
- provide for comparative analysis of CSR.

According to Juscius, Sneideriene and Griauslyte (2014), there are two main reasons that drive the growing scale of CSR reporting:

1. Stakeholder pressure for reporting on CSR activities:
 - Government pressure,
 - NGO pressure,
 - Recommendations of financial organizations,
 - Investor pressure.
2. The benefits for business of reporting on CSR activities:
 - Reduce the risk of sanctions,
 - Increase productivity and profitability,
 - Open up communication channels (reputation, recruitment of talented employees, consumer loyalty, public support, easier access to capital).

A detailed analysis of reasons for CSR reporting is tabulated below.

The review of the literature on the benefits of CSR reporting shows that the information requirements of stakeholders were primarily indicated as the main reason for the reporting, at the initial development stages of the process of disclosing non-financial information. In time,

Tab. 1: Reasons for CSR reporting identified in its research literature (Part 1)

No.	Reasons for CSR reporting	Author	Year	Benefits of CSR reporting
1.	Satisfy the needs of stakeholders. Form of communication with stakeholders.	S.O. Idowu, B.A. Towler	2004	CSR reporting is the stakeholders' right to know about the company's contribution to increasing public welfare.
		B.A. Towler, S.O. Idowu	2004	80% of the 100 largest UK companies whose shares are quoted on the London Stock Exchange prepare CSR reports.
		D.O. Rourke	2004	Investors and shareholders also wish to obtain complete information about non-financial risks and liabilities.
		S.O. Idowu, I. Papolomon	2007	Stakeholders want to know how socially responsible the organization is.
		G. Birth et al.	2008	CSR reporting often promotes a company's stock price or leads to increased trade in its shares.
		L. Sweeney et al.	2008	CSR reports as one of the communication channels. Communication increases customer loyalty, expands public support for the company, eases the recruitment of talented employees, and decreases the risk of reputational damage.
		Y. Gao	2009	Companies listed on the stock exchange must also provide information about CSR in their financial statements.
		A.W. Sutantoputra	2009	CSR reports are extremely important in making business decisions.
		D.O. Rourke	2004	Growing demand for CSR investments.
2.	Improving the image and reputation of the company	M. Marais	2012	CSR communication is an essential element of CSR development between organizations.
		A.W. Sutantoputra	2008	Companies can develop a positive public image.
		C.A. Adams	2008	Companies try to enhance their reputation through CSR reporting (which is one form of image management).
3.	Creating brand value	D. Hildebrand et al.	2011	A company's communication, which is a set of associations arising between stakeholders in the company, affects its reputation.
		D.O. Rourke	2004	Consumers would agree to pay more for a garment made by a company guided by social and environmental standards.
		R. Chomvilailuk, K. Butcher	2010	There is a positive relationship between CSR and brand value creation – companies can gain a clear competitive advantage, for consumers are hoping that will match some social values, not just be a quality product at a low price.
		A. Ivanisevic Hernaus, A. Stojanovic	2015	From banks' point of view social responsibility in its comprehensive understanding is the way of creating long-term value – recognize business opportunities and manage risk more efficiently.

Tab. 1: Reasons for CSR reporting identified in its research literature (Part 2)

No.	Reasons for CSR reporting	Author	Year	Benefits of CSR reporting
4.	Increase profitability minimization of risk	D.O. Rourke	2004	CSR reports can serve as a self-regulatory instrument that helps to avoid future risks, because the problems are managed immediately after being identified.
		G. Birth et al.	2008	Due to CSR reporting the uniqueness of the product increases and companies can sell it at a higher price.
		J.D. Margolis et al.	2007	CSR reporting contributes to increasing enterprise value.
		M. Plumlee et al.	2010	Improvement of cash flow.
		E. Dimson et al.	2012	Increases stock prices in large enterprises.
		K. Lang et al.	2012	Improvement in financial liquidity.
		D. Martinčik, M. Polívka	2012	From the maximization of profits to the maximization of shareholder value.
5.	The element of strategic management	P. Jones et al.	2007	CSR is an important element of strategic management in helping companies to respond to changes in business environment.
		R. Tewari	2011	It is easier to confront a strong CSR communication risk than where a business has no idea about the extent, ways and accents of communication. Companies also may fail by choosing bad communication strategies.
		I. Pollach	2012	A company signalling CSR only in a public relations campaign, i.e. applying a superficial rather than a deep rooted strategy, loses the opportunity to get maximum benefits.
		R.E. Hinson, P. Kodua	2012	Only an integrated company's strategy which is unique and consistent with the company's activities CSR practice will be useful.
6.	Providing comparability of CSR reports	A. Douglas et al.	2004	Comparability and transparency.
		O. Delbard	2008	Comparability and transparency.
		V. Juscius, A. Sneideriene, R. Griauslyte	2014	Only responsibly and professionally prepared reports can act as powerful marketing tools and means of helping to adopt CSR practice in the marketing process.

Source: The authors' own compilation.

improved image and reputation, creation of brand value, as well as increasing profitability and minimising risks began to be cited. CSR became a major source of information for broadly-defined stakeholders, was used to manage enterprises and to generate benefits, including improved financial performance. These results were confirmed by the research

of Margolis et al. (2007) that pointed to a link between environmental reporting and goodwill; research by Dimson et al. (2012), who recorded growth in the share prices of large enterprises; by Plumlee et al. (2010) who demonstrated improved cash flows; and by Lang et al. (2012), who traced a link between CSR and financial liquidity. The need to standardise CSR reporting

in order to assure its comparability also began to be highlighted.

2. Reasons for CSR Reporting in the Opinions of Enterprises

The benefits of reporting non-financial information can be divided into two groups:

- Internal – reporting helps to streamline a range of processes in an enterprise by diagnosing problems. It also helps to maintain appropriate relations between market positioning of a product brand and its production, which influences the assessment of products and thus demand, market share and the profits of enterprises.
- External – reporting is a part of information policies that: reinforces the reliability of actions for and relations with stakeholders, helps to manage reputation risks and build competitive advantage.

These benefits are reflected in a survey by *EY and Boston College Center for Corporate Citizenship* (2013) with members of the *Center for Corporate Citizenship and Survey Sampling International (SSI)*. There were 579 respondents in total – 391 of whom work for organizations that issue a sustainability report, and 188 for organizations do not issue reports.

The reasons for drafting CSR reports in the opinion of the respondents are summarised in Tab. 2.

An analysis of the reasons for preparing CSR reports demonstrates:

- Transparency with stakeholders is the principal reason, selected by all the entities examined, proof that the reporting is an important element of information policies and reporting itself is seen as part of the information.
- The organisations surveyed perceive reporting as a major part of risk management, which contributes to more efficient operations (an internal benefit), to building of reliability with stakeholders and to competitive advantage (external benefits).
- CSR reporting is not currently considered to be a marketing tool that would build brand (amongst large enterprises – 4% of the organisations questioned disagreed, that rose to 5% in in finance and insurance). This reason should be expected to become more important over time.
- Some entities are not convinced it is reasonable to draft CSR reports (4% of large and 6% of smaller entities, 7% of public and 8% of private organisations). This means an

Tab. 2: Reasons for CSR reporting (%)

Reasons for CSR reporting	By company size		By company type		By company activity					
	Annual revenues over \$5 billion	Annual revenues under \$5 billion	Publicly traded for-profit company	Private for-profit company	FI	H	I	M	P	U
Transparency with stakeholders	79	59	79	60	69	56	73	83	81	89
Risk management	48	33	39	49	41	29	42	40	41	52
Stakeholder pressure	46	25	38	29	22	8	38	45	27	38
Competitive advantage	67	59	57	52	58	46	66	53	59	37
Brand/reputation	4	-	2	1	5	-	3	1	-	8
Company culture	6	7	7	8	12	5	10	6	5	5
Other	11	8	13	5	-	-	-	-	-	-
I'm not sure	4	6	7	8	-	-	-	-	-	-

Note: FI – Finance and Insurance, H – Health care and social assistance, I – Information, M – Manufacturing, P – Professional scientific and technical services, U – Utilities and mining.

Source: The authors' own compilation on the basis of EY (2013).

Tab. 3: Reasons why companies do not report (%)

Reasons why companies do not report	Publicly traded for-profit companies	Private for-profit companies
No one is asking for this information	26	45
We intend to do so, but have not have the resources to prepare a public report	51	18
We track this information internally, but elect not to publish it	19	29
We consider the information proprietary	6	18

Source: The authors' own compilation on the basis of EY (2013).

absence of obligatory reporting undermines its rationale; in addition, organisations employ other forms of communication with stakeholders and find them adequate.

It is also interesting to analyse the reasons for not compiling CSR reports by 30% of the organisations examined (Tab. 3).

The survey shows that 51% of public and 18% of private organisations which do not report indicated absence of resources on which to base reports – which unequivocally points to a clear need to define rules of preparation, or reporting standards. 45% of private and 26% of public entities that do not report indicated a lack of stakeholder requirements as a reason – proof that the idea of CSR and the significance of the associated information policies are misunderstood. These organisations do not realise the potential benefits they could attain by compiling CSR reports.

In general, the introduction of compulsory CSR reporting and the definition of its standards would contribute to the development of the idea of CSR and improve the information policies of enterprises by ensuring their comparability and legitimacy.

3. Standardisation of Non-Financial Information

The fundamental reason for standardising non-financial information reporting is to improve the transparency of social and environmental information supplied by reporting organisations, in order to assure its comparability both across sectors and internationally. Non-financial information disclosed assists enterprises with measurement, supervision and management with reference to financial performance and its impact on the public, and to help to satisfy

the needs of investors and other interested parties, including consumers, as far as access to information about public impact of an enterprise is concerned. It is therefore valuable both to enterprises themselves and to a wide range of external and internal stakeholders. Legal systems laying down guidelines for CSR reporting vary considerably, however, which impedes comparability across enterprises and prevents assessments of their actions and the CSR principles adopted. It would therefore be desirable to develop international rules of CSR reporting, including the format and scope of reporting, which would provide for a transparent message of CSR-related activities.

Two models of CSR reporting can be distinguished:

- voluntary, supported mainly by corporations (Rodríguez & LeMaster, 2007; Francis, Nanda, & Olsson, 2008; Dhaliwal, Li, Tsang, & Yang, 2009),
- compulsory, mainly promoted by non-government organisations, pressure groups and trade unions (Doane, 2002; Maguire, 2011; Ioannou & Serafeim, 2011).

Specialist literature offers arguments both for and against these models of CSR reporting. Proponents of compulsory reporting usually point to fostering of socially responsible management practices (Ioannou & Serafeim, 2011; Porter & Kramer, 2011) and transparency of the reports (Elkington & Spencer-Cooke, 1997; Gray, 2007; Doane, 2008; DeSilva, 2008; Lydenberg, Rogers, & Wood, 2010; Gray & Bebbington, 2010).

Opponents of compulsory reporting most frequently stress costs of the reporting, associated both with compilation of a report in itself and with monitoring of the reporting

process (Schaltegger, 1997; CGA, 2011; Centre for Strategy and Evaluation Services, 2011) as well as utility of the reports – fulfilment of only minimum regulatory requirements contributes to neglecting the process of gathering and analysing CSR data, which

leads to the undesirable outcome of low-quality information displacing high-quality information (Schaltegger, 1997; Herzig & Schaltegger, 2006). Obviously, each of the models has its advantages and disadvantages (Tab. 4).

Tab. 4: Advantages and disadvantages of compulsory and voluntary model of CSR reporting

Model of CSR reporting	Advantages	Disadvantages
Compulsory	<ul style="list-style-type: none"> ▪ comparability of reports, ▪ promotion of socially responsible management practices. 	<ul style="list-style-type: none"> ▪ inflexibility, ▪ individual nature of a reporting entity is not taken into consideration, ▪ limitation to minimum regulatory requirements and neglect of analysis of CSR data – lower quality of information, ▪ costs of reporting.
Voluntary	<ul style="list-style-type: none"> ▪ flexibility, ▪ individual nature of a reporting entity is taken into consideration. 	<ul style="list-style-type: none"> ▪ voluntary selection of: reporting periods, ratios to disclose, forms of presentation, ▪ incomparability of reports, ▪ incomplete.

Source: The authors' own compilation.

Analysis of global trends in CSR reporting shows about two thirds of 140 national standards, both compulsory and voluntary, identified in 30 countries are compulsory (KPMG, UNEP, GRI, University of Stellenbosch, 2010). The need to standardise principles and, at least partly (e.g. by industry), formats of CSR reporting is clear, therefore, as it would preserve flexibility and individuality of enterprises. It is difficult to subscribe to views of Herzig and Schaltegger (2006), however, that fulfilment of barely minimum regulatory requirements contributes to neglecting the process of gathering and analysing CSR data and leads to low quality of information. Introduction of compulsory reporting of non-financial information and its appropriate standardisation will contribute to improved quality of the information as it will provide for a standard presentation and comparability of data. It will not necessarily mean, as indicated by Herzig and Schaltegger (2006), neglecting the process of gathering and analysing CSR data. Conversely, maintenance of data transparency and legibility prevents all

data from being presented in external reports since too much information is as inadequate as its absence.

The practice of enterprises publicising their CSR initiatives shows this information is communicated via: mass media, financial reports including incomplete and random CSR information, social or integrated reporting. These are very different practices, a result of the lack of any standard regulations of CSR reporting globally, continentally or nationally. Enterprises compile CSR reports according to a variety of guidelines, e.g. the Global Reporting Initiative (GRI), ISO 26000, Global Compact, and the Carbon Disclosure Project. Reporting in line with the GRI standards is the most common (Lament, 2015; Marková, Lament, & Wolak-Tuzimek, 2015).

Research into corporate social responsibility by the European Commission (2013) points to two major problems:

- Insufficient transparency of non-financial information, due both to market imperfections and regulatory gaps, the

latter caused by an absence of appropriate legal regulations,

- Lack of diverse membership of management boards, a result of inappropriate recruitment practices for management bodies – recruitment of candidates with similar profiles. This contributes to ineffective control and supervision of management decisions, due to uniform viewpoints, value systems and competences, and restricts corporate innovation.

To address these issues, the European Commission has passed Directive 2014/95/EU, to be introduced by the member states by 6 December 2016 and applicable to the relevant businesses during the financial year beginning on 1st January 2017 or during the calendar year 2017.

Directive 2014/95/EU applies to large enterprises of public interest, i.e. quoted companies, insurance companies, banks and other organisations of public importance in view of their business profile and employing more than 500 staff on average in a financial year as at the balance closing date.

Pursuant to Art. 1 section 1 item 1 of EU Directive, the organisations concerned shall include in their reports non-financial information, including information required to understand the development, results and position of the organisation and the impact of its operations in respect of environmental and social issues, respect for human rights, counteracting bribery and corruption, including:

- A brief description of the business model.
- A description of practices with regard to such issues, including due diligence processes in place.
- The outcomes of these practices.
- The chief risks associated with these issues and with the operations of the organisation.
- The key non-financial performance indicators relating to a given business.

Notably, reporting organisations:

- Must, as a minimum, provide explanations if they do not follow any policies in respect of the foregoing issues.
- By way of exception, may omit information about expected occurrences or matters subject to negotiations in progress if their disclosure might have a seriously adverse effect on commercial position of an organisation while having no impact on a correct and objective understanding of

the development, performance and position of the organisation and the impacts of its activities.

- Can rely on national, EU or international framework principles. These should be specified in the circumstances.
- May be free from the duty to report non-financial information if they prepare a separate report which is published together with financial statements, or on the organisation's website, within six months of the balance closing date, and if financial statements contain a reference to such a report.

The regulations of the Directive are a step forward since they will help to standardise the rules of reporting non-financial information, and will improve its transparency and utility. They will largely apply to organisations that already compile such reports in the spirit of CSR, and a lack of detailed regulations would impede their comparability, since organisations could rely on different rules and guidelines. Thus, the Directive 2014/95/EU fills a regulatory gap and improves the usefulness of the information generated by organisations obliged to prepare CSR reports.

4. Reporting of Non-Financial Information in 2010–2014

Enterprises submitting CSR reports to GRI (*Global Reporting Initiative*) in 2010–2014 were surveyed in order to determine trends in CSR reporting and to evaluate the extent of its standardisation. The numbers and structure of the reports were analysed by region and by enterprise size. The criteria were considered jointly and separately, that is, rules of CSR reporting across global regions were examined by size of enterprise.

The figures concerning CSR reports are divided into reports following the GRI guidelines and those based on other rules and guidelines.

Principles of classifying organisations according to GRI assumptions are presented in Tab. 5.

The research implies:

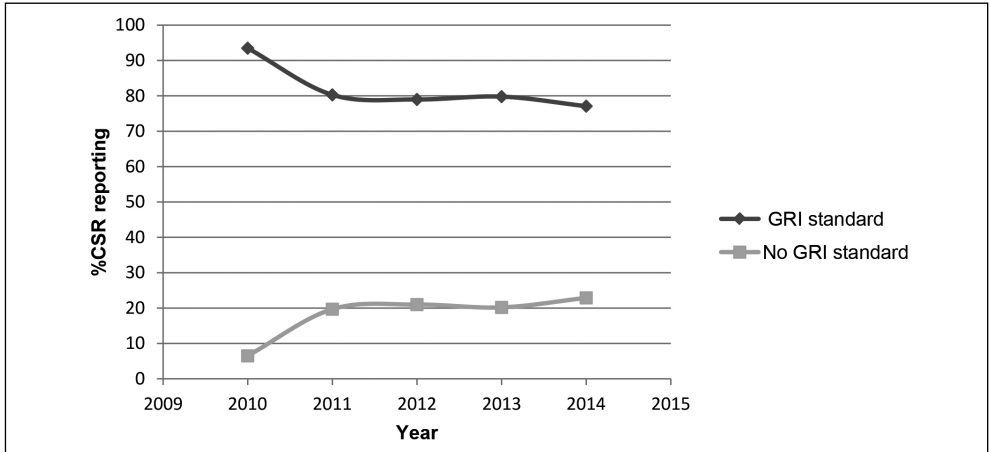
1. CSR reports commonly follow the GRI guidelines (93.5% organisations questioned in 2010, 79% in 2012, and 77.1% in 2014). A declining trend is observed, though, which suggests other reporting guidelines have been gaining popularity (2010 – 6.5%, 2012 – 21%, 2014 – 22.9%) – Fig. 1.

Tab. 5: Principles of classifying organisations according to GRI assumptions

Size of organisation	Headcount	Revenue	Balance sheet total
SME	Up to 250	Up to € 50m	Up to € 43m
Large	Above 250	Above € 50m	Above € 43m
MNE	Above 250 (of various nationalities)	Above € 50m	Above € 43m

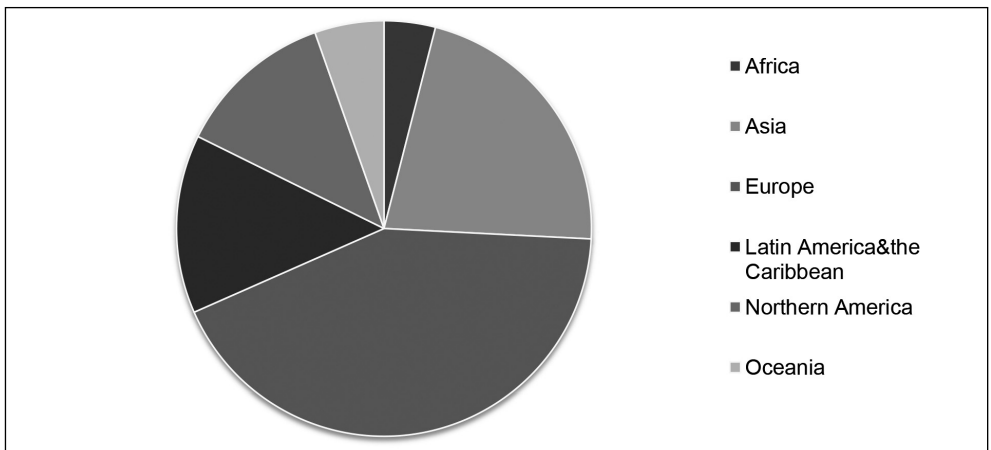
Source: GRI

Fig. 1: Changes of structure of CSR reporting in 2010–2014 (%)



Source: The authors' own research on the basis of GRI, Sustainability Disclosure Database

Fig. 2: Structure of reports submitted to GRI across regions in 2010 (%)

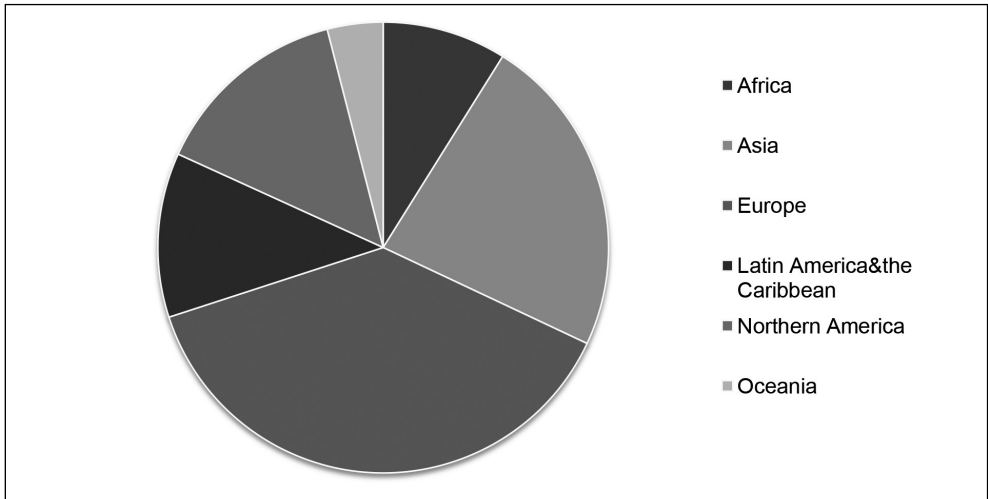


Source: The authors' own research on the basis of GRI, Sustainability Disclosure Database

2. A majority of CSR reports are compiled by enterprises in Europe (2010 – 42.6% of the organisations examined, 2012 – 38%, 2014 – 34.9%). A declining trend can be observed, though, which means CSR reporting is expanding intensely in other regions, mainly in Asia (2014 – 25.6% of the organisations surveyed, 2012 – 23.1%, 2010 – 21.8%) and Africa (2010 – 4%, 2012

– 8.9%, 2014 – 7.2%). Increasing numbers of reports are drafted in the remaining regions, yet the growth is not sufficient to affect the structure of the reporting (Latin America – approximately 13% of the reports in the entire period under analysis, North America – 13–14% depending on the year, Oceania – 3–5% depending on the year) – Figs. 2–4.

Fig. 3: Structure of reports submitted to GRI across regions in 2012 (%)



Source: The authors' own research on the basis of GRI, Sustainability Disclosure Database.

3. The reports are most frequently compiled by large enterprises, accounting for 68.6% in 2010, 64.9% in 2012, and 64% in 2014. Their share in the structure of reporting has been diminishing, proof that the reporting is gaining importance with other organisations, chiefly MNEs (in 2010 – 20% of the organisations questioned, 2012 – 23.8%, and 2014 – 25.2%). Numbers of reports submitted by SMEs are not sufficiently large to affect the structure of reporting. Their share reached: 11.4% in 2010, 11.3% in 2012 and 10.8% in 2014 – Tab. 6.

4. Large enterprises preparing CSR reports operate mainly in Europe (2010 – 42.7%, 2012 – 35.3%, 2014 – 35%) and Asia (2010 – 21.5%, 2012 – 24.9%, 2014 – 27.4%). The

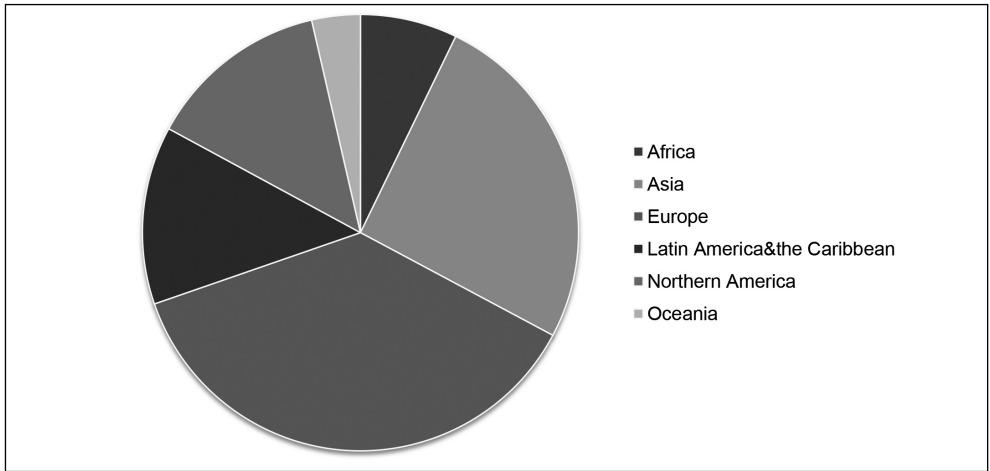
proportion of reporting enterprises has been climbing in Asia and falling in Europe – Fig. 5.

5. SMEs reporting under CSR, like large enterprises, chiefly operate in Europe (2010 – 60.6% of SMEs examined, 2012 – 55.6%, 2014 – 52.6%) – Fig. 6.

6. MNEs enterprises preparing CSR reports operate mainly in Europe (2010 – 32.4%, 2012 – 33.7%, 2014 – 34.9%) and Asia (2010 – 30%, 2012 – 34%, 2014 – 26.5%). The proportion of reporting enterprises has been climbing in Europe and falling in Asia – Fig. 7.

7. Both large enterprises, SMEs and MNEs draft their reports not only in compliance with the GRI guidelines, as the incidence of reporting based on other guidelines has been growing substantially:

Fig. 4: Structure of reports submitted to GRI across regions in 2014 (%)



Source: The authors' own research on the basis of GRI, Sustainability Disclosure Database.

Tab. 6: Structure of reports submitted to GRI in 2010–2014 by size of organisation

Specification	2010		2012		2014	
	quantity	%	quantity	%	quantity	%
SME – reporting as per GRI standard	241	11.0	357	9.0	359	8.0
SME – No GRI reports	8	0.4	89	2.3	127	2.8
Large – reporting as per GRI standard	1,413	64.6	2,033	51.6	2,296	50.9
Large – No GRI reports	88	4.9	524	13.3	589	13.1
MNE – reporting as per GRI standard	415	18.9	720	18.3	855	19.0
MNE – No GRI reports	24	1.1	217	5.5	281	6.2
Total reporting as per GRI standard	2,072	94.5	3,110	78.9	3,510	77.9
Total – No GRI reports	120	5.5	830	21.1	998	22.1

Source: The authors' own research on the basis of GRI, Sustainability Disclosure Database

- SME (2010 – 3.6%, 2012 – 20.4%, 2014 – 26.8%).
- Large enterprises (2010 – 7%, 2012 – 20.6%, 2014 – 21%).
- MNE (2010 – 6.4%, 2012 – 23.5%, 2014 – 29.9%) – Fig. 8.

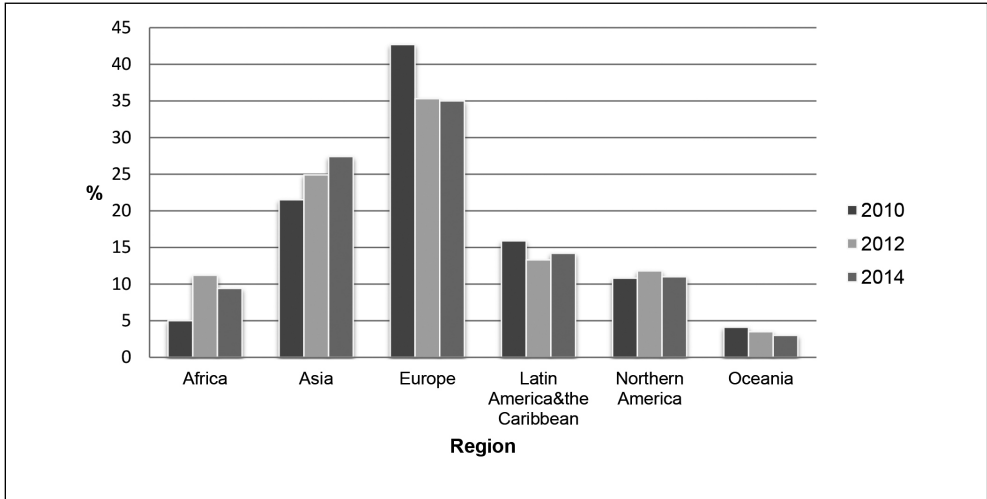
This tendency is reaffirmed by an analysis of the enterprises in those regions with the most

distinct growth:

- SME – in North American enterprises (2010 – 0.4%, 2014 – 5.4% of SMEs reviewed),
- Large enterprises – in European enterprises (2010 – 2.7%, 2014 – 7.4% of the large enterprises examined),
- MNE – in European enterprises (2010 – 2%, 2014 – 9.7% of MNEs surveyed).

Fig. 5:

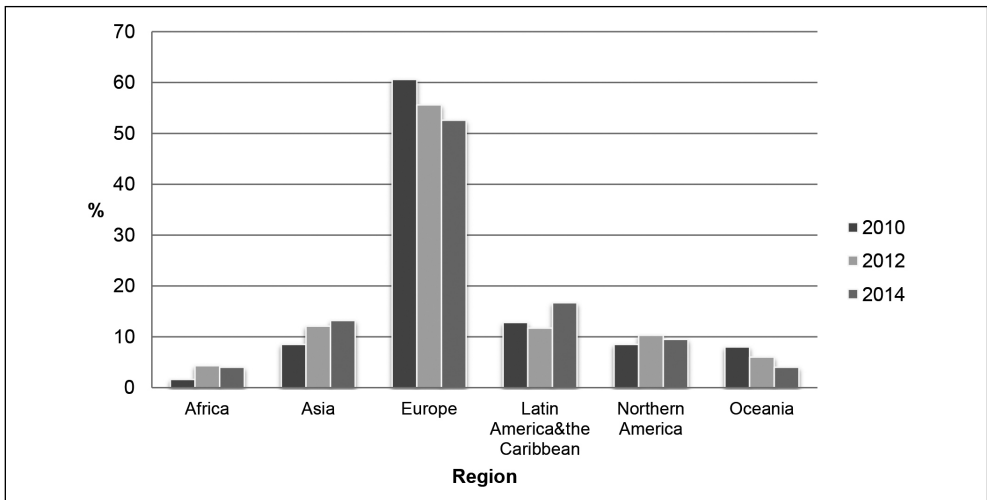
Structure of reports prepared by large enterprises submitted to GRI in 2010–2014 across regions (%)



Source: The author's own research on the basis of GRI, Sustainability Disclosure Database.

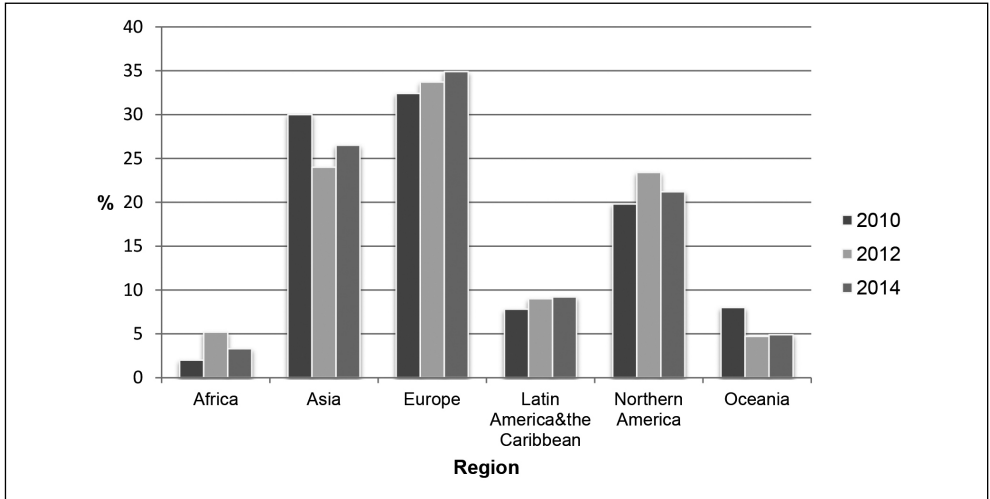
Fig. 6:

Structure of reports prepared by SME enterprises submitted to GRI in 2010–2014 across regions (%)



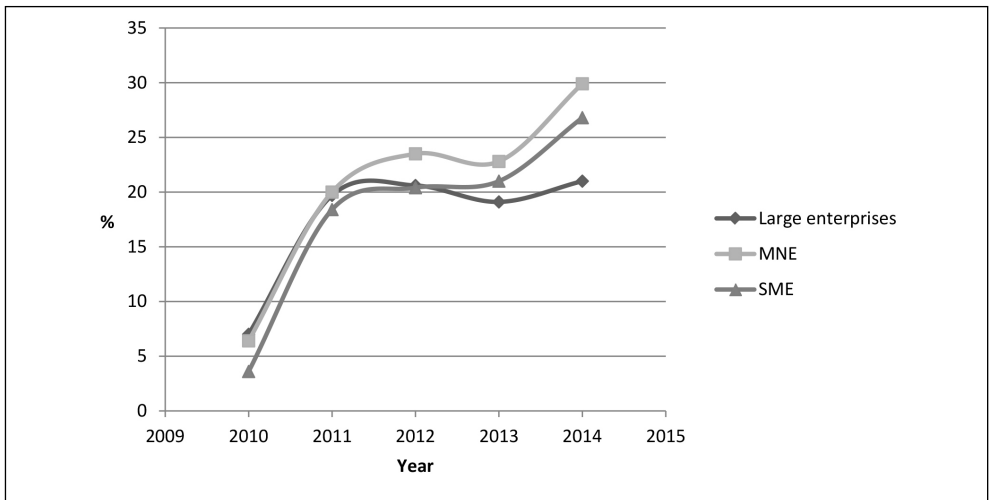
Source: The authors' own research on the basis of GRI, Sustainability Disclosure Database.

Fig. 7: Structure of reports prepared by MNE to GRI in 2010–2014 across regions



Source: The authors' own research on the basis of GRI, Sustainability Disclosure Database.

Fig. 8: CSR reporting as per standards other than GRI by enterprises size 2010–2014 (%)



Source: The authors' own research on the basis of GRI, Sustainability Disclosure Database.

Conclusion

Presentation of non-financial information helps to identify issues important to a given entity and the associated risks. This is additional information, not clearly visible in financial reports since, in accordance with the principle of significance, only events with significant impact on operations and financial standing of an enterprise should be disclosed. If an entity fails to recognise environmental and social developments as significant to its financial position and its activities, they will not be presented in financial statements either. Therefore, absence of publication duties concerning non-financial information should be regarded as contributing to emergence of the information asymmetry.

It should be pointed out not only reporting in itself but also its scope and principles are important to stakeholders, including investors. In order to limit the information asymmetry, non-financial data should be presented:

- to an adequate extent – it is important to determine types of information to be disclosed. Both information gaps and excess information are inadvisable, both producing similar effects. Information to be disclosed should be specified, therefore,
- in an appropriate form – to assure comparability and transparency of the disclosures,
- according to standards defined e.g. for specific industries.

Non-financial information must be said to constitute an important part of the decision-making process in an enterprise, therefore, lack of a duty to report it contributes to emergence of the information asymmetry, since various entities hold information of different quality. In order to limit the information asymmetry, the duty of reporting non-financial information should be introduced and standards of non-financial reporting must be laid down.

The literature review and empirical research into motivations for CSR reporting and trends in reporting of non-financial information have helped to verify the hypotheses formulated initially:

1. Communication with stakeholders is the fundamental reason for reporting non-financial information. This is confirmed by the literature review, with most authors believing this is the prime reason for preparing CSR reports. Authors indicating other motivations treat it as the fundamental

cause which obtains jointly with other motivations.

This is also supported with results of the survey among enterprises compiling CSR reports – all the enterprise groups queried commonly point to this reason for CSR reporting.

2. The need to standardise CSR reporting to ensure its transparency and clarity is noted by reporting organisations. This is proven by surveys of organisations drafting CSR reports – approximately 80% of all reports follow the GRI guidelines, which thus become the most popular rules of reporting. This means the reporting enterprises wish their reports to be clear, transparent and comparable and for their stakeholders to be able to fully satisfy their information requirements. This is also evidence of the care for good relations with stakeholders, who receive standardised data although this is not binding on enterprises. A growing tendency for CSR reporting to follow guidelines other than the GRI can also be noted in the entire period under analysis – another argument for specifying rules of reporting and introducing standards. This will not necessarily be a single compulsory standard, yet a model report would need to be set to assure transparency and comparability.

This is addressed by Directive 2014/95/EU, applicable only to large enterprises employing more than 500 staff, nonetheless it fills a regulatory gap, will contribute to improved comparability of results and will improve utility of information generated by enterprises drafting CSR reports.

It would be reasonable to continue the research by reviewing norms and standards of CSR reporting by enterprises active in particular industries, as this would help to define their characteristic norms and standards that could subsequently be standardised.

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Abstract

THE REPORTING OF NON-FINANCIAL INFORMATION AND THE RATIONALE FOR ITS STANDARDISATION**Peter Krištofik, Marzanna Lament, Hussam Musa**

CSR (Corporate Social Responsibility) is an important part of communication with stakeholders and a response to the need for non-financial reports. Regrettably, the rules of non-financial reporting are almost not regulated. CSR reports are drafted using a variety of principles and guidelines, which limits comparisons across enterprises, transparency and assessment of progress.

The reasons for reporting non-financial information cited in the specialist literature, and by enterprises preparing CSR reports are examined, and the benefits of standardising reports of non-financial information are determined.

The literature review and empirical research into the motivations for CSR reporting and the trends in reporting of non-financial information helped to verify the initial hypotheses:

1. Communication with stakeholders is the fundamental reason for reporting non-financial information. This is confirmed by the literature review, with most authors believing this is the prime reason for preparing CSR reports. Authors indicating other motivations still treat it as the fundamental cause which exists jointly with other motivations.

2. The need to standardise CSR reporting to ensure its transparency and clarity is noted by reporting organisations. This is proven by surveys of organisations drafting CSR reports – approximately 80% of all reports follow the GRI guidelines. This means the reporting enterprises wish their reports to be clear, transparent and comparable and for their stakeholders to be able to fully satisfy their information requirements. This is also evidence of the care for good relations with stakeholders, who receive standardised data although this is not binding on enterprises. A growing tendency for CSR reporting to follow guidelines other than the GRI can be noted in the entire period under analysis. This will not necessarily be a single compulsory standard, yet a model report would need to be followed to assure transparency and comparability.

The Regulations of the Directive 2014/95/EU are a step forward since they will help to standardise rules of reporting non-financial information and will improve its transparency and utility.

Key Words: *Corporate Social Responsibility, reporting, management.*

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FINANCIAL TRANSACTION TAXATION IN AGENT-BASED SIMULATION

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Introduction

The need for a financial transaction tax (FTT) has been attracting more attention because of the financial crisis in 2008, although ideas about introducing a new tax on financial sector have been debated at various times over the last thirty years. Due to the crisis' different effects on different countries, consensus has not yet been achieved, although Keynes (1936) proposed a FTT for the stock market and Tobin (1978; 1996) recommended a FTT for the foreign-exchange market. Schulmeister et al. (2008) describe a general FTT, Keen (2011) explores the possible purposes and broad design of distinctive tax measures for financial institutions, focusing especially on the potential role of corrective taxation. Next, Schulmeister (2014) outlines reasons to introduce a FTT. First, the economic crisis was deepened by the instability of stock prices, exchange rates and commodity prices. This instability might be dampened by such a tax. Second, as a consequence of the crisis, the need for fiscal consolidation has increased substantially. A FTT would provide governments with substantial revenues. Third, the dampening effects of a FTT on the real economy would be much smaller than other tax measures such as increasing the VAT. Szarowská (2014) notes that the main expectation is that a new FTT could dissuade harmful speculation by financial markets and that its revenues would appear to be a fair way of recovering the costs of the crisis.

On the other hand, Shackelford et al. (2010) and Rieger (2014) present opponents' arguments, such that the high trading volume observable in financial markets does not cause price volatility and is in fact a stabilizing influence. He argues that the introduction of a FTT would lower liquidity; as a result, trades would have a larger impact on prices, which,

in turn, would increase volatility. Thus, from the point of view of opponents, a FTT could destabilize financial markets.

The aim of this paper is to investigate the impact of FTTs on the stability of the financial market. Because FTTs may be defined in different ways, assets are defined as tax objects in this paper. We use the model developed by Westerhoff (2009) but extended it to FTTs and consequential transaction-cost influences. An agent-based model was implemented and managed as a simulation in the netLogo development platform to provide the research basis for simulation experiments. In the model, virtual market participants in the form of intelligent agents traded one type of asset.

This paper is structured as follows: Section 1 briefly summarizes the main facts about FTTs and its relationship with transaction costs and financial sector stability while introducing the agent-based methods for modeling and simulation. Section 2 presents the original agent-based model and its extension. Section 3 presents the simulation results.

1. Theoretical Background

This section introduces a short literature review and the theoretical basis for the concepts used in this paper.

1.1 Financial Transaction Taxation

The transaction costs for financial markets are mainly the costs of obtaining and interpreting information, the time required to make decisions, as well as various types of fees, etc. Transaction costs, according to Burian (2010), are often viewed as negative phenomena, but there are cases in which increases in transaction costs can be viewed positively and contribute to the stability of the market. Increases in transaction costs may also occur in the form of non-market regulation

such as taxes. Tobin (1978) suggested that all short-term transactions in foreign-exchange markets should be taxed at a low fixed rate (the proposal was later identified as the so-called Tobin tax) because currency speculation can lead to the sudden withdrawal of currencies from circulation to artificially increase prices. The results, according to Tobin, would avoid short-term currency speculation and stabilize the market.

The question of whether new taxes should be levied on the financial sector to complement regulations and bank levies has been a topic since the beginning of the economic crisis. Generally, the concept of FTTs is based on the application of a tax to all financial transactions, in particular, those carried out in organized markets, such as the trade of equity, bonds, derivatives, currencies, etc. It would be levied at a relatively low statutory rate and would apply each time the underlying asset was traded. The tax collection or the legal tax incidence occurs – as far as possible – via the trading system that executes the transfer.

Although the FTT is connected to and understood as a Tobin tax in most cases, several different tax instruments are generally referred to as “financial transaction taxes.” Matheson (2011) defines a securities transaction tax (STT) as a tax on trades in all or certain types of securities (equity, debt and their derivatives). A currency transaction tax (CTT) is a securities transaction tax imposed specifically on foreign exchange transactions and possibly also their derivatives: currency futures, options and swaps. It is often used as pecuniary foreign exchange control in lieu of administrative and regulatory measures. A capital levy or registration tax is imposed on increases in business capital in the form of capital contributions, loans and/or issuance of stocks and bonds. The registration tax may encompass all forms of business capital or be limited to a particular type of capital (e.g. debt or equity) or form of business, such as corporations or partnerships. A registration tax may also be charged to individuals on bank loans and/or mortgages. A bank transaction tax (BTT) is a tax on deposits and/or withdrawals from bank accounts. Most commonly seen in Latin American and Asia, BTTs are usually imposed on an ad valorem basis as a percentage of the deposit or withdrawal. BTTs effectively tax purchases of goods and services, investment

products and factor payments paid for with funds intermediated by banks. Shaviro (2012) summarizes the history of the FTT.

The motivation for the FTT is based on two claims about the tax. First, it improves the functioning of financial markets through curbing harmful short-term speculation and reducing volatility by making it less profitable. Second, it raises significant amounts of revenue even if the tax rate is very low (for details look at Nerudová and Dvořáková (2014)).

As was already noted, there are several types of FTTs, and each has its own purpose. Some FTT types have already been implemented, whereas some are still only proposals. Griffith-Jones and Persaud (2012) state that 40 countries had FTTs in operation, raising \$38 billion (€29bn) in 2011. Other arguments for their adoption include progressivity and ease of implementation. However, as Matheson (2011) notes, experiences regarding revenue from securities transaction taxes over the past two decades have varied widely.

There is currently a growing number of empirical studies analyzing the possibility of using FTTs to regulate the financial market and enhance financial sector stability. In line with the European Commission’s expectation (2010), FTTs should heighten the efficiency and stability of financial markets and reduce their volatility, as well as the harmful effects of excessive risk-taking, which can create negative externalities for the rest of the economy. Unfortunately, Habermeier and Kirilenko (2001) conclude that in most circumstances, transaction taxes or their equivalents, such as capital controls, can have negative effects on price discovery, volatility, and liquidity, and lead to a reduction in market efficiency.

Phylaktis and Aristidou (2007) examine the effects of security transaction taxes on volatility. Tab. 1 shows the results of earlier empirical studies based on different market samples and periods. The authors focus on whether the tax has a greater effect on highly traded stocks because it penalizes entering and exiting the market, and whether the effect depends on the state of the stock market. Their results highlight that effects are stronger during bull periods and for highly traded stocks, but that volatility increases instead of decreases, as intended by the proponents of transaction taxes.

Tab. 1: Volatility effects of transaction taxes

Author	Sample (Market)	Sign of Effect
Roll (1989)	23 countries	Zero
Umlauf (1993)	Sweden	Positive
Jones and Seguin (1997)	U.S.A.	Positive
Saporta and Kan (1997)	United Kingdom	Zero
Hu (1998)	Hong Kong, Japan, Korea, Taiwan	Zero
Green, Maggioni and Murinde (2000)	United Kingdom	Positive
Hau (2003)	France	Positive

Source: Phylaktis and Aristidou (2007)

Schäfer (2012) argues that FTTs complement financial market regulation. With FTTs, governments have an additional instrument for influencing trading activity. FTTs can reduce regulatory arbitrage, flash trading, overactive portfolio management, excessive leverage and speculative transactions of financial institutions. If, contrary to expectations, harmful transactions will not be curbed, FTTs at least generate large tax revenues that can help cover the costs of a financial crisis.

Rieger (2014) studies the impact of a financial transaction tax on trading volume and asset price volatility in a model with heterogeneous beliefs. He studies a tax on bond and asset purchases. The simulated model shows that the introduction of a transaction tax results in a lower trading volume and thereby less liquid financial markets because of the decreased liquidity and increased volatility of the stock market.

Schulmeister (2014 and 2015) and DeMooij and Nicodeme (2014) summarize the main arguments in favor of and against FTTs and provides empirical evidence about the movements of the most important asset prices. He shows that their long swings result from the accumulation of extremely short-term price runs over time. Therefore, a (very) small FTT – between 0.1 and 0.01 percent – would mitigate price volatility not only over the short-run but also over the long run. Next, he combines empirical results with an analysis of technical trading systems and formulates a hypothesis about trading behavior and asset price dynamics (the “Bull-Bear-Hypothesis”). On the one hand, asset trading has become progressively more short-term-oriented (“faster”); on the other

hand, the phenomenon of long-term trends (“bulls” and “bears”) has also become more pronounced. This coincidence can be explained by the fact that long-term trends are the results of the accumulation of very short-term price runs that are exploited and strengthened by the use of ever “faster” trading systems. The results of his research suggest that the FTT should be levied on all transactions of any type of financial asset. The “faster” an asset is traded and the riskier it is, the more will the FTT increase transactions costs. At the same time, holding a financial asset will not be burdened by the FTT. Hence, an FTT with a uniform rate will specifically dampen very short-term speculation in derivatives because the effective tax burden relative to the cash (margin) requirement increases with the leverage factor.

Finally, Szołno-Koguc and Twarowska (2014) contest the hypothesis that FTTs reduce the scale of market speculation, which is not confirmed by the results of empirical studies. To prove this hypothesis, the proponents of the tax carry out simulations based on econometric models. Regardless of the testing method, the analytical results are inconclusive. These doubts concern not only whether FTTs affect the scale of market speculation and price volatility of financial instruments but also whether the impact is positive or negative.

1.2 Agents and Agent-Based Models

The roots of this research lay in computational social science, which involves the use of agent-based modeling and simulation (ABMS) to study complex social systems (Kaegi, 2009; Epstein & Axtell, 1996). ABMS is a core technique used

by this paper to study financial system. ABMS consists of a set of agents and a framework for simulating their decisions and interactions. Although the ABMS shares many traits with other models, the ABMS is differentiated by its focus on finding the set of basic decision rules and behavioral interactions that can produce the complex results experienced in the real world (Sallach & Macal, 2001). ABMS tools are designed to simulate the interactions of large numbers of individuals to study the macro-scale consequences of these interactions (Tefatsion, 2001).

The intelligent agent technology used in this paper has a long history in economic theory, mainly in the ideas of Hayek (1949) and Simon (1955). Hayek (1949) claims that the economic system should be studied from the bottom. He stresses the need to look at the market economy as a decentralized system that consists of mutually influencing individuals (the same goes for financial markets). This approach contrasts with the assumption of perfect information, which is used in traditional equilibrium analysis. In the theory of complex systems, where ABMS belongs, this idea is the primary principle (Macal & North, 2006). Agents, unlike in a classical equilibrium approach, do not have perfect information about all processes in the system.

The market participants in multi-agent models use technical and fundamental analysis to assess financial markets. Multi-agent financial market models have strong empirical foundations. This paper uses and extends the original model developed by Westerhoff (2009), combining the basics from three known agent-based financial market models.

In the first model, Brock (1997 and 1998) chooses a continuum of financial market participants endogenously between different trading rules. The agents are rational in the sense that they tend to pick trading rules that have performed well in the recent past, thereby displaying some kind of learning in their behavior. The performance of trading rules is measured as a weighted average of previously realized profits, and the relative importance of the trading rules is derived via a discrete choice model. Contributions developed in this manner are often analytically tractable. Moreover, numerical investigations reveal that complex endogenous dynamics may emerge due to an ongoing evolutionary competition between trading rules. In such a setting, agents interact

only indirectly with one another: their orders have an impact on price formation, which, in turn, affects the performance of trading rules and agents' selection of rules. Put differently, agents are not directly affected by the actions of others.

Kirman (1991; 1993) introduces an influential opinion formation model with interactions between a fixed numbers of agents. Agents may hold one of two views. At each moment in time, two agents may meet at random and there is a fixed probability that one agent may convince the other agent to adopt his opinion. In addition, there is also a small probability that an agent will change his opinion independently. A key finding of this model is that direct interactions between heterogeneous agents may lead to substantial opinion swings. Applied to a financial market setting, one may therefore observe periods in which either destabilizing technical traders or stabilizing fundamental traders drive the market dynamics. Agents may change rules due to direct interactions with other agents but the switching probabilities are independent of the performance of the rules.

The models of Lux (1998) and Lux and Marchesi (1999) also focus on the case of a limited number of agents. Within this approach, an agent may either be an optimistic or a pessimistic technical trader or fundamental trader. The probability that agents switch from having an optimistic technical attitude to a pessimistic one (and vice versa) depends on the majority opinion among the technical traders and the current price trend. For instance, if the majority of technical traders are optimistic and if prices are increasing, the probability that pessimistic technical traders turn into optimistic technical traders is relatively high. The probability that technical traders (either being optimistic or pessimistic) switch to fundamental trading (and vice versa) depends on the relative profitability of the rules. However, a comparison of the performance of the trading rules is modeled in an asymmetric manner. Although the attractiveness of technical analysis depends on realized profits, the popularity of fundamental analysis is a result of expected future profit opportunities. This class of models is quite effective at replicating several universal features of asset price dynamics.

Westerhoff's (2009) model combines key ingredients of the three aforementioned approaches to build a simple model that is

able to reproduce the stylized facts of financial markets. Direct interactions between a numbers of agents are considered. To avoid asymmetric profit measures, he defines a fitness function. The attractiveness of a rule is approximated by a weighted average of current and past myopic profits.

2. Methodology

Simulating financial markets is a new, quickly growing research area with two primary motivations. The first motivation is the need to provide a development platform for the ever-increasing automation of financial markets. The second is the inability of traditional computational mathematics to predict market patterns that result from the choices made by interacting investors in a market.

The agent-based model simulating the financial market developed by Westerhoff (2009) was chosen for the implementation. Two base types of traders are represented by agents:

- Fundamental traders, whose reactions are based on the fundamental analysis. They believe that asset prices in long term approximate their fundamental price. They buy assets when the price is under the fundamental value.
- Technical traders, who decide using technical analysis. They believe that prices tend to move in trends and by their extrapolating there comes the positive feedback, which can cause the instability.

Price changes reflect current excesses of demand. These excesses express the amount of orders submitted by technical and fundamental traders each turn and the rate between their orders evolves over time. Agents regularly meet and discuss their trading performance. One agent can be persuaded by the other to change its trading method if the initial method's rules are less successful than the other's. Communication is a direct conversation between one agent and others. The agents meet randomly and there is no special relationship between them. The success of rules is represented by a current and past profitability. To emphasize this, the model assumes the ability of traders to define the fundamental value of assets and their rational behavior.

The price reflects the relationship between assets that have been bought and sold in a turn (trading period), and the price change caused

by these orders. This can be formalized as a simple log-linear price impact function:

$$P_{t+1} = P_t + a(W_t^C D_t^C + W_t^F D_t^F) + \alpha_t, \quad (1)$$

where a is a coefficient of a positive price change, D^C are the orders generated by technical agents, and D^F are the orders of fundamental traders. W^C and W^F are weights of agents using the technical and fundamental rules, respectively. The weights reflect the current ratio between the technical and fundamental agents. The α coefficient brings randomness to Equation 1 because the model is a single representation of a real financial market. It is an independently distributed random variable with a zero average and a constant standard deviation σ^α .

As mentioned earlier, the technical analysis extrapolates the price trends, which means when prices grow, trading agents buy the assets. As a result, the formalization for technical order rules can be:

$$D_t^C = b(P_t - P_{t-1}) + \beta_t \quad (2)$$

The reaction parameter b has a positive influence and represents the agent's sensitivity to price changes. The difference in brackets reflects the trend and β is a parameter from the normal distribution with a zero average and a constant standard deviation σ^β .

The theory of fundamental analysis argues that asset prices can differ from the fundamental price in the short term. However, the theory assumes that asset prices converge to the fundamental value in the long run. Because the fundamental analysis suggests buying (or selling) assets when the actual prices are under (or above) the fundamental value, the fundamental business rules can be formalized as follows:

$$D_t^F = c(F - P_t) + \gamma_t \quad (3)$$

where c is the parameter of a positive reaction and the parameter F is a fundamental value. In our case, we keep this value constant to simplify the implementation as much as possible (In our implementation, $F = 0$). Parameter γ is a random variable with a normal distribution, a zero average and a constant standard deviation σ^γ .

If we say that N is a total number of agents and K is a number of technical traders, then we define the weight of technical traders as follows:

$$W_t^C = K_t/N \quad (4)$$

And the weight of fundamental traders as:

$$W_t^F = (N - K_t)/N \quad (5)$$

The number of technical and fundamental traders is set out as follows. As in Kirman's (1991; 1993) models, two traders randomly meet at each point in time. The probability that the first trader adopts the view of the second trader is $(1-\delta)$. In addition, there is a small probability ε that the trader changes his mind independently of the others. Contrary to Kirman (1991; 1993), we say that the probability of a trader changing views is asymmetric and depends on the current and past profitability of the rules. This is indicated by the attractiveness variables A^C and A^F , which are defined later. The assumption is that the technical trading rules generated higher profits in the past than the rules used by fundamental traders. It is therefore more likely that a technical trader will persuade a fundamental trader than vice versa. Likewise, when the fundamental rules are more profitable than the technical rules, the chance of a successful meeting of a fundamental trader with a technical trader becomes higher. Therefore, we define the probability K as follows:

$$K_t = \begin{cases} K_{t-1} + 1 & \text{with probability } p_{t-1}^+ = \\ K_{t-1} - 1 & \text{with probability } p_{t-1}^- = \\ K_{t-1} & \text{with probability } 1 + p_{t-1}^+ - p_{t-1}^- \end{cases} \quad (6)$$

$$= \frac{N - K_{t-1}}{N} \left(\varepsilon + (1 - \delta) \frac{F \rightarrow C}{t-1} \frac{K_{t-1}}{N-1} \right)$$

$$= \frac{K_{t-1}}{N} \left(\varepsilon + (1 - \delta) \frac{C \rightarrow F}{t-1} \frac{N - K_{t-1}}{N-1} \right),$$

$$- p_{t-1}^-$$

where the probability that a fundamental agent becomes a technical one is:

$$(1 - \delta) \frac{F \rightarrow C}{t-1} = \begin{cases} 0.5 + \lambda & \text{for } A_t^C > A_t^F \\ 0.5 - \lambda & \text{otherwise} \end{cases} \quad (7)$$

and the probability that a technical agent becomes a fundamental one is:

$$(1 - \delta) \frac{C \rightarrow F}{t-1} = \begin{cases} 0.5 - \lambda & \text{for } A_t^C > A_t^F \\ 0.5 + \lambda & \text{otherwise} \end{cases} \quad (8)$$

A success (fitness of the rule) is represented by the past profitability of rules, which are formalized as:

$$A_t^C = (\exp[P_t] - \exp[P_{t-1}])D_{t-2}^C + dA_{t-1}^C \quad (9)$$

for the technical rules, and:

$$A_t^F = (\exp[P_t] - \exp[P_{t-1}])D_{t-2}^F + dA_{t-1}^F \quad (10)$$

for the fundamental rules. Agents use the most recent performance (at the end of the A^C formula with respect to A^F). The orders submitted in a $t-2$ period are executed at the prices started in the $t-1$ period. The profits are calculated accordingly. Agents have memory, which is represented by the d parameter ($0 \leq d \leq 1$). If $d = 0$, then the agent has no memory. With higher values for the d parameter, the influence of profits on the rule fitness rises.

The stability of financial markets is measured by price volatility (the stable the market is, the smaller are price differences are at a given time). The entrance of transaction costs in the form of FTTs will have direct effects on asset prices. The original model was changed to include this aspect into the calculated price.

$$P_{t+1} = P_t + a(W_t^C D_t^C + W_t^F D_t^F) + FTT + \alpha_t \quad (11)$$

where FTT is a value of the transaction costs, which are constant during the simulation experiments. Because the tax is an out-of-trade factor, all agents will be affected in the same way. In general, there can be other transaction costs besides taxes (e.g., the costs of obtaining the information). We expect that increases in $FTTs$ should have the following results:

- Price **increases** will stimulate the usage of technical rules. Their influence on expected future profit opportunities (as the fundamental value of the asset) is irrelevant. They depend on the state of the company rather than transaction costs.
- In a **short time**, price increases will attract technical traders. However, after the realization of profits, prices will decrease and fundamental traders will start to dominate. This will lead to market stabilization (price volatility will be lower).

3. Results and Discussion

On the basis of Westerhoff's model (2009) an agent-based model was implemented and managed as a simulation in netLogo development platform to provide the research basis for simulation experiments. Virtual market participants trade with one type of asset and are involved in the model as intelligent agents. Agents follow technical and fundamental trading rules to determine their speculative investment positions. We consider direct interactions between speculators, due to which they may decide to change their trading behavior (Šperka & Spišák, 2012; Šperka & Spišák, 2013). To be more accurate, 20 simulations were processed. The averaged values are plotted in graphs below.

3.1 Original Model Results

The model was parameterized using the original parameterization from Westerhoff (2009). Nevertheless, the number of agents (N) was set to 10.000 to obtain more relevant results. The parameters are:

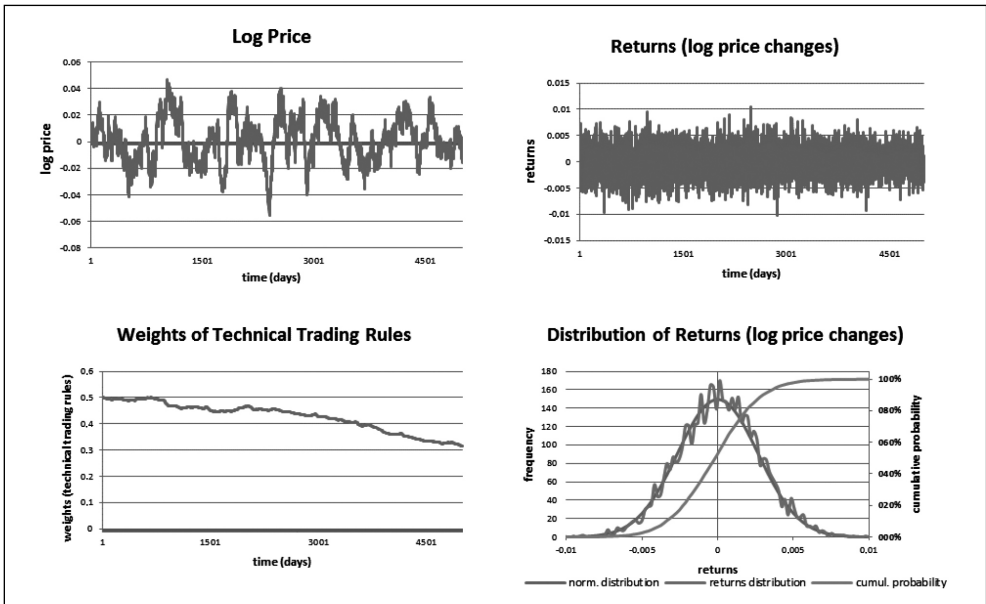
$$a = 1, b = 0.05, c = 0.02, d = 0.95, \lambda = 0.45, \quad (12)$$

$$\varepsilon = 0.1, \sigma^a = 0.0025, \sigma^b = 0.025, \text{ and } \sigma^c = 0.0025$$

With these parameters, the model is calibrated to the daily data. The number of turns with respect to periods of time is 5,000 days, which presents more than 13.5 years. Westerhoff (2009) found that increases in the number of agents reduced the model's dynamicity and price volatility, whereas agents' behavior tended to be fundamental. This can be reduced by adding more communication turns. We decided to give 1% of agents the opportunity to talk, which had a positive influence on the model's dynamicity.

Price values are on the top left of figures 1, 2 and 3. The top-right graph represents changes in asset prices at a given point in time. The bottom-left graph shows the weights of technical trading rules (in the long run, there is a tendency to prefer fundamental to technical trading rules in figure 1). The bottom-right graph includes the distribution of returns (which are log price changes) compared with the normal distribution. In figure 1, the asset prices oscillate over a narrow interval, as does

Fig. 1: Simulation results – original model



Source: own

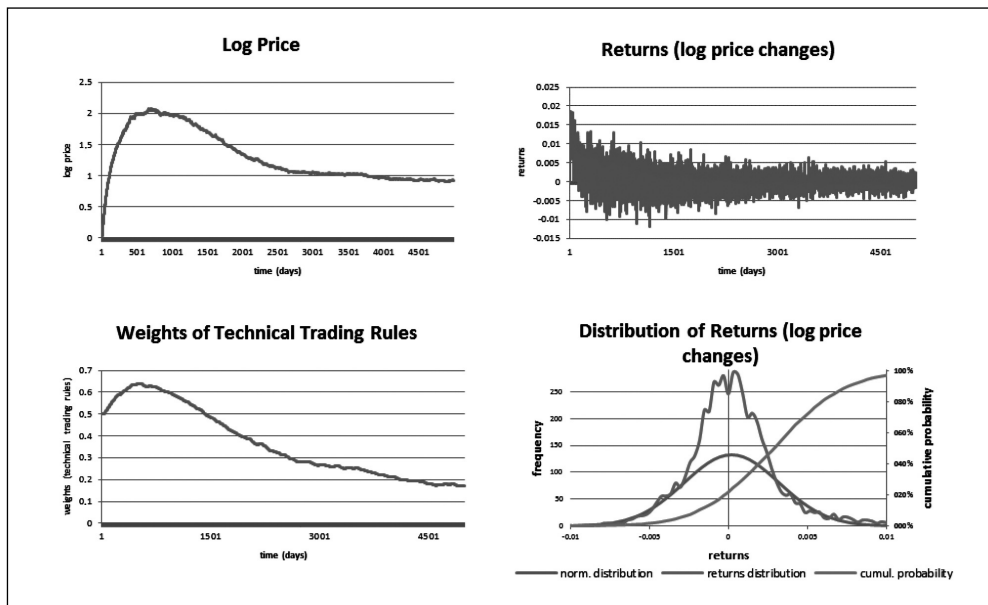
volatility. The distribution of returns follows the normal distribution curve almost perfectly. This situation is similar to the real financial market as it currently appears.

3.2 Extended Model Results

In a new set of simulation experiments, all parameters remained the same, except for newly added FTT costs. The *FTT* parameter is a constant value equal to *0.015*. One can see

from the following graphs in figure 2 that FTT costs have a significant influence on the model. The price grows in the short run, but in the long run, it decreases. The technical weight evolution is similar. As one can see from the results, the price grows in the short run, but after some time, it starts to decline. The reason for this reaction is that agents prefer the fundamental strategy at this point. The market stabilizes with more fundamental traders.

Fig. 2: Simulation results – FTT (0.015)



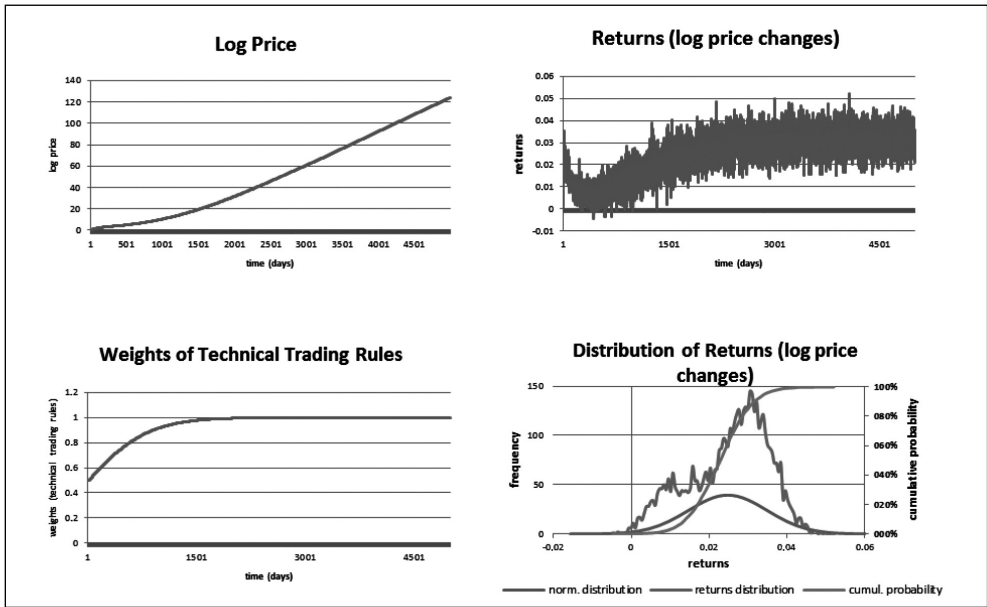
Source: own

We achieved different results with the last set of simulations. All the parameters remained the same, except for the *FTT*, which was doubled, and the constant, which was set equal to *0.03*. The higher value of *FTT* caused the model to become destabilized. Technical trader rules won in this case (*weight* = 1) and the price increased without limit. Figure 3 demonstrates the contradictory effect on the market; instead of stabilizing, the market become unstable.

These results correspond with the European Commission's (2010), whose proposal considered FTT values at a low rate. Our conclusions are in line with Szolno-Koguc and

Twarowska (2014), who highlight the importance of selection methodology and data samples for analytical results. This choice determines not only whether a FTT affects the scale of market speculation and the price volatility of financial instruments but also whether the impact is positive or negative. Although Habermeier and Kirilenko (2001) present negative effects on price discovery, volatility and liquidity, they do not specify a transaction tax rate, so their conclusions agree with our conclusions about high values of FTT & consequent costs. Phylaktis & Aristidou (2007) refer to many studies (e.g. Umlauf, 1993; Jones & Seguin,

Fig. 3: Simulation results – FTT (0.03)



Source: own

1997; Green et al., 2000 or Hau, 2003) that report the positive volatility effects of transaction taxes, which support our conclusions. This variety of conclusions is generated by the differences used in econometric models, country samples, observation periods and variables. It must be emphasized that most researchers have used ex-post data (Phylaktis & Aristidou, 2007; Schulmeister, 2014; 2015; Rieger, 2014), but this study has used a general agent-based approach.

Conclusions

The aim of this paper was to investigate the impact of a FTT on the stability of the financial market. Because FTTs may be defined in various ways, this paper defines assets as tax objects. The agent-based financial model designed by Westerhoff (2009) was implemented and extended by a FTT and rising transaction costs. The model includes direct interactions between speculators, which may lead them to decide to change their trading behavior, and addresses the technical and fundamental strategies of market participants.

Our extended model has a tendency to stabilize itself in a long term if the fundamental trading rules outweigh the technical trading method thanks to the introduction of FTTs. This could be used when bubbles and crashes occur in financial markets. Asset prices would be stabilized because their value targets are near the fundamental value. The volatility would also be minimized. Introducing a low FTT rate makes asset price rises to a bubble while technical traders take over the market. However, prices start to fall after some time in accordance with the growth of a technical strategy. At that moment, volatility minimizes and the market stabilizes. Different results are achieved with a higher rate of FTT. If FTT and consequent costs are too high, the financial system destabilizes and the price grows without limit.

The model described in this paper explores dependence market stability to the extent of FTTs. However, the model should not be interpreted as a model only for the introduction of FTT, but as a general model of transaction costs' influence on the financial market.

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Abstract

FINANCIAL TRANSACTION TAXATION IN AGENT-BASED SIMULATION**Roman Šperka, Irena Szarowska**

The aim of this paper is to investigate the impact of financial transaction taxes (FTTs) on the stability of financial markets. This paper presents an agent-based financial market model and simulations in which agents follow technical and fundamental trading rules to determine their speculative investment positions. The model developed by Westerhoff (2009) was chosen for implementation and was extended by FTT and arising transaction costs. Because FTTs may be defined in various ways, this paper defines assets as tax objects. The model includes direct interactions between speculators, which may lead them to decide to change their trading behavior and addresses a technical and a fundamental strategy of market participants. The results suggest that the modified model has a tendency to stabilize itself in the long term if fundamental trading rules outweigh the technical trading method. This model could be used when bubbles and crashes occur in financial markets. Asset prices would be stabilized because their value targets near the fundamental value and volatility would also be minimized. Setting FTTs at a low rate for market stabilization is important. If FTTs and consequent transaction costs are too high, then the financial system will destabilize and prices will grow without limit. The model described in this paper explores dependence market stability to the extent of FTTs. However, the model should not be interpreted as a model only for the introduction of FTT, but as a general model of transaction costs' influence on the financial market.

Key Words: *Financial transaction tax, agent-based model, technical and fundamental analysis, simulation.*

JEL Classification: F38, G18, C63, C88.

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STOCHASTIC MODEL OF SHORT-TERM PREDICTION OF STOCK PRICES AND ITS PROFITABILITY IN THE CZECH STOCK MARKET

Milan Svoboda

Introduction

One of the characteristics of stock markets is their permanent fluctuation. Periods of share price growth alternate with periods of share price decrease, both of different lengths. One of the possibilities applied for prediction of share price development and for simulation of this fluctuation is technical analysis (TA).

Principles and methods of TA are widely described, for example by Murphy (1999). TA is understood as an extensive complex of methods which predict the future prices from the previous prices and trade volumes. The basis of TA can be summarized by the following three statements:

- The share price is determined only by mutual iteration between supply and demand. Supply and demand are influenced by fundamental and psychological factors.
- Share rates move in trends which have certain inertia. A trend change is caused by a change of ratio between the selling and buying (optimistic and pessimistic investors). These trend changes are possible to be identified in time by studying historical prices and trade volumes. Technical analysts distinguish three types of trends. A primary trend which lasts from one year to several years, a secondary trend which lasts for several months and a minor trend which lasts for days or weeks.
- Development cycles and formations repeat themselves. It is based on the human nature to behave in a similar way under the same circumstances. This fact allows predicting the future rate development.

The basic assumption for technical analysts is the second statement. Identifying trend in time raises hope of an above-average profit. The main goal for technical analysts nowadays is to predict short term price movements, while important being not the price level but the price

changes estimate. TA proceeds from some scientific theories but above all it is based on a great amount of empirical findings. On the base of these empirical findings particular methods, whose number is practically unlimited, are created.

It is necessary to mention that academicians, in contrast to businessmen, did not trust TA for a long time. The reason was the Efficient Market Hypothesis according to which markets perform a random walk and therefore they are unpredictable. An effective market is thought to be such market which reacts to all new information immediately. This information cannot be predicted, it comes randomly and thus a price change is also random. It is not possible to reach above-average profit in effective markets and according to this theory TA methods are non-functional. The idea of 'random walk' was first published probably by the French mathematician L. Bachelier. This theory was later developed and with empirical studies supported by Fama (1965; 1970). The conclusions of Fama were confirmed in the paper by Solnik (1973), for example. There were also some previous and widely cited negative empirical studies about a reliability of TA in stock markets, for example Fama and Blume (1966) or Jensen and Benington (1970). However, other later papers, for example Sweeny (1988) or Brock et al. (1992) prove that business strategies using TA methods are able to overcome a passive share holding strategy called "buy and hold" and to overcome the market. Since the computing capacity became cheaper and electronical databases developed and are easily accessible, the number of studies exploring the profitability of different TA methods has been growing.

The goal of this empirical research is to create a stochastic model which would predict a short term share price movement successfully.

It means that a model will be usable for generating business signals and that trading according to these signals will bring higher profit than passive share holding. We proceed from the TA assumption that a share price moves in short term trends and during that trend the share price accumulates a certain profit or a loss in relation to the price at the beginning of the trend. We also assume that the probability of this trend change grows with an increasing accumulated loss or profit. The crucial question for us is how big the accumulated loss or profit must be to cause a trend change with a high probability. Considering the data character (daily opening and closing prices) we will use the Markov chains theory for modelling the trend change probability.

The structure of the paper is as follows. The first part is dedicated to the Markov chains theory to a sufficient extent and also to already published works which use Markov chains for the prediction of stock markets. The second part characterises data on which the research is lead and describes the methodology of the research. The third part is dedicated to empirical findings and there is also a brief discussion about them included. The closing part presents an evaluation and also indicates where the following research is oriented.

1. Theoretical Background

Markov chains (MC) are used for modelling processes which can be found in one of finite (countable) number of states in discrete time moments. MC is understood as a sequence of discrete random variables X_1, X_2, X_3, \dots with the Markov property which can be formally described as follows:

$$\begin{aligned} P(X_{n+1} = x_{n+1} \mid X_1 = x_1, X_2 = \\ = x_2, \dots, X_n = x_n) = P(X_{n+1} = \\ = x \mid X_n = x_n) \end{aligned} \quad (1)$$

In other words, MC is a random process with a discrete set of states, discrete time and of that kind that the probability $p_i(n)$, that at the time moment t_n the process will be in state i , is stochastically dependent only on the state at the previous time moment, i.e. on the state at the time t_{n-1} . Particular realizations x_i are elements of a countable set $S = \{s_j\}$, $i = 1, 2, \dots, N$ which is called a state space. Behaviour of

the described process is determined by:

- vector of unconditional probabilities $p(n)^T = [p_1(n), p_2(n), \dots, p_N(n)]$, where T means transposition. For $n = 0, 1, 2, \dots$ $p_i(n)$ denotes probability that the process is in the moment n in the state i ,
- transition probability matrix \mathbf{P} whose elements p_{ij} give conditional probability of process transition from the state i to the state j . That could be formally described $p_{ij} = P(X_n = s_j \mid X_{n-1} = s_i)$, where $i = 1, 2, \dots, N$ and $j = 1, 2, \dots, N$ and where p_{ij} can depend on n . In case that p_{ij} does not depend on n at all, we speak about homogenous MC, in the opposite case we speak about non-homogenous MC.

If we know the probability of particular states appearance at the time moment when the process starts, we can describe the process behaviour using the following relations:

$$p^T(n) = p^T(n-1)\mathbf{P} \text{ thus } p^T(n) = p^T(0)\mathbf{P}^n \quad (2)$$

The first task will be to find an appropriate principle for defining a state space. We need to have such a state space model where there are states from which the process will most likely proceed into states with an opposite trend. In other words, we need to find such states in which a trend change will occur with high probability. Such states would be usable for generating buying and selling orders.

Application of MC for stochastic description of stock markets development and prediction of their development is used very rarely. For example, the works Zhang and Zhang (2009), Doubleday and Esunge (2011) and Vasanthi et al. (2011) deal with stock markets modelling using the MC theory. A common feature of these papers is that they describe a state space very shortly. A state space is defined on the base of a size of a daily share price change or share index. The results found out on such defined state space do not offer a possibility of a suitable application.

More approaches to a state space definition are offered in the work Svoboda and Lukáš (2012). In this paper three ways of state space defining are described. The first approach is the same as in the above mentioned works and a state space is defined according to a size of a daily share price change expressed as percentage. The second approach defines

a state space also according to daily share price changes but the interval span for space assignment is set as a multiple of a standard deviation of daily share price changes. That implies that each share has its individually defined state space. Neither the first nor the second approach seems to be the suitable one for our goals and does not offer states with high trend change probability. Only the third approach seems to be the suitable one. It defines a state space on the basis of a size of cumulative share price changes determining the interval span for state assignment again as a multiple of standard deviation of daily share price change. In such defined state space there are states in which a trend change occurs with a sufficiently high level of probability. This third approach is used in our research.

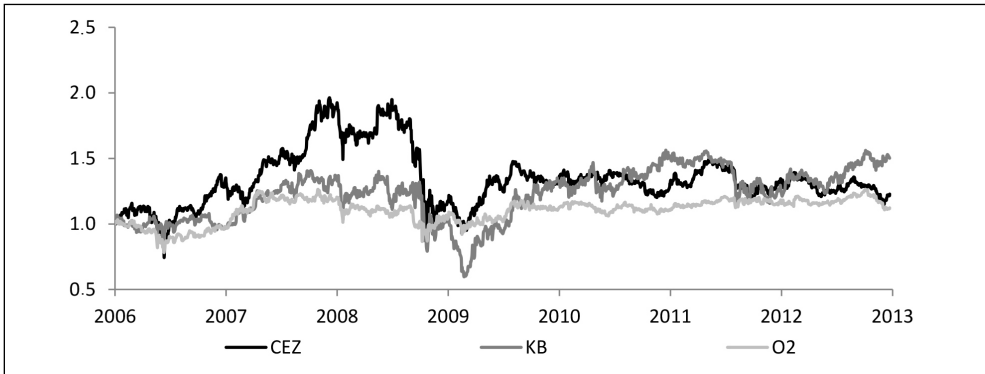
2. Data and Methodology

In this part of the paper we will first characterize the data on which the research is carried on and then we will describe the procedure of state space modelling and we will explain the principle of trading strategy.

2.1 Data

The research is based on the data from the Czech stock market. We received the share prices of three companies traded at Prague Stock Exchange. These companies are Telefónica O2, Komerční banka and ČEZ (O2, KB and CEZ). We have to our disposal daily opening and closing prices for each company in the period of seven years, from 5th January 2006 until 2nd January 2013, i.e. ca. 1,760 trading days. The development of monitored shares value including paid out net dividends can be seen in Fig.1.

Fig. 1: Shares value development



Source: Patria, author

It is seen in the chart that during the seven years long period shares of monitored companies went through all the three types of primary trend but each company with a different intensity. We can observe a growing trend in the years 2006 to 2007, a decreasing trend with a follow-up partial correction in the years 2008 and 2009 and a sideways trend which comes after the year 2010.

2.2 State Space

We define a state space out of cumulative daily share price changes. A cumulative share price change is denoted Y_t , (y_t is Y_t expressed as a percentage). Y_t is interpreted as short basis

indexes of daily closing prices, being the basic period the day of trend change, i.e. the transition from a decrease to a growth or vice versa. The length of the time period is determined by the number of growing or decreasing closing prices in sequence. Y_t is calculated according to the following relations:

$$\begin{aligned}
 Y_t &= Y_{t-1} \frac{P_t}{P_{t-1}} \text{ if } (P_{t-2} \leq P_{t-1} \leq P_t) \\
 &\text{or } (P_{t-2} \geq P_{t-1} \geq P_t), \\
 Y_t &= \frac{P_t}{P_{t-1}} \text{ otherwise,}
 \end{aligned}
 \tag{3}$$

where P_t is daily closing price in time t , P_{t-1} is daily closing price in time $t-1$ and P_{t-2} is daily closing price in time $t-2$. We define a state space on values y_t . We will use a set of eight states to sort out the data. The states when the share price decreases will be denoted D_i . The state D_1 will be the state with the lowest price decrease and on the contrary the state D_4 will denote the state with the highest price decrease. States when the share price grows will be denoted G_i . The state G_1 will be the state with the lowest price growth and G_4 will denote the state with the highest price growth. A common state space model will be defined on the following principle:

$$\begin{aligned} D_4: y_t < -3\Delta; & & D_3: -3\Delta \leq y_t < -2\Delta; \\ G_1: 0 \leq y_t < 1\Delta; & & G_2: 1\Delta \leq y_t < 2\Delta; \\ D_2: -2\Delta \leq y_t < -1\Delta; & & D_1: -1\Delta \leq y_t < 0; \\ G_3: 2\Delta \leq y_t < 3\Delta; & & G_4: 3\Delta \leq y_t, \end{aligned}$$

where $\Delta = k\sigma$, σ is a standard deviation of daily share price changes and k is a multiple of a standard deviation. For particular shares the standard deviation value is as follows: $\sigma_{O2} = 1.442\%$, $\sigma_{CEZ} = 1.996\%$, $\sigma_{KB} = 2.355\%$. The procedure used for sorting out the states is illustrated in Tab.1.

We will perform a filtration on the obtained MC. A filtration is understood as omitting the subsequent identical states. In this way we leave out the states where the share price stagnates (or more precisely, it changes only very little in the same trend). These states are not interesting for us from the trading point of view. To illustrate this, we can show a part of chain before the filtration: ... $D_4, G_1, G_1, G_1, G_2, D_1, D_1, D_2, G_2, D_2, D_2, \dots$ and after the filtration: ... $D_4, G_1, G_2, D_1, D_2, G_2, D_2, \dots$. We will determine the transition probability matrix P for the after-filtered MC. Transition probabilities for the model $k = 1$ are shown in Tab. 2. Discovered probabilities are displayed only with three decimals, therefore the probabilities sum does not have to equal 1 precisely. Direct transitions among some states are impossible and in these impossible transitions there is null without decimals. The columns $\sum G_i$ and $\sum D_i$ quote the probability of remaining in a trend or a change in a trend. For example, we can observe that if the KB share is now in the state D_3 , the probability of a trend change is 0.742 and the probability of continuing in a decreasing trend is 0.258. In the last column there is a number of particular states incidence stated.

The results in Tab. 2 show that we got a principle for modelling a state space with such

Tab. 1: Procedure of model illustration for CEZ shares and $k = 0.5$ ($\Delta = 0.998$)

t	1	2	3	4	5	6	7	8	9
P_t	801.2	809.0	813.7	807.5	802.1	819.0	825.0	834.0	821.0
Y_t		1.0097	1.0156	0.9924	0.9857	1.0211	1.0286	1.0398	0.9844
y_t		0.97%	1.56%	-0.76%	-1.43%	2.11%	2.86%	3.98%	-1.56%
state		G_1	G_2	D_1	D_2	G_3	G_3	G_4	D_2

Source:Patria, author

states where a trend change occurs very likely. We are going to use this principle of state space definition for creating trading strategies.

2.3 Trading Strategies

Trading strategies are created on the following principle. When a certain level of a share price decrease is reached, a buying signal is generated and when a certain level of a share price growth is reached, a selling signal is generated. Trading strategies are always

realized according to the rules as follows. One trade (transaction) is understood as a share buying and a following selling. If a buying or selling signal is generated one day, the trade is realized for the opening price from the following day. The whole capital is always invested (it means that it is theoretically possible to buy a part of a share). We do not take into consideration any transaction fees. We count and reinvest paid out dividends after tax in case that we obtained shares on the record day.

Tab. 2: Transition probabilities for the model k = 1

n-1 \ n	n	D ₄	D ₃	D ₂	D ₁	G ₁	G ₂	G ₃	G ₄	∑D _i	∑G _i	n
		D ₄	O2	0	0	0	0	0.475	0.375	0.025	0.125	0
	CEZ	0	0	0	0	0.282	0.564	0.051	0.103	0	1	39
	KB	0	0	0	0	0.457	0.229	0.229	0.086	0	1	35
D ₃	O2	0.358	0	0	0	0.448	0.179	0.015	0.000	0.358	0.642	67
	CEZ	0.333	0	0	0	0.439	0.193	0.035	0.000	0.333	0.667	57
	KB	0.258	0	0	0	0.485	0.152	0.091	0.015	0.258	0.742	66
D ₂	O2	0.065	0.258	0	0	0.497	0.142	0.032	0.006	0.323	0.677	155
	CEZ	0.079	0.220	0	0	0.567	0.110	0.018	0.006	0.299	0.701	164
	KB	0.079	0.287	0	0	0.500	0.091	0.037	0.006	0.366	0.634	164
D ₁	O2	0.006	0.047	0.261	0	0.584	0.094	0.009	0.000	0.314	0.686	341
	CEZ	0.006	0.029	0.266	0	0.622	0.072	0.003	0.003	0.301	0.699	349
	KB	0.009	0.043	0.272	0	0.568	0.084	0.014	0.009	0.325	0.675	345
G ₁	O2	0.012	0.006	0.089	0.567	0	0.282	0.034	0.009	0.675	0.325	326
	CEZ	0.003	0.017	0.078	0.543	0	0.309	0.038	0.012	0.642	0.358	346
	KB	0.003	0.000	0.092	0.593	0	0.260	0.031	0.021	0.688	0.312	327
G ₂	O2	0.000	0.012	0.110	0.497	0	0	0.312	0.069	0.618	0.382	173
	CEZ	0.005	0.005	0.109	0.552	0	0	0.262	0.066	0.672	0.328	183
	KB	0.007	0.000	0.116	0.527	0	0	0.288	0.062	0.651	0.349	146
G ₃	O2	0.000	0.027	0.080	0.587	0	0	0	0.307	0.693	0.307	75
	CEZ	0.014	0.029	0.087	0.536	0	0	0	0.333	0.667	0.333	69
	KB	0.000	0.013	0.143	0.532	0	0	0	0.312	0.688	0.312	77
G ₄	O2	0.000	0.116	0.279	0.605	0	0	0	0	1	0	43
	CEZ	0.044	0.044	0.400	0.511	0	0	0	0	1	0	45
	KB	0.000	0.063	0.250	0.688	0	0	0	0	1	0	48

source: author's calculation

Dividends are included in the moment of share selling. A short selling is not taken into account and two consecutive buyings are not possible. The invested capital value is calculated according to the following relation:

$$C_i = C_{i-1} \frac{S_i + D_i}{B_i} \tag{4}$$

and after n^{th} trades (transactions) the capital value will be:

$$C_n = C_0 \prod_{i=1}^n \frac{S_i + D_i}{B_i} \tag{5}$$

where $C_0 = 1.000$ is initial capital value, C_n is capital value after the n_{th} transaction, S_i is selling price in the i_{th} transaction, D_i are dividends after tax in case that during the i_{th} transaction there was a record day, B_i is buying price in the i_{th} transaction.

We will compare the profit brought by the trading strategy with the profit we would

reach by the passive strategy “buy and hold” (i.e. shares are bought and then only held, not traded). Reached profitability of particular shares with the strategy “buy and hold” in the studied period is for O2 shares 1.122, CEZ shares 1.227 and for KB shares 1.502. In case of portfolio investing, it means that investment is distributed equally among all three shares, profitability of this portfolio is 1.284.

3. Results and Discussion

We will gradually test the trading strategies on 14 state space models. A model is determined by the value k , where k will gradually acquire values from 0.5 to 1.8, with one step being 0.1 (for $k < 0.5$ trades are concentrated on the states D_3 , D_4 and G_3 , G_4 ; for $k > 1.8$ the states D_3 , D_4 and G_3 , G_4 are found only very few times). For each model we will calculate nine (3x3) trading strategies. States D_2 , D_3 , D_4 will generate a buying signal and states G_2 , G_3 , G_4 selling signals. States D_1 and G_1 are not used for states generating because we require a minimal share price decrease and growth.

First we will present all trading strategies profitability on two models ($k = 0.5$ and $k = 1.8$). For other models only summary results will be presented. Finally we will calculate the strategies profitability in case of investments into shares portfolio. We will always give short comments to the presented results.

3.1 Profitability of Chosen Models

The first calculated model is the model with $k = 0.5$. A state space is defined as follows:

$$D_4: y_t < -1.5\sigma; \quad D_3: -1.5\sigma \leq y_t < -1.0\sigma; \\ G_1: 0 \leq y_t < 0.5\sigma; \quad G_2: 0.5\sigma \leq y_t < 1.0\sigma;$$

$$D_2: -1.0\sigma \leq y_t < -0.5\sigma; \quad D_1: -0.5\sigma \leq y_t < 0; \\ G_3: 1.0\sigma \leq y_t < 1.5\sigma; \quad G_4: 1.5\sigma \leq y_t.$$

The obtained profitability of particular trading strategies and the number of realized trades can be seen in Tab. 3. Trading strategies which reached a higher profitability than the strategy “buy and hold” are highlighted in this and in the other tables with bold font.

The results show that in case of O2 shares six strategies beat the strategy “buy and hold” (success rate 66.7%), in case of CEZ shares four strategies were the winning ones (44.4%) and in case of KB shares four strategies beat it as well (44.4%). The number of realized trades was between 63 and 113. We may state that the strategies with states D_2 and G_2 were only little successful, the trading strategy D_2 - G_2 did not even beat the strategy “buy and hold” in case of any share. The strategies D_4 and G_4 were successful, the strategy G_4 - D_4 highly beat the strategy “buy and hold” in all cases of the three shares. We must also pay attention to the fact that a small change of trading strategy parameter (neighbouring strategy) can bring very different results. For example, in case

Tab. 3: Results of model $k = 0.5$

buy \ sell		G_2		G_3		G_4	
		C_n	n	C_n	n	C_n	n
D_2	O2	0.977	107	0.764	84	1.048	94
	CEZ	0.890	113	1.183	88	1.213	82
	KB	0.909	105	2.017	81	1.028	88
D_3	O2	1.608	72	1.434	63	1.511	65
	CEZ	1.119	78	1.899	69	2.084	81
	KB	0.681	77	1.373	65	1.691	72
D_4	O2	1.986	77	1.295	74	1.619	87
	CEZ	1.189	76	1.803	75	2.335	93
	KB	1.604	79	1.281	66	2.156	91

Source: author's calculation

of KB there is a big difference in profitability among strategies with a buying signal D_2 .

We can expect that in other models with the increasing k the success rate of strategies with states D_2 and G_2 will grow and the number of trades will decrease. This expectation is confirmed in Tab. 4 where detailed results for the model $k = 1.8$ are given.

The model $k = 1.8$ is the last one that was calculated. Although the model reached a good profitability, we would need to realize more trades to confirm strategies success and thus to study a longer period of time than the one we have at our disposal. It still holds true that a small change of a trade strategy parameter can bring very different results. We can see it for example in KB for strategies D_3-G_2 and D_4-G_2 . Models with $k > 1.8$ were not calculated because the realized trades number was very low.

We will not present such detailed results for other models. We will present only summary results for each model.

3.2 Summary Results

Summary results for particular models are presented in Tab. 5. The table shows winning strategies proportion for each model and each share and also reached average profitability for each share which is calculated according to the formula:

$$\bar{C} = \frac{C_{D_2-G_2} + C_{D_3-G_3} + \dots + C_{D_4-G_4}}{9} \quad (6)$$

In the penultimate column the average profitability for the whole model is stated. It is calculated according to the relation:

$$\bar{C} = \frac{\bar{C}_{O2} + \bar{C}_{CEZ} + \bar{C}_{KB}}{3} \quad (7)$$

The total number of trades realized in the stated model is given in the last column of this table (27 trading strategies).

We can see in the table that most of the trading strategies beat the passive strategy “buy and hold”. From the point of view of particular models it may be stated that the average model profit for models $k \geq 0.7$ was always higher than 1.5, by which the average profit of the “buy and hold” strategy, 1.284, was considerably overcome. Models $0.8 \leq k \leq 1.2$ and $k \geq 1.5$ reach the highest profits.

When taking into consideration only models $k \geq 0.7$, from the point of view of particular shares O2, the shares showed the best performance for these models. Winning strategies ratio for no model was lower than 0.778 and average strategies profitability in the portfolio was always higher than the profitability obtained by passive share holding. Also CEZ shares showed a good performance, the winning strategies ratio was never lower than 0.556 and the average profitability was always higher than the one by the passive share holding. With KB shares the winning strategies ratio was about 0.5 and in three models ($k = 1.1; 1.3; 1.4$) the

Tab. 4: Results of model $k = 1.8$

buy	sell	G_2		G_3		G_4	
		C_n	n	C_n	n	C_n	n
D_2	O2	2.114	63	1.895	23	1.540	11
	CEZ	1.451	56	1.577	20	1.510	9
	KB	2.542	69	1.414	25	1.574	18
D_3	O2	1.264	20	1.688	13	1.376	8
	CEZ	1.367	18	1.016	8	1.320	6
	KB	1.013	19	0.837	13	1.383	13
D_4	O2	1.880	9	1.520	6	1.437	7
	CEZ	1.704	9	1.241	6	2.402	7
	KB	2.725	14	1.451	11	2.053	11

Source: author's calculation

Tab. 5: Summary results

k	winning strategies proportion			portfolio value – \bar{C}			\bar{C}	$\sum_{i=1}^3 \sum_{j=1}^9 n_{i,j}$
	O2	CEZ	KB	O2	CEZ	KB		
0.5	0.667	0.444	0.444	1.360	1.524	1.416	1.433	2,202
0.6	0.778	0.778	0.222	1.425	1.472	1.344	1.414	2,007
0.7	0.889	0.556	0.444	1.558	1.425	1.548	1.510	1,819
0.8	0.778	0.778	0.556	1.731	1.423	1.882	1.679	1,639
0.9	0.889	0.667	0.667	1.695	1.393	1.642	1.577	1,404
1.0	1.000	0.667	0.556	1.662	1.734	1.743	1.713	1,220
1.1	1.000	0.667	0.444	1.423	1.706	1.442	1.524	1,067
1.2	1.000	0.667	0.444	1.632	1.558	1.576	1.589	935
1.3	0.889	0.778	0.444	1.607	1.505	1.449	1.520	810
1.4	1.000	0.667	0.444	1.754	1.368	1.387	1.503	711
1.5	1.000	0.667	0.778	1.694	1.404	1.598	1.565	644
1.6	1.000	0.556	0.667	1.552	1.455	1.677	1.561	576
1.7	1.000	1.000	0.778	1.694	1.580	1.783	1.686	581
1.8	1.000	0.889	0.444	1.635	1.510	1.666	1.603	492

Source: author's calculation

portfolio did not reach the profit of the passive strategy “buy and hold”.

3.3 Profitability of Shares Portfolio

The results presented above show that there are strategies which do not overcome the market. These strategies cannot be identified in advance. One of the possibilities how to reduce a risk in the stock market is capital investing into more shares, it means creating a shares portfolio. Therefore we will divide the invested capital equally into three analysed shares and we will calculate the profitability of this portfolio.

We will calculate the profitability only for the most successful models with a sufficient number of trades. It means for the models $0.8 \leq k \leq 1.2$. The models with $k \geq 1.5$ have a low number of trades and they will be a subject of another separate research. In the studied portfolios we are interested in obtained capital value and in the average number of trades,

$$\bar{C}_{D_i-G_j} = \frac{C_{O2, D_i-G_j} + C_{CEZ, D_i-G_j} + C_{KB, D_i-G_j}}{3}, \quad (8)$$

$$\bar{n}_{D_i-G_j} = \frac{n_{O2, D_i-G_j} + n_{CEZ, D_i-G_j} + n_{KB, D_i-G_j}}{3}.$$

The results are stated in Tab 6.

The results show that all portfolios with selling signals G_3 and G_4 overcame the value of passive portfolio “buy and hold” (1,284). One important question for us is how the portfolio value develops in time. The development of chosen portfolios value is seen in Fig. 2. To make it clear we chose only four portfolios. If we had chosen more strategies, the figure would have been too unclear. The portfolio of the trading strategy D_4-G_4 was chosen for the model $k = 0.8$, for the model $k = 1.0$ two strategies D_4-G_3 and D_3-G_4 and for the model $k = 1.2$ the strategy D_3-G_3 was chosen.

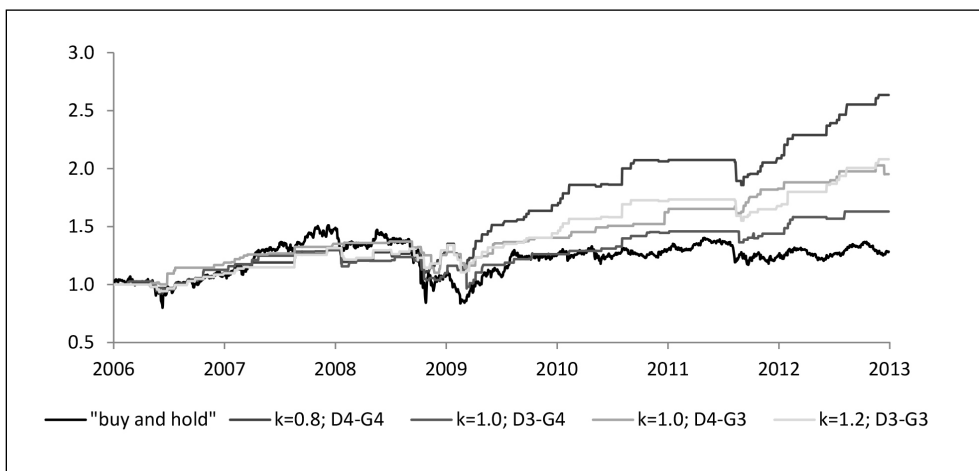
The chart offers valuable information. We can see that in the market growth period, years 2006, 2007 and a part of the year 2009, trading strategies were copying or losing in comparison with the passive portfolio “buy and hold”. In contrast, in the market decrease period, the second half of the year 2008 and the beginning of the year 2009, trading strategies were making smaller loss or were showing stagnation. In the period of sideways trend, from the year 2010, all portfolios reached higher profits than the passive portfolio.

Tab. 6: Portfolios results

k	sell buy	G ₂		G ₃		G ₄	
		\bar{C}	\bar{n}	\bar{C}	\bar{n}	\bar{C}	\bar{n}
0.8	D2	1.101	112.3	1.687	74.3	1.740	58.0
	D3	1.248	70.7	1.734	55.0	2.014	49.3
	D4	1.290	44.7	1.661	40.3	2.635	41.7
0.9	D2	1.277	113.0	1.405	63.7	1.725	47.0
	D3	1.443	61.3	1.667	47.3	1.769	39.0
	D4	1.306	36.3	1.571	30.3	2.027	30.0
1.0	D2	1.706	105.3	1.931	60.7	1.752	37.0
	D3	1.213	51.3	2.076	43.0	1.630	28.3
	D4	1.250	30.3	1.952	27.0	1.905	23.7
1.1	D2	1.625	102.7	1.871	53.7	1.739	32.3
	D3	1.115	44.3	1.382	34.0	1.506	23.7
	D4	1.204	24.7	1.817	22.0	1.453	18.3
1.2	D2	1.319	93.0	1.938	50.3	1.465	26.0
	D3	1.084	37.3	2.081	30.3	2.039	20.3
	D4	1.144	20.0	1.825	18.7	1.404	15.7

Source: author's calculation

Fig. 2: Development of capital value



Source: author's calculation

Tab. 7: Annual yield of portfolios

year	buy and hold		k=0.8; D ₄ -G ₄		k=1.0; D ₃ -G ₄		k=1.0; D ₄ -G ₃		k=1.2; D ₃ -G ₃	
	C	yield	C	yield	C	yield	C	yield	C	yield
2012	1.284	2.7%	2.635	26.1%	1.630	13.3%	1.952	6.9%	2.081	24.1%
2011	1.250	-3.2%	2.089	1.3%	1.439	-0.5%	1.827	12.5%	1.677	-2.5%
2010	1.292	3.6%	2.062	22.5%	1.446	14.6%	1.623	15.7%	1.720	19.3%
2009	1.247	16.8%	1.683	31.1%	1.262	14.8%	1.403	11.8%	1.441	11.3%
2008	1.068	-27.7%	1.284	-2.3%	1.099	-15.2%	1.254	-7.1%	1.296	-1.3%
2007	1.477	36.4%	1.314	20.4%	1.296	15.0%	1.351	15.6%	1.313	21.1%
2006	1.082	8.2%	1.091	9.1%	1.127	12.7%	1.168	16.8%	1.084	8.4%

Source: author's calculation

Let's have a look at annual yield in particular years. These yields are shown in Tab. 7. They are approximate annual yields because portfolios are not appraised every day but only on the day of share sale. It means that if we hold shares at the end of the year, the given portfolio value is the same as the value in time of the last sale. The only exception is the value on 28th December 2012 when in case we had bought some shares, these shares were appraised with the closing price of this day.

Annual yields confirm that the only year in which the strategy "buy and hold" beat the trading strategies, was the year 2007 when the "buy and hold" strategy reached the yield 36.4%. In other years our trading strategies were doing better or comparably.

The differences among profitability will become even more apparent if we have a look at average annual yields. Average annual yield is calculated as geometric mean. The average annual yield of the strategy "buy and hold" was 3.6%. The average yield for portfolios calculated in Tab. 6 with the selling signals in G₃ or G₄ oscillates between 4.7% ($k = 1.1; D_3-G_3$) and 14.8% ($k = 0.8 D_4-G_4$).

From the point of view of practical use we have to take into consideration transaction costs (fees). Costs are usually determined by the percentage from the trade volume. When calculating the costs, the invested capital value after n -trade transactions may be approximately determined according to the relation:

$$C_{after\ fees} = C_n \left(\frac{1 - \frac{p}{100}}{1 + \frac{p}{100}} \right)^n, \quad (9)$$

where p is the fee in percent. When trading orders are submitted electronically, the lowest fees are around 0.1% from the trade volume. It is seen in Tab. 6 that the average number of realized trades for the strategies G₃ and G₄ was between 15.7 ($k = 0.8 D_4-G_4$) and 74.3 ($k = 0.8 D_2-G_3$). With substitution to the relation lowering average annual yields would occur approximately in the range from 0.45 to 2.1 percentage points.

Conclusions

Our intention was to create a stochastic model which will successfully predict a short term share price movement and which will be usable for generating trading signals. Trading, according to these signals, should bring higher profitability than passive share holding. The presented results show that the aim was reached. Applying the Markov chain theory we found a compact set of state space models $0.8 \leq k \leq 1.2$ and on the basis of this set of models we defined a compact set of trading strategies (D₂, D₃, D₄)x(G₃, G₄) which beat the passive strategy "buy and hold". The strategy "buy and hold" is beaten even after including transaction costs, which is important in case of practical application in algorithmic trading systems. The results are even more

encouraging as it is a case of basic one-criterion model with stationary strategy which for example does not take into consideration the changing volatility of stock markets. This is probably the reason why we obtained the most stable results with O2 shares, which had the lowest volatility in the studied period.

The obtained results are also a contribution to the discussion about the efficiency of Czech stock market. The results point out ineffective behaviour of Czech stock market and thus they do not confirm the conclusions of works Diviš and Teplý (2005) or Hájek (2005) about increasing efficiency of Czech stock market. On the contrary, the results confirm the conclusions of work Svoboda and Říhová (2015) which states that Czech stock market is not able to absorb unexpected information quickly and precisely. They also support the Overreactions Theory (De Bond & Thaler, 1994) according to which share prices overvalue (undervalue) the right values after releasing new information and therefore their backward movement must come.

We will continue with the research, we think that we may reach even higher profitability by modifying this basic trading strategy. Our next research will concentrate on the following fields:

- Confirmation of this work results which means including other shares into portfolios and also prolongation of the time period.
- More detailed analysis of trading strategies success in growing, decreasing and sideways primary trend.
- Development of a dynamic model which would react to changing volatility in stock markets.
- Application of these models in other stock markets.
- Development of a more-criterion model which would for example change trading strategies depending on prediction of primary trend development. One strategy is more suitable for a growing primary trend and another for a sideways trend.

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STOCHASTIC MODEL OF SHORT-TERM PREDICTION OF STOCK PRICES AND ITS PROFITABILITY IN THE CZECH STOCK MARKET

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This paper deals with stochastic modelling and short time prediction of share price development in Czech stock market. The aim of this research is to create such models which can be used for creating automatic trading strategies that will beat the market. Reliability of these models is being checked in three highly liquid shares from Prague Stock O2, CEZ and KB in seven years long period in years 2006–2012. We used Markov chain analysis for modelling. In our models a state space is defined on the basis of cumulative daily changes of share price and a state space with eight states is used. The state space is defined parametrically as a multiple of standard deviation of daily yields for each share. There were 14 parameters calculated in total and for each parameter nine trading strategies for all shares were applied. It means that 378 trading strategies were calculated. We succeeded in finding a set of compact state space models and in applying a compact group of trading strategies on these models which always beat the market when invested in portfolio. The average annual market yield was 3.6%. The average yield of our portfolios oscillates between 4.7% and 14.8%. Strategies overcame the market also even after including transaction costs. After including transaction costs in amount of 0.1% from the trade volume a decrease of average annual yields would occur in the range from 0.45 to 2.1 percentage points. We reached the best results in the sideways trend and in shares with less changing volatility.

Conclusions of this research are in contradiction to the Efficient Market Hypothesis. Results indicate that Czech stock market is not effective in any of its form.

Key Words: *Technical analysis indicators, stock market predication, trading strategies, Markov chain analysis, algorithmic trading.*

JEL Classification: C02, C13, G14, G17.

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FORMALIZED QUALITATIVE MODELING OF ONLINE TRUST: INTRODUCTION OF THE METHOD AND A DETAILED EXAMPLE

Štěpán Veselý, Mirko Dohnal

Introduction

The task of the present paper is to outline a formalized qualitative model (FQM) of online trust (OT). OT is vital for establishing and maintaining commercial relationships on the internet (Grabner-Kraeuter, 2002; Van Der Heijden et al., 2003; Kim et al., 2008; 2012; Beldad et al., 2010; Delina & Dráb, 2010). Trust is especially important when there is relative lack of certainty, formal rules, customs and agreements (Bradach et al., 1989; Gefen & Straub, 2004), as is often the case with e-commerce interaction and online interaction in general (Gefen, 2000; McKnight et al., 2002; Gefen & Straub, 2004).

OT is a multidimensional problem (McKnight & Chervany, 2001; McKnight et al., 2002; Shankar et al., 2002; Chau et al., 2007; Beldad et al., 2010). FQMs are well suited for tackling multidimensional tasks. Also, FQMs are useful whenever vague and/or qualitative information need to be included into a model. In the OT context it might be necessary to consider for instance the influence of perceived social presence embedded in a web site (Gefen & Straub, 2004; Cyr et al., 2007; Hassanein & Head, 2007) or positive word of mouth (Grabner-Kraeuter, 2002; Corbitt et al., 2003; Utz et al., 2012). It might be difficult or prohibitively costly to measure these influences precisely or quickly enough (e.g. when online companies need to meet deadlines for strategic decisions). It is appropriate to use an FQM then.

FQMs capture relationships among variables in the form of degraded (simplified) equations and statistical relations and/or in the form of common-sense heuristics (e.g. if X goes up, Y goes down with increasing rapidity). Qualitative methodology (Kuipers, 1989; Dohnal, 1991; Trave-Massuyes et al., 2004) has been used in some form to model for example investment decisions and economic

problems (Benaroch & Dhar, 1995; Hinkkanen et al., 2003; Curic et al., 2008; Konečný et al., 2010; Kocmanová et al., 2011) and a variety of engineering problems. See Bourseau et al. (1995), De Jong (2004) and Price et al. (2006) for an overview.

Qualitative models capture the fundamental features of a system under study, while eliminating quantitative detail (Kuipers, 1989). Qualitative modeling can be seen as one of the “uncertainty calculi”, such as fuzzy sets (Zadeh, 1965; Dubois & Prade, 1991; Hub & Zatloukal, 2009), rough sets (Pawlak, 1982) and order of magnitude reasoning (Raiman, 1991). Such calculi can be helpful when dealing with online trust (Song et al., 2005; Chakraborty & Chakraborty, 2007; Li et al., 2009; Li et al., 2012), especially under information shortage, measurement difficulties, time pressure to make decisions and/or uncertainty, or when several novel, subjective and/or difficult to measure (e.g. qualitative only) variables are being considered.

We propose a general methodological framework that enables incorporation of many even very vague and very diverse influences on OT in the context of e-commerce.

Although the specific version of the qualitative algorithm originally proposed by the second author has been used several times in the past, most recently in Vícha & Dohnal (2008a, 2008b), Konečný et al. (2010), Kocmanová et al. (2011), Režňáková et al. (2012), this is actually the first paper where one of the principal aspects of the algorithm, namely selection of a consistent set of scenarios, is treated explicitly and in detail (see section 1.2).

1. Method

1.1 Qualitative Models

There are only three qualitative values: positive, zero and negative. The symbols used

are +, 0, -, respectively. A qualitative scenario of a qualitative model is specified if all its n qualitative variables $X \equiv (X_1, X_2, \dots, X_n)$ are described by the qualitative triplets (X, DX, DDX) , where DX and DDX are the first and second qualitative derivatives with respect to time (or an independent variable in general).

Let us suppose that the triplet $(++0) \equiv (T, DT, DDT)$ represents risk aversion $R(t)$ as a function of time: it means that risk aversion is positive ($R = +$), it is increasing in this example ($DR = +$) and the increase is linear ($DDR = 0$) as the second derivative is zero.

Informally speaking, the first qualitative derivative tells us whether a variable is increasing, decreasing, or stable as a function of another variable – the first qualitative derivative is positive, negative, and zero in these cases, respectively. Again informally speaking, the second qualitative derivative tells us whether such a change (i.e. increase or decrease) in a variable is accelerating, stable or decelerating – the second qualitative derivative is positive, zero, and negative in these cases, respectively.

Looking at Fig. 1 on the next page, in pictures 21, 22 and 23 are instances of functions with positive first qualitative derivative, while in pictures 24, 25 and 26 we can see instances of functions with negative first qualitative derivative. A function with the first qualitative derivative equal to zero would be represented by a horizontal straight line (parallel with the X axis).

Pictures 22 and 25 in Fig. 1 give examples of functions with the second qualitative derivative equal to zero. Pictures 21 and 26 represent functions with positive second qualitative derivative (the increase or decrease in Y is becoming more and more pronounced as a function of X), while pictures 23 and 24 represent functions with negative second qualitative derivative (we can see that the increase or decrease in Y with respect to the increase in X gradually flattens out).

A typical example of a qualitative knowledge item can be formalized by a certain simple relation between two variables X and Y. For example:

$$\begin{aligned} & \text{If the price } X \text{ of a product} \\ & \text{is decreasing then the demand} \\ & Y \text{ is increasing.} \end{aligned} \quad (1)$$

A formal interpretation of the qualitative knowledge item (1) is $DY/DX = -$, where DY/DX

is the first qualitative derivative of Y with respect to X (in this example the derivative is negative).

Typical examples of qualitative relations are given in Fig. 1.

The identification numbers given in Fig. 1 are shape codes for the respective qualitative shapes, i.e. for instance 21 is a code number for function characterized by positive value of Y and positive first and second qualitative derivatives of Y with respect to X (triplet +++). The identification numbers are employed in section 2.1.

If the second derivative is not known then there are two variants of qualitative proportionality:

$$\begin{aligned} M_+ & \text{ If } X \text{ is increasing then } Y \text{ is increasing.} \\ & \text{If } X \text{ is decreasing then } Y \text{ is decreasing.} \end{aligned} \quad (2)$$

$$\begin{aligned} M_- & \text{ If } X \text{ is increasing then } Y \text{ is decreasing.} \\ & \text{If } X \text{ is decreasing then } Y \text{ is increasing.} \end{aligned} \quad (3)$$

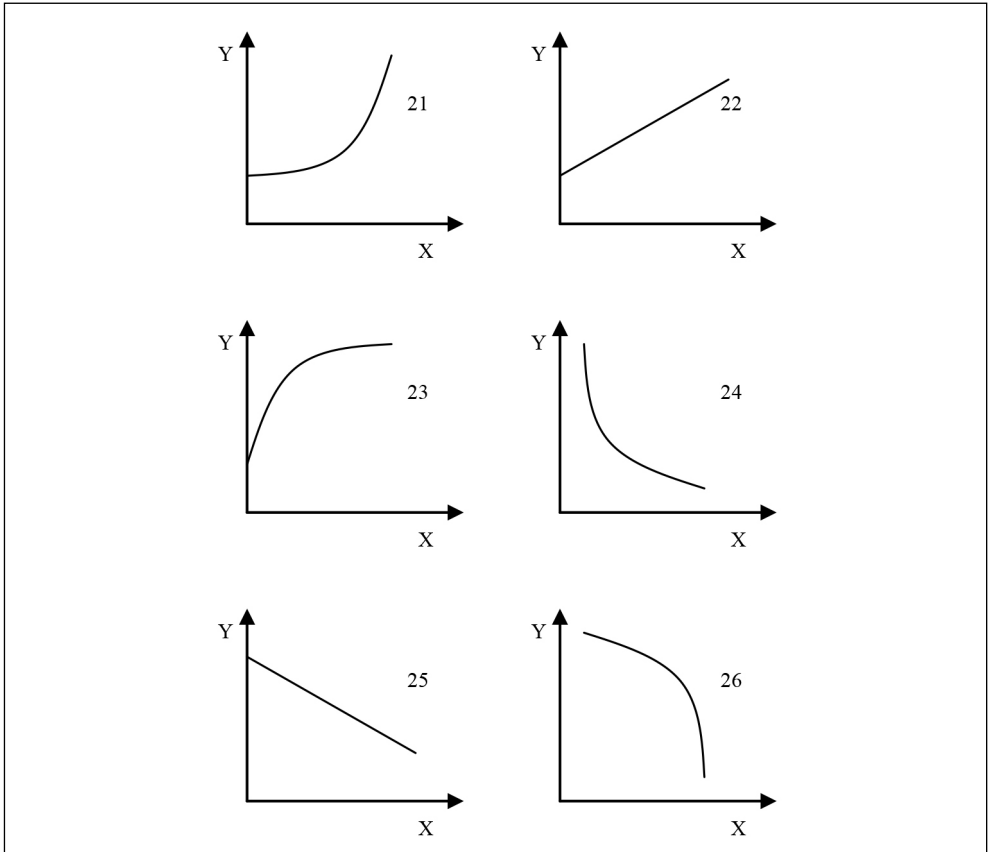
For more details see e.g. Kuipers (1989), Parsons and Dohnal (1995), Trave-Massuyes et al. (2004).

A key concept in the approach to qualitative modeling presented here is “qualitative scenario” or simply “scenario”.

In plain words, a scenario represents a concise qualitative description e.g. of an object or a system. An example of a scenario could be: If price of product X increases, we will sell less X. Another example could be: If price of X is stable and if X’s reputation for quality increases, we will sell more X. These two examples describe a business development using two (price and sales) and three (price, sales and reputation for quality) variables, respectively.

Technically, a scenario consists of a series of variables. Each variable in the scenario is qualitatively described by its state (positive quantity, negative quantity, zero quantity) and by the first and second qualitative derivatives (usually with respect to time). As we already stated at the beginning of this section, these three qualities each variable can take can have only three possible values (+, - and 0). The three qualities each variable can take can therefore be described by a sequence of three signs, i.e. a triplet, as was also already mentioned above.

To illustrate how a scenario is described using triplets, let us return to the example of a qualitative scenario mentioned previously: “If price of X is stable and if X’s reputation

Fig. 1: Examples of pair-wise qualitative equationless relations


Source: own

for quality increases [let us assume that it increases linearly, so the second qualitative derivative is zero], we will sell more X [let us assume that the increase in sales is slowing down because of gradual demand saturation, so the second qualitative derivative is negative].” This scenario can be described by the following series of triplets: +00 (price), ++0 (reputation), ++- (sales). Each scenario can be conveniently displayed in one row of a table where each cell contains qualitative description of one variable/one triplet (see Tab. 2 in section 2.3).

As we will show next, some scenarios represent possible solutions of a qualitative model because they are consistent with a set of constraints based on available knowledge

about a problem (e.g. about online trust and its determinants), while other scenarios are discarded because they are not consistent with the set of constraints (see section 1.2). Those discarded scenarios typically include certain relations between variables that are deemed unlikely or impossible based on the available knowledge (for example a negative relation between the level of trust towards an online site and this site’s perceived quality and ease of use).

1.2 Qualitative Vector Optimization

Let us suppose that there are two independent variables X_1 , X_2 and two objective functions Q_1 , Q_2 . There is a vector F of constraints represented

by a set of equationless relations among (some or all) of the variables X_1, X_2, Q_1, Q_2 :

$$F(X_p, X_q, Q_r, Q_s) = 0 \quad (4)$$

Such a set of constraints (4) constitutes the qualitative model of the problem at hand. A given model can have any number of independent variables and objective functions. A concrete example of a qualitative model (i.e. a set of constraints) describing the problem of online trust is given in (6) in section 2.2. Another very simple example of a constraint is given in (5) in this section. The constraint (5) consists of a single relation (namely the negative qualitative proportionality) between two variables, X and Y.

This very simple model (5) will be used to illustrate how the constraints are employed to differentiate solutions of a problem that are consistent and solutions that are inconsistent with a model of a problem. In simple words we can say that solutions consistent with the model can happen, while inconsistent solutions can not take place in reality (as far as the knowledge used to construct the model is valid, of course). A given model (i.e. the set of constraints) can be based on empirical observation, on previously published results or on expert opinions.

The present qualitative algorithm is based on systematic confrontation of all possible triplets for each variable and the model itself. Scenarios (solutions) consistent with the model (i.e. with the set of constraints) are selected, while inconsistent scenarios are rejected. This type of solution is called brutal force in artificial intelligence.

We have now described, in general terms, how a qualitative model is solved. To recapitulate: the possible solutions (i.e. scenarios) are selected if they are consistent with a set of constraints formed by a set of qualitative relations between variables (such as (5) and (6) below). In the following paragraphs, we describe the process of solving a qualitative model in more detail. Readers interested mainly in the application of qualitative modeling to online trust can now skip directly to section 2.

As we already understand on the conceptual level, scenarios selection can be seen as a consistency problem. At the beginning of the process of model development we usually have just a set of variables. Even at this initial stage it is possible to calculate solutions for the qualitative model. But it would not have any

practical value, because we would obtain all "imaginable" scenarios, i.e. all combinations of qualitative values for each triplet.

Recall that in a scenario each variable is represented by a qualitative triplet (X, DX, DDX) – see section 1.1. In the present model of online trust we have 13 variables (see section 2.1), hence 13 triplets in each scenario. Each value (X, DX and DDX) in the triplet can be either +, -, or 0. So, at this initial stage, there are $3^3 = 27$ possible combinations for each triplet. Since we have 13 such triplets (one for each variable) in each scenario, there are 27^{13} possible combinations of +, -, and 0, where each combination represents one "imaginable" scenario.

This vast number of 27^{13} scenarios needs to be reduced to obtain a practical solution. This is done by including new knowledge in the model.

Before we show how the number of scenarios is reduced for the online trust model (see Tab. 3 in section 2.3), we will outline the basic principle of how inconsistent scenarios are discarded from the model with the inclusion of knowledge items.

Consider the following simple example. The interrelation

$$M_- \quad X \quad Y \quad (5)$$

states there is a negative relationship between variables X and Y. All scenarios that violate this relationship must be discarded from the model when this knowledge item is entered. If we had a model with just two variables (X and Y), the model solution *before* and *after* entering interrelation (5) would look as shown in Tab. 1.

The solution in Tab. 1 is intuitively comprehensible: we must simply exclude all scenarios that have other values of first derivatives (DX) than either "+" for X and "-" for Y or "-" for X and "+" for Y. To see this, let us say that X is increasing as a function of some variable Z (e.g. time). This means that the first qualitative derivative of X with respect to Z is positive. If during the same change in Z (e.g. time) Y also increased, i.e. $DY = +$ (with respect to Z), this would mean that X and Y moved in the same direction (both increased as a function of Z). This is represented by scenario 1 in Tab. 1. However, such a development is not possible given constraint (5) which requires a *negative* proportionality between X and Y, i.e. when X goes up, Y must go down and vice

Tab. 1: Scenarios before and after entering an interrelation

Model before entering interrelation (5)			Model after entering interrelation (5)		
Scenario	Variables		Scenario	Variables	
	X	Y		X	Y
1	++*	++*			
2	+-*	+-*			
3	+0*	+0*			
4	++*	+0*			
5	+-*	++*	5	+-*	++*
6	+0*	+-*			
7	++*	+-*	7	++*	+-*
8	+-*	+0*			
9	+0*	++*			

Note: All variables are assumed to be positive. For simplicity, second derivatives are not considered in this example, thus the second derivative (DDX) is denoted by * in all triplets (* can mean either +, - or 0).

Source: own

versa. Consequently, only scenarios 5 and 7 in Tab. 1 are consistent with constraint (5).

In contrast, scenarios 1 and 2 (in Tab. 1) would be consistent with a constraint stipulating a positive proportionality between the variables. Scenarios 4, 6, 8 and 9 indicate there is no relation between the variables (when one variable changes in either direction, there is no change in the remaining variable). Scenario 3 describes a situation where there are no changes in either variable, thus it cannot be shown that there actually is a positive relation between X and Y as required by (5). Scenario 3 is therefore also discarded from the set of solutions consistent with constraint (5).

2. Results and Discussion

2.1 Model Variables

OT can be characterized by the following set of 13 variables, 11 independent variables and two objective functions:

Objective functions:

- TRU Level of trust towards an online site/company
- RIS Perceived risk of interaction with the site/company (Hoffman et al., 1999; Yoon, 2002; Lacohee et al., 2006; Kim et al., 2008)

Independent variables:

- FAM Familiarity with the site/company (Gefen, 2000; Gefen & Straub, 2004)
- MAR Level of the online company's market orientation, e.g. services customization (Srinivasan et al., 2002; Corbitt et al., 2003; Koehn, 2003)
- SIT Perceived website quality and ease of use (McKnight & Chervany, 2001; Grabner-Kraeuter, 2002; Liao et al., 2006; Chau et al., 2007; Kim et al., 2008, 2012)
- SOC Social presence embedded in the web site (Gefen & Straub, 2004; Cyr et al., 2007; Hassanein & Head, 2007)
- BEN Perceived benevolence of the online company (McKnight et al., 2002; Gefen & Straub, 2004)
- REP Site's/company's positive reputation (McKnight & Chervany, 2001; Casalo et al., 2008; Kim et al., 2008)
- WOM Level of positive of word of mouth (Grabner-Kraeuter, 2002; Corbitt et al., 2003; Lacohee et al., 2006)
- PAR Site's/company's partnership with well known partners (Corbitt et al., 2003; Zhang, 2004; Kim et al., 2008; Hong & Cho, 2011)
- EXP User's web experience (McKnight et al., 2002; Corbitt et al., 2003; Lacohee et al., 2006; Metzger, 2006; Li et al., 2009)

PRE	Number of the user's previous positive experiences with online interaction (Gefen & Straub, 2004; Flavian et al., 2006; Casalo et al., 2008)	27	M_-	BEN	RIS
		28	24	REP	RIS
		29	24	PAR	RIS
		30	24	EXP	RIS
TEC	Perceived technological trustworthiness of the site/company (Grabner-Kraeuter, 2002; Corbitt et al., 2003; Lacohee et al., 2006)	31	M_-	PRE	RIS
		32	24	TEC	RIS

(6)

2.2 Model Instructions

The following set (6) of pair-wise qualitative relations is used to formalize relations among the set of variables from section 2.1. The set of interrelations is inspired by many dialogues with a team of experts and a group of internet users and by studies quoted above in section 2.1. The experts were MBA students at Brno University of Technology with substantial experience in online trade and/or marketing. The internet users were selected pre-graduate students at Brno University of Technology. The qualitative model is represented by the following set of relations (see Fig. 1):

No.	Shape	X	Y (see Fig. 1)
1	23	WOM	FAM
2	M_-+ (see (2))	SIT	MAR
3	M_-+	REP	MAR
4	21	WOM	MAR
5	21	WOM	SIT
6	21	TEC	SIT
7	21	BEN	SOC
8	M_-+	REP	BEN
9	M_-+	WOM	BEN
10	23	PAR	BEN
11	23	PRE	BEN
12	M_-+	TEC	BEN
13	23	WOM	REP
14	M_-+	TEC	REP
15	M_-+	TEC	EXP
16	26	RIS	TRU
17	23	FAM	TRU
18	23	MAR	TRU
19	23	SIT	TRU
20	23	SOC	TRU
21	23	BEN	TRU
22	23	REP	TRU
23	23	PAR	TRU
24	M_-+	PRE	TRU
25	24	FAM	RIS
26	24	SIT	RIS

2.3 Model Results – Scenarios

The set of 23 scenarios – see Tab. 2 – is generated using software employed in Vicha and Dohnal (2008a; 2008b). The software was programmed by a group around the second author. As far as we know, there are currently no widespread commercial softwares for analyzing qualitative problems and different research groups often use their own softwares. However, analytical tools for qualitative computations can be programmed for example in MATLAB.

Different qualitative problems related to online trust can be easily solved using the set of scenarios in Tab. 2 which represent a complete description of all possible behaviors within the modeled system (constrained by relations given in (6)).

All variables in Tab. 2 are positive because of their very nature. Therefore the first values in all triplets (in Tab. 2) are always equal to +. For example scenario 12 is a steady state situation: all first and second derivatives are zeros. Therefore nothing is happening, there are no changes in time.

Scenarios 1–10 indicate e.g. that level of trust towards the company (TRU) increases as a function of time and perceived risk of interaction with the site/company (RIS) decreases as a function of time, while the rest of the variables go up. Scenarios 14–23 give the opposite. That means all independent variables in the present model are positively linked to TRU and negatively linked to RIS (this is not surprising, e.g. in Kim and Park (2013) six out of seven independent variables were positively related to online trust). There are, however, some differences in the precise character of the increase/decline of the variables with respect to the second derivatives. For example in scenario 1 all variables increase (or in the case of RIS decrease) more and more quickly (all triplets are equal to +++ and +--, respectively), whereas in scenario 10 all variables increase (or in the case of RIS decrease) with a decreasing rapidity (all triplets are equal to +-+ and +++, respectively).

Tab. 2: Online trust scenarios

Scenario	Variables (see section 2.1)												
	TRU	RIS	FAM	MAR	SIT	SOC	BEN	REP	WOM	PAR	EXP	PRE	TEC
1	+++	+--	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
2	++-	+++	++-	++-	++-	+++	++-	++-	++-	+++	++-	++-	++-
3	++-	+++	++-	++-	++-	+++	++-	++-	++-	++0	++-	++-	++-
4	++-	+++	++-	++-	++-	+++	++-	++-	++-	++-	++-	++-	++-
5	++-	+++	++-	++-	++-	++0	++-	++-	++-	+++	++-	++-	++-
6	++-	+++	++-	++-	++-	++0	++-	++-	++-	++0	++-	++-	++-
7	++-	+++	++-	++-	++-	++0	++-	++-	++-	++-	++-	++-	++-
8	++-	+++	++-	++-	++-	++-	++-	++-	++-	+++	++-	++-	++-
9	++-	+++	++-	++-	++-	++-	++-	++-	++-	++0	++-	++-	++-
10	++-	+++	++-	++-	++-	++-	++-	++-	++-	++-	++-	++-	++-
11	+0+	+0-	+0+	+0+	+0+	+0+	+0+	+0+	+0+	+0+	+0+	+0+	+0+
12	+00	+00	+00	+00	+00	+00	+00	+00	+00	+00	+00	+00	+00
13	+0-	+0+	+0-	+0-	+0-	+0-	+0-	+0-	+0-	+0-	+0-	+0-	+0-
14	+++	++-	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
15	++-	+++	++-	++-	++-	+++	++-	++-	++-	+++	++-	++-	++-
16	++-	+++	++-	++-	++-	+++	++-	++-	++-	+0	++-	++-	++-
17	++-	+++	++-	++-	++-	+++	++-	++-	++-	++-	++-	++-	++-
18	++-	+++	++-	++-	++-	+0	++-	++-	++-	+++	++-	++-	++-
19	++-	+++	++-	++-	++-	+0	++-	++-	++-	+0	++-	++-	++-
20	++-	+++	++-	++-	++-	+0	++-	++-	++-	++-	++-	++-	++-
21	++-	+++	++-	++-	++-	++-	++-	++-	++-	+++	++-	++-	++-
22	++-	+++	++-	++-	++-	++-	++-	++-	++-	+0	++-	++-	++-
23	++-	+++	++-	++-	++-	++-	++-	++-	++-	++-	++-	++-	++-

Source: Authors

The nature of one of the objective functions (TRU) requires maximization, whereas the other objective function (RIS) requires minimization, hence, there are 10 relatively favorable scenarios, i.e. scenarios 1–10, and 10 relatively undesirable ones, scenarios 14–23.

Let us for example suppose that an online company is uncertain about the effect an increase in the variable “social presence embedded in the web site” (SOC) will have on “perceived risk of interaction with the site/company” (RIS). Having a look at scenarios 1–10 (and columns RIS and SOC) in Tab. 2 would tell the company managers that the effect ought to be positive. Also, it seems that the effect would be almost always the same (with the exception of

scenario 1) irrespective of the speed with which the changes in SOC are implemented.

We need to keep in mind, though, that FQMs are information non-intensive. This implies that they usually capture only the most robust aspects of the described systems. This is the case especially when the solutions are narrowed down to just a few scenarios (i.e. when the amount of available qualitative knowledge is large, see Tab. 3 and text below). More information intensive methods (e.g. fuzzy mathematical methods or statistics) can be subsequently used to gain additional insights into the studied systems/problems. However, this is not always an option in high-speed environments, for example because collection of quantitative data takes time.

We can say that the present model is well specified by interrelations given in (6), which causes it to be quite restrictive, i.e. there is little variability in the scenarios obtained. If less input knowledge (such as (6)) was available, the model would be less well specified and consequently less restrictive, and more variability would be encountered in the scenarios obtained (e.g. certain variables would be linked to certain other variables positively in a given subset of scenarios and negatively in another subset).

Relying on a restrictive model has a potential disadvantage in that certain subtle relations or differences may be disregarded in the model in order to obtain the set of the most robust or most typical scenarios (e.g. in the present model we ignore the possibility that the relation between SIT and TRU might be partially culture-sensitive, see Park et al., 2012). On the other hand, it is also possible to develop an ad hoc qualitative model "typical" for an unusual situation/system.

Table 3 displays the number of online trust scenarios obtained using the basic principle of consistency outlined in section 1.2. The columns "Interrelations entered" give the range

of interrelations entered (i.e. 1–3 means that interrelations 1, 2 and 3 from (6) have been entered into the model).

Using the principle of consistency, the vast number of "imaginable" scenarios (27¹³) has been rapidly reduced by entering available pieces of knowledge.

As is apparent from Tab. 3 the solutions of qualitative models become interpretable after including about 25 pair-wise interrelations between variables. This statement is true for models with about the same number of variables we have in our model of online trust. More (less) knowledge items need to be entered if the model features more (less) variables.

It can also be observed that entering certain interrelations (e.g. interrelations number 5, 13, 14, 18, 26 – see Tab. 3) does not reduce the number of scenarios obtained. The reason is that the respective set of scenarios before the particular interrelation was entered had already been consistent with that interrelation.

FQM development is a multi-step process, and the present model can be modified/ upgraded to address specific practical and

Tab. 3: Number of scenarios dependent on the pair-wise relations entered in the model

Interrelations entered	Number of scenarios	Interrelations entered	Number of scenarios
None	27 ¹³	1-16	819
All variables positive*	9 ¹³	1-17	187
1	407953774917	1-18	187
1-2	45328197213	1-19	187
1-3	5036466357	1-20	187
1-4	731794257	1-21	187
1-5	731794257	1-22	187
1-6	176969853	1-23	187
1-7	28402569	1-24	59
1-8	2421009	1-25	23
1-9	1594323	1-26	23
1-10	255879	1-27	23
1-11	54675	1-28	23
1-12	45927	1-29	23
1-13	45927	1-30	23
1-14	45927	1-31	23
1-15	5103	1-32	23

Note: * We assume that all variables are positive later on (in this table) as well.

Source: own

theoretical needs. Also, it is possible to calculate all possible transitions between the qualitative scenarios (Režňáková et al., 2012). The possibility to update qualitative models quickly and easily based on an inflow of new qualitative information can be an advantage in turbulent environments such as electronic retail markets or the computer and mobile phones industries.

The obvious limitation of FQM is that qualitative reasoning can answer qualitative queries only, not quantitative ones, and thus can serve just as a complement to the existing quantitative methods (and/or as a rigorous formalization of qualitative methods, such as case studies). However, inclusion of mathematical equations into qualitative models is possible (Vícha & Dohnal, 2008a; 2008b).

FQMs can enrich the methodological instrumentarium used in the study of OT (e.g. Grabner-Krauter & Kaluscha (2003) advocate the use of a broad spectrum of research tools). The main advantages of FQMs are:

- No numerical values of constants and parameters are needed (i.e. information non-intensive).
- The set of possible solutions (scenarios) is complete, i.e. there cannot be any other qualitative scenarios that are not generated by the qualitative model.
- FQMs are flexible, diverse variables can be included.
- They are inexpensive and readily understandable by practitioners.

Conclusion

Qualitative approach has much to offer when highly complex and/or partially vague problems such as OT are examined. In the present study of OT determinants a formal tool for dealing with data of non-numerical nature was employed to generate a FQM consisting of 23 possible scenarios. The model obtained is definitely not the only possible alternative. Many modifications, upgrades and extensions are possible. The paper presents just methodology and a simple model as a demonstration. Also, this is the first paper where one of the principal aspects of the present qualitative algorithm, namely selection of a consistent set of scenarios, is treated explicitly and in detail.

FQMs can complement established tools for OT analysis with very little additional cost. This might be profitable especially under information

shortage, measurement difficulties, time pressure to make decisions and/or uncertainty, or when several novel, subjective and/or difficult to measure (e.g. qualitative only) variables are considered when dealing with online trust in the e-commerce context.

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Abstract

FORMALIZED QUALITATIVE MODELING OF ONLINE TRUST: INTRODUCTION OF THE METHOD AND A DETAILED EXAMPLE**Štěpán Veselý, Mirko Dohnal**

The paper presents a simple qualitative model of online trust in the context of e-commerce. Qualitative models use just three values: Positive/Increasing, Zero/Constant and Negative/Decreasing. Such quantifiers of trends are the least information intensive. Qualitative models can be useful, since models of online trust include such variables as e.g. Perceived website quality and ease of use (SIT) or Company's positive reputation (REP) that are sometimes difficult or costly to quantify. Hence, a significant fraction of available information about online trust is not of numerical nature, e.g. if SIT is decreasing then online trust is decreasing as well. Such equationless relations are studied in this paper. The model has 13 variables and 32 pair-wise interrelations among them. The set of variables and interrelations was established based on discussions with experts and internet users. The model is solved and 23 solutions, i.e. scenarios are obtained (thus, we reduce a vast set of all "imaginable" scenarios concerning online trust to a manageable list of scenarios). All qualitative states, and the first and second qualitative derivatives of all variables are specified for each scenario. Many modifications, upgrades and extensions of the present model are easy within the methodological framework introduced in the paper. Qualitative modeling can be seen as one of the uncertainty calculi, such as fuzzy sets and rough sets, that can be helpful e.g. under information shortage (for example when new website is about to be launched and/or when novel, subjective or difficult to measure variables are considered). The paper is self-contained and no a priori knowledge of qualitative modeling is required on the reader's part.

Key Words: *Trust, online, e-commerce, internet, qualitative model, multidimensional, formalized, methodology.*

JEL Classification: C65, D80, L81, M31.

DOI: 10.15240/tul/001/2016-2-014

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